ESSAYS ON BUSINESS CYCLES AND THE CAUSES AND CONSEQUENCES OF PROCYCLICAL POLICIES

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Economics

September 2017

Abstract

The conventional wisdom regarding the cyclical behavior of macroeconomic policy is that both fiscal and monetary policies are countercyclical or acyclical in most advanced economies, but procyclical in many emerging and developing countries. Procyclical policies are conducted by fiscal authorities cutting (raising) budget deficits and by the monetary authorities raising (cutting) interest rates during recessions (booms). Such policies are deemed sub-optimal since they will tend to reinforce the cyclical fluctuations, aggravating the busts and exacerbating the booms. These characteristics have sparked a debate on how to achieve policy discipline to boost macroeconomic performance. Motivated by this debate, the main purpose of this thesis is to evaluate the core determinants of procyclical policies and to assess their consequences on macroeconomic performance.

In Chapter 2, by using data from 137 countries for 1970-2014, we show that fiscal procyclicality has become the norm rather than the exception in many countries. More specifically, over the last 45 years, a substantial number of emerging and low-income developing countries are trapped within procyclical policy, in the sense of not being able to move from procyclical to countercyclical fiscal policy. We also show that even after controlling for the endogeneity of "*government quality*" and other determinants of procyclicality, there is a causal relation running from better "*government quality*" to more countercyclical or less procyclical policy.

We then focus on the cyclical properties of monetary policy in Chapter 3. We find that many countries, specifically emerging and low-income developing countries have also faced challenges in implementing countercyclical monetary policies. We document that over the last 55 years, a large number of countries consistently followed procyclical monetary policy or have recently turned procyclical. We then aim to address the question, why this has been the case. We show that procyclical stop-and-go policies are intensified in the presence of "*fear of free floating*", that is, monetary authorities' reluctance to avoid large swings in the exchange rates. We also find that our results are robust to the endogeneity of "*fear of free floating*" and other determinants of procyclical monetary policy.

In Chapter 4, we explore whether procyclical macroeconomic policy stances – being contractionary in bad times and expansionary in good times – have consequences for the rest of the economy. We provide empirical evidence that observed procyclical fiscal and monetary policy have significant macroeconomic costs; procyclical countries have lower rates of economic growth, higher rates of output volatility and inflation volatility.

In Chapter 2 and 3, we also show that over the last decades some emerging countries have been able to escape the procyclicality trap and become countercyclical. During the global financial crisis 2008-09, these countries pursued countercyclical macroeconomic policy to counter the sharp drop in economic activity. However, our cross-country evidence in Chapter 5 provides little evidence for a central role of countercyclical policy to cushion against the global financial shock. We find that pre-crisis level of short-term external debt and collapse in export demand were the key factors determining the intensity of 2008-09 crisis.

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Acknowledgements

Firstly, I would like to express my sincere gratitude to my supervisor Prof. Gulcin Ozkan for the continuous support of my Ph.D study, for her valuable comments, guidance, patience, and immense knowledge. Her constant guidance assisted me during the last four years to conduct my research and writing of this thesis.

Beside my supervisor, I would like to thank my thesis advisory panel members Prof. Peter N. Smith and Dr. Andrew Pickering for their insightful comments.

I would like to acknowledge the funding support provided by the University of York and The Department of Economics and Related Studies.

Last but not the least, I would like to thank my father Gias Uddin Ahmad and my mother Shamsun Nahar Begum for their unconditional assistance, motivation and guidance.

Author's Declaration

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References.

Chapter 1

Introduction

Understanding business cycles and their associations with macroeconomic policies remain primary challenges for economists. The traditional Keynesian models of the business cycle calls for a countercyclical policy that is contractionary during the period of economic acceleration and expansionary during the time of recession to stabilise output fluctuations. There is by now, a large and growing literature that analyse the cyclical properties of macroeconomic policy. The conventional wisdom that emerges from literature is that macroeconomic policies – both fiscal and monetary are countercyclical or acyclical in most advanced economies and *vice versa* in developing countries. For example, fiscal and monetary policies are predominantly procyclical in Latin America and other emerging and developing countries[1]. Procyclical policies take the form of fiscal authorities increasing taxes and reducing government spending, and monetary authorities increasing interest rates during downturns and the opposite during booms. This feature of policy deprive emerging and developing countries of important macroeconomic stabilisation tools and amplify fluctuations in the business cycle.

Why would emerging and developing countries pursue procyclical policies that might aggravate the business cycle? There are three explanations in the existing literature. The first is a financial markets related argument suggesting that emerging and developing countries' ability to adopt countercyclical policies are severely hampered by creditworthiness/sustainability in the world capital markets, lack of financial integration and shallow domestic financial systems. According to this hypothesis, these countries have limited access to international credit markets and they may not be able to borrow in an economic downturn or can do so only at high-interest rates, or maybe even forced to pay back during the recession, leading to contractionary macroeconomic policies (see, for example, Gavin and Perotti, 1997). This situation mainly arises from the shallow nature of domestic credit markets hence dependence

[1] On the monetary policy procyclical evidence, see, for example, Kaminsky *et al*. (2004); Calderón *et al.* (2004a&b); Yakhin (2008); Takats (2012); McGettigan *et al.* (2013); Vegh and Vuletin (2012); and Duncan (2014). On the fiscal policy procyclical evidence, see, for example, Gavin and Perotti (1997); Lane (2003); Kaminsky *et al.* (2004); Talvi and Végh (2005); Ilzetzki and Végh (2008); Woo (2009); Halland and Bleaney (2011); Frankel *et al.* (2013) and McManus and Ozkan (2015).

on external sources and periodic occurrences of capital flow reversals in these countries. Indeed, "*sudden stops*" in capital flows to emerging markets are regularly observed with the resulting collapse of investment, sharp real depreciations of the domestic currency, and sharp fiscal stagnation (see, for example, Calvo and Reinhart, 2000). The slowdown in economic growth exacerbates fiscal solvency, which in turn, calls for additional contractionary policy. The macroeconomic policy cycle and the capital flow cycle thus tend to reinforce each other, or, as Kaminsky *et al.,* (2004) put it, "*when it rains, it pours*" in these economies. This suggests that access to the international credit market is limited during bad times and the need for fiscal adjustment is greater. In sum, procyclical capital flows reinforce procyclical macroeconomic policies.

The second source of procyclicality in emerging and developing countries is traced to political-economy constraints, political distortion, and absence of strong political and legal institutions. The explanation is related to the notion that good times encourage the corrupt government's rent-extracting activities. Voters do not prefer entrusting fiscal surplus to the "*less-than-benevolent*" government (see, for example, Alesina and Tabellini, 2005). As a result, fiscal resources will be wasted by the rent-seeking groups, rather than being saved for rainy days. As a consequence, voters push fiscal authorities to achieve excessive public spending during booms, as far as possible to "*get their share of the cake*". The interaction between voters' asymmetric information and political agency problem leads to lower taxes or higher public expenditure during expansions. This public pressure forces the fiscal authorities into procyclical policies, whenever rent-seeking motivations and imperfect information are sufficiently strong.

A third explanation of procyclicality of fiscal policy relates to political economy factors the first of which is linked to the underlying power dispersion in the economy. Tornell and Lane (1999) develop a political economy model in which they analyse fiscal policy formulation in an environment where power blocs of interest interplay in an economy with weak political infrastructure. They argue that the intensity of fiscal spending increases during upturns. For example, in the event of a temporary improvement in output, fiscal expenditure can increase more than proportionally, or they put it "*voracity effect*", relating output volatility to power dispersion. The competition among the power blocs for the same share of tax revenue leads to a more than proportionate reallocation effects when output increase (i.e., *common pool* problem). The presence of

"*common pool*" problem creates procyclicality because, when the economy is performing well, no group will be eager to give up their share of claims on the revenue. Hence, the government would permit individual groups to increase their appropriation demand by a greater amount and overspend rather than save the windfall of revenue in the form of a budget surplus.

Another political economy factor underlying fiscal procyclical is linked to the political polarisation of preferences associated with social income inequality. Woo (2009) proposes that lack of equality across social groups makes voters hostile and weaken the support for the incumbent. Similarly, a high degree of social inequality may make it hard for policymakers who represent diverse socioeconomic groups to agree upon ideal policies. In the presence of such varying preferences, heterogeneous policymakers may have greater incentives to reduce social inequality. Policymakers prefer to conduct expansionary fiscal policy during good times to reduce inequality. Thus fiscal policy becomes procyclical at the presence of "*polarised preferences*".

In contrast to the substantial literature on fiscal cyclicality, there is very little in the existing literature on the puzzling behaviour of procyclical monetary policy in emerging countries. Two main issues highlighted in the literature are, first, the presence of substantial foreign currency denominated debt or "*liability dollarisation*" and second, credit market worthiness (or the quality of the balance sheet) (see, for example, Calvo, 1999 and Lane, 2003). Calvo and Reinhart (2002, p.2) and Kaminsky *et al.,* (2004) argue that emerging countries do not adopt countercyclical stabilisation policies because when the economy contracts, it experiences capital outflows. Rapid capital outflows trigger currency depreciation, which turns sudden reversals of capital inflows during crises episodes, referred to as "*sudden stop*" phenomenon (see, for example, Calvo and Reinhart, 2000). Monetary authorities are then forced to raise interest rates to compensate for the effect on the exchange rate, instead of leaving the currency to float freely, or, as Calvo and Reinhart (2002) put it, "*fear of free floating*". During crises episodes, the fear becomes severe, when the currency depreciates rapidly, and balance sheet effect (i.e., fear of bankruptcy of domestic firms indebted in foreign currency) plunge the economy into deeper crisis by encouraging further capital outflows. As a result, the need to raise interest rates to defend domestic currency would prevent financially fragile economies to conduct countercyclical monetary policy.

In summary, it is largely agreed that emerging and developing countries pursue procyclical policy due to weak institutions, political-economy concerns, foreign currency denominated liabilities, shallow domestic financial systems, time-varying external credit constraints, weak exchange rate and the risk of full-blown crises. However, procyclical policies are deemed sub-optimal since they will tend to reinforce the cyclical fluctuations, aggravating the busts and exacerbating the booms. Economists suggest that such policies should be avoided and might partially explain the higher volatility of inflation and output in these countries (see, for example, Lane, 2003). These characteristics have sparked a debate on how to achieve policy discipline to boost macroeconomic performance. Motivated by this debate, the main purpose of this thesis is to evaluate the core determinants of procyclical policies – both fiscal and monetary policy and to assess the consequences of procyclical policies on macroeconomic performance. We also examine the effectiveness of macroeconomic policy response during the global financial crisis to cushion against the crisis shocks. Below we will briefly discuss each Chapters' empirical methods, findings and our contributions.

In Chapter 2, we attempt to both provide empirical evidence on the cyclical properties of fiscal policy and second to uncover the potential reasons for this cyclical stance of fiscal policy. The first mandatory step in any such investigation is to determine the cyclical behaviour of fiscal policy. The simplest measure of fiscal cyclicality is the correlation between the cyclical components of fiscal instruments and output that are filtered by Hodrick-Prescott method. Other studies have adopted time series regression approach where cyclical components of the fiscal indicator are regressed on cyclical components of output and the estimated coefficient is considered to be the measure of cyclical properties of fiscal policy. Based on such methods, the literature reveals that most of the developing countries tend to pursue procyclical policy. The empirical studies implicitly assume that the causality runs from business cycle fluctuation to fiscal policy (see, for example, Rigobon, 2004).

In Chapter 2, we address the reverse causality issue by following instrumental variable techniques to explore the time-series cyclical properties of fiscal policy for a large sample of 137 countries (30 advanced, 59 emerging and 48 low-income developing countries). Along with the instrumental variable techniques, we also consider two conventional methods from the earlier studies for an alternative

measurement of fiscal cyclicality and provide a systematic account of how the choice of alternative methods affect fiscal cyclicality. It is also important to note that most empirical studies examine the cyclical properties of fiscal policy by utilising panel data approach (see, for example, Calderón and Schmidt-Hebbel, 2008 and others) that has not fully exploited the time-series properties of individual country data.

Our empirical analysis in Chapter 2 suggests that majority of the advanced economies follow countercyclical fiscal policy, while most of the emerging and low-income developing countries' fiscal policy is profoundly procyclical. We also investigate how the cyclical behaviour has changed over the last 45 years for our sample countries. We find that more than 55% of our sample countries have been trapped within the procyclical fiscal policy cycle, in the sense of not being able to move from procyclical to countercyclical fiscal policy. We refer to this group of countries as "*procyclicality trap*" countries. Not surprisingly, the majority of the emerging and low-income developing countries fall under this category.

Chapter 2 then asks a critical question, more precisely for "*procyclicality trap*" countries, why do these group of countries run procyclical fiscal policy and why have they remained in the trap over the last 45 years? Most common answer from the literature is that these countries have less creditworthiness; having limited access to international credit market to borrow during bad times, which prevents them from enacting expansionary policies in downturns (see, for example, Gavin and Perotti, 1997 and Kaminsky *et al.,* 2004). We argue that this explanation begs two critical questions. First, why do these countries fail to self-insure themselves by accumulating reserves during booms? Second, why would foreign capital markets not provide loans, even in bad times, if they were assured that the borrowing would help the country to recover from the crisis and eventually pay back their debt?

To answer both of the questions, we rely on political economy arguments by incorporating "*government quality*" for these group of countries. To this effect, we construct a composite index of "*government quality*" for each individual country by combining three measures from novel sources: political corruption (proxy for the rent-seeking behaviour), release of macroeconomic information by the government (proxy for the information transparency) and egalitarian democracy index (proxy for the social inequality). We find that our constructed "*government quality*" index is

positively and significantly correlated (around 0.80) with credit ratings, indicating that low government quality reduces creditworthiness. Thus countries with low government quality face greater borrowing constraints in conducting countercyclical policy. We also find that "*procyclicality trap*" countries have consistently lower government quality compared to other countries.

The above findings suggest that government quality is one of the major determinants of procyclical fiscal policy. One of our novel contributions in Chapter 2 is in the quantitative analysis. Relying on a comprehensive set of data for 137 countries, our cross-country and panel analysis document that government quality is strongly negatively associated with the degree of fiscal procyclicality, underlying a strong link running from better government to a less procyclical stance. We propose that better government quality is required to shift from the "*procyclicality trap*" to countercyclical policy. Our results are robust to additional explanatory variables, potential endogeneity, alternative specification and outlier's sensitivity.

Although substantial work is carried out on the potential determinants of procyclical fiscal policy, little empirical attention has been devoted to cyclical properties of monetary policy. In particular, there is very little work on the potential reasons for procyclical monetary policy. To address this issue, in Chapter 3, we empirically investigate the cyclical behaviour of monetary policy to explore why some countries exhibit procyclical monetary policy. Two interrelated objectives underlie our analysis in Chapter 3. First, we empirically investigate the cyclical properties of monetary policy, and second we examine the potential determinants of these cyclical properties. The simplest measure of monetary policy cyclicality is the correlation between the cyclical components of monetary policy instruments and output that are filtered by Hodrick-Prescott method. In Chapter 3 in addition to the correlation approach, we attempt to estimate monetary policy stances by utilising the Taylor rule for each country for which data are available.

Our empirical analysis of the monetary cyclicality of 100 countries (29 advanced, 46 emerging and 25 low-income developing countries) over the period 1960-2014 in Chapter 3 suggests that procyclical monetary policy is widely observed across the emerging and developing countries. More specifically, these countries raise interest rate in bad times and reduce it during good times. On the contrary, we find that

majority of the advanced economies consistently follow countercyclical monetary policy. We also investigate how the cyclical behaviour has changed over the past decades for our sample countries. We document that over the last 55 years, a substantial number (19% of the sample) of emerging and low-income developing countries are trapped in a procyclical monetary policy cycle (in the sense of not being able to move from procyclical to countercyclical policy) or have recently turned procyclical (8.24% of the sample) who used to conduct countercyclical policy.

The second objective in Chapter 3 is related to the question of why these group of countries are implementing procyclical monetary policies. Most common answer from Kaminsky *et al.,* (2004) is that capital inflows to developing countries are procyclical – that is, they tend to borrow in good times and repay in bad times due to their diminished creditworthiness in bad times. This procyclical access to international capital market reinforces monetary policy procyclicality. In this proposition, during downturns countries have experienced sharp depreciations (typically characterised by significant capital outflows) as they are cut off from the international credit markets (i.e., "*sudden stop*" phenomena proposed by Calvo and Reinhart, 2002). This would force the monetary authorities to raise the interest rates to defend the domestic currency, when the required change in interest rate is in the opposite direction. The fear is that a rapid currency depreciation would plunge the economy into deeper recession by stirring further capital outflows and leading to bankruptcy (i.e., balance sheet crisis) of domestic firms indebted in foreign currency (i.e., liability dollarisation). As a result, the need to raise short-term interest rates to prevent currency devaluation may preclude monetary authority to conduct countercyclical policy.

We take the above theoretical predictions to the data, which is one of our novel contributions in Chapter 3. We follow Calvo and Reinhart (2002) method to construct an indicator for "*fear of free floating*" for our sample countries. Our empirical findings document that procyclical stop-and-go policies are intensified in the presence of "*fear of free floating*", that is, reluctance to avoid large swings in the exchange rates. Our results are robust to additional explanatory variables, tests of possible endogeneity and alternative specifications.

In Chapter 4 we ask a critical question; does it matter whether a country adopts procyclical policy rather than a countercyclical one? Standard Keynesian theory

advocates that macroeconomic policies should act as a stabilisation tool. A country should pursue countercyclical policy – both fiscal and monetary policy to stabilise the business cycle. A countercyclical fiscal and monetary policy stance with policy actions against the cycle is expected to act as a stabilisation tool to keep the output movements on a non-fluctuating path. On the contrary, procyclical policies reinforce cyclical fluctuations, aggravating the busts and exacerbating the booms. This feature of fiscal and monetary policy deprived emerging and developing countries of important macroeconomic stabilisation tools and might partially explain the higher volatility of inflation and output in these countries (see, for example, Aguiar and Gopinath, 2007).

The procyclical policy is typically presumed to be harmful to economic growth. It is surprising that in contrast to the wealth of the literature on the sources of procyclical policy, the potential cost of such sub-optimal policies – both fiscal and monetary policies have been largely ignored in the existing literature. A small number of exceptions includes, McManus and Ozkan (2015) who find that procyclical countries have lower rates of economic growth, higher rates of inflation and a higher rate of output volatility. However, to the best of our knowledge, there has been no attempt, to examine the cost of procyclical monetary policy on macroeconomic performances. Chapter 4 complement and improve some of the previous evidence in the following dimensions. First, we use a larger sample that incorporates not only the advanced countries but also a wider sample of emerging and low-income developing countries in analysing the cyclicality of monetary policies. Second, we examine not only the consequences of fiscal procyclicality but also the potential cost of pursuing procyclical monetary policy.

Our cross-country evidence in Chapter 4 suggests that procyclical (countercyclical) countries have lower (higher) rates of economic growth, higher (lower) rates of output volatility and inflation volatility. We check the robustness of our findings by using GMM method to control for the potential endogeneity of procyclical policy with that macroeconomic outcomes. We find that our results are robust to additional explanatory variables and outlier's sensitivity.

In Chapter 2 and 3, we also show that over the last decades a good number of emerging countries have been able to escape the procyclicality trap and become countercyclical. During the global financial crisis 2008-09, many emerging economies pursued

countercyclical policy to cushion against the global financial shock (see, for example, Blanchard *et al.,* 2010). This is a remarkable departure from the earlier crisis episodes during which emerging countries had to cut government spending due to less creditworthiness and had to increase interest rates to defend the value of the domestic currency to maintain capital inflow. However, in Chapter 5, we find little evidence for a central role of countercyclical policy to cushion against the global financial shock and trade collapse.

Our empirical work in Chapter 5 suggests that pre-crisis level of short-term external debt and collapse in the export demand played a key role in the intensity of the crisis. The standard explanation of the transmission of the global crisis highlights the role played by the global financial and trade linkages. The original shock originated in the financial system of the United States led to the interruption in the financial system of several emerging and advanced economies. In turn, the disruption in the global financial system steadily transferred to emerging countries' real economy, with the financial crisis along with a contraction in economic activity and significant decline in capital inflows and international trade in 2008-2009. The most affected emerging countries were those that had to rely on external capital inflows, large current account deficits and a sizable short-term debt denominated in foreign currency (see, for example, Lane and Milesi-Ferretti, 2011 and Ozkan and Unsal, 2017). Along with the financial shock, these countries had also experienced a sharp decline in their export on the eve of the crisis (see, for example, Berkmen *et al.,* 2009).

In Chapter 5, we also investigate the question of whether the cross-country severity of the crisis is systematically related to pre-crisis external debt and crisis time trade collapse. More specifically, we examine 38 emerging countries' external balance sheets (i.e., liability side) based on the maturity structure (i.e., long and short-term). Second, we analyse the role of pre-crisis level of gross external debt by the sectors (i.e., government, central bank, bank and non-bank private sector). Third, we also investigate the financial sectors' vulnerable position (i.e., external leverage position and foreign rollover risk) in the pre-crisis period. Fourth, we develop crisis time trading partners' export demand index to account for the trade collapse proposition.

Using cross-country data from 38 emerging countries, our analysis shows that reduced export demand had a positive impact on output losses during the crisis (2008-09) and

short-term external debt in 2007, specifically financial sectors' short-term external debt were important determinants in explaining the intensity of the crisis. Our analysis also suggests that countries with more leveraged domestic financial sectors, combined with foreign rollover risk tend to be inflicted by greater losses during the crisis. Surprisingly, we find little evidence for a central role of fiscal and monetary policy to cushion against the output loss in the crisis. Our results are robust to additional explanatory variables and outlier's sensitivity.

The rest of the thesis is organized as follows. Chapter 2 estimates cyclicality properties of fiscal policy and examines potential causes of procyclical fiscal policy. Chapter 3 repeats the same exercise for monetary policy by estimating the cyclical behaviour of monetary policy and examines potential determinants of procyclical monetary policy. Chapter 4 explores the potential costs of pursuing such procyclical policy. Chapter 5 examines the role of trade and external debt in the global financial crisis. Chapter 6 provides the conclusions, main economic policy recommendations, and a discussion on the agenda for future research. A further description of some of the methods implemented in this thesis, along with the variables and data descriptions and list of countries are provided in the appendices.

Chapter 2

Why are some countries in a fiscal procyclicality trap?

2.1 Introduction

How should fiscal policy be conducted to stabilise the economy over the business cycle? The traditional Keynesian model of the business cycle suggests that fiscal authorities should conduct countercyclical fiscal policy that is contractionary during the period of expansions and expansionary during downturns to stabilise output fluctuations[2]. At the other extreme, from a neoclassical point of view, fiscal policy should aim to minimise distortions. According to Barro's (1979) tax smoothing hypothesis, fiscal policy (tax rates) should remain constant or essentially neutral over the business cycle, as long as the shock on the tax base or spending shock is temporary (and respond to unexpected events that affect the fiscal authorities' budget constraints). Neoclassical theory prescribes that the balanced budget should be positively associated with output fluctuation, as it absorbs changes to tax revenues, caused by shocks to the tax base, as well as changes in other expenditure and revenues. Hence, if fiscal authorities followed Keynesian prescriptions, over the business cycle one should observe a negative correlation between government spending and output, and a positive correlation between tax rates and output. In sharp contrast, if fiscal authorities followed Barro's hypothesis, those correlations should be essentially zero.

Despite the absence of unanimous views, most economists agree with the normative approach of countercyclical fiscal policy to smooth out the business cycle fluctuations. Surprisingly, however, the empirical evidence consistently reveals that the fiscal policy is often expansionary during booms and contractionary during recessions in many countries. There is by now, a large and growing literature, which has reached similar conclusions; industrial countries tended to follow the fiscal policy that is countercyclical or at worst acyclical. On the other hand, emerging and low-income developing countries tended to pursue procyclical fiscal policy by violating the Keynesian's prescription; they have cut taxes (or raised spending) during the period of expansion and cut spending during the

[2] Throughout this Chapter following Kaminsky *et al.*, (2004), a procyclical fiscal policy is defined to involve lower (higher) government spending and higher (lower) tax rates in bad (good) times. Conversely, a countercyclical fiscal policy involves higher (lower) government spending or lower (higher) tax rates in bad (good) times.

period of recession[3]. Most economists suggest that such procyclical policies that amplify fluctuations in real output should be avoided, for these economies suffer from prolonged recession in bad times and inflationary pressures in good times. Thus, there is widespread agreement that procyclical fiscal policies are harmful as it leads to macroeconomic instability[4]. Motivated by the consequences of procyclical fiscal policy, our goal in this chapter is twofold: first, we attempt to provide empirical evidence of the cyclical properties of fiscal policies and second to uncover the potential sources of these cyclical stances on fiscal policy. To attain these goals, we utilise annual data from 137 developed, emerging and low-income developing countries over the period 1970-2014[5].

With regards to our first goal, to estimate fiscal cyclicality, the conventional approach utilises a simple correlation between the cyclical components of government expenditure and output that are filtered by the Hodrick-Prescott or Baxter-King filtering method[6], where a positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. While a positive/negative association between the cyclical components of output and government expenditure certainly gives no signal of reverse causality, the empirical studies implicitly assume that the causality runs from business cycle fluctuation to fiscal policy. Other studies follow a time-series regression-based approach, where a measure of government expenditure is regressed on a measure of output, and the estimated coefficient is considered to be the key indicator of fiscal cyclicality[7]. It should be noted that the estimation method can yield an unbiased estimation of fiscal cyclicality only if output is exogenous to fiscal policy. However, there is substantial evidence that in the short-run fiscal policy does have an impact on output[8].

In this chapter, we reinvestigate the conventional cyclicality results proposed by the previous literature and estimate the cyclical behaviour of fiscal policy through the instrumental variable technique. We find that the endogeneity problem is embedded in the correlation between macroeconomic policies and output growth. We handle this issue by proposing an instrument (i.e., trading partners' export demand) for the output growth. We also consider two conventional methods for alternative measure of fiscal cyclicality

[3] See, for example, Gavin and Perotti (1997); Kaminsky *et al.,* (2004); Talvi and Végh (2005); Alberola and Montero (2007); Ilzetzki and Végh (2008); Woo (2009); Erbil (2011); Halland and Bleaney (2011); Frankel *et al.,* (2013); and McManus and Ozkan (2015).
[4] See, for example, Talvi and Végh (2005); Woo (2009); and McManus and Ozkan (2015).
[5] The country group classification is from Nielsen (2011, p.20).
[6] See, for example, Kaminsky *et al.,* (2004); Talvi and Végh (2005) and Frankel *et al.* (2013) follow a simple correlation based approach.
[7] See, for example, Alesina and Tabellini (2005); Woo (2009); Afonso *et al.,* (2009) and Holland and Bleaney (2011) follow regression based approach.
[8] Reverse causality was first discussed by Gavin and Perotti (1997). Rigobon (2004) emphasizes for the endogeneity problems and re-examines on Kaminsky *et al.,* (2004) cyclical measurement techniques.

and provide a systematic account of how the choice of different alternative estimation methods affects the estimated cyclical behaviour of fiscal policy.

After an exhaustive battery of time series econometric tests over the period 1970-2014, the evidence provided in this chapter clearly suggests that procyclical fiscal policy is observed across the globe and should be viewed as the norm rather than the exception. Indeed, for a sample of 137 countries (30 advanced, 59 emerging and 48 low-income developing countries), we find that, in line with the previous literature, a majority of the advanced countries follow countercyclical or acyclical fiscal policy. In sharp contrast, the majority of the emerging and low-income developing countries run procyclical fiscal policies. We show that our findings are robust to alternative time-series specifications to control for reverse causality. We also investigate how the cyclical behaviour has evolved over the past few decades for our sample countries. Interestingly, over the last 45 years, we find that a substantial number of emerging and low-income developing countries have been trapped within the procyclical fiscal policy stance, in the sense of not being able to move from procyclical to countercyclical fiscal policy. We refer to these group of countries as "*procyclicality trap*" countries.

To address our second goal, we ask this critical question; why are so many emerging and low-income developing countries caught within a trap of procyclical fiscal policy over the past few decades? A most common answer from the literature relies upon their access to the international credit market[9]. It is widely argued that during bad times, many developing countries are unable to borrow, or can only do so with high-interest rates, therefore this group of countries have to cut spending; but in good times, they have better access to international credit and choose to use it. However, the following questions remain. First, why did this group of countries' fiscal authorities fail to self-insure themselves by accumulating extra tax revenues during good times, so that they are less likely to face credit constraints in bad times? Second, why do this group of countries face credit constraints in international capital markets during recessions, if the lenders knew that the borrowing would help the country to recover from the crisis and would optimally smooth the cycle, so that the borrowers can repay them back?

To answer the above two questions, we rely on the analysis of political landscape. More specifically, we consider three major political factors: transparency, corruption and

[9] For example Gavin and Perotti (1997) were the first to discuss the Latin American countries' facing credit constraints from the international capital market; then Sutton and Catão (2002), Riascos and Végh (2003) and Kaminsky *et al.,* (2004) pointed out that this is not a Latin American phenomenon only; borrowing constraints are common in many emerging and low-income developing countries.

egalitarian democracy on the following grounds. First, a county's transparency relates to its moral hazard problem between the international lenders and its fiscal authorities. The international investors can observe the state of the economy, however, at the presence of lack of transparency the true size of the fiscal authorities' hidden off balance sheet liabilities may not be revealed. It therefore follows that countries with less transparency are likely to face more limited access to international credit markets, particularly during downturns, restricting their ability to run countercyclical policies[10].

Second, the presence of corruption is also likely to reinforce borrowing constraints. Credit rating agencies, for example, use measures of corruption as an indicator of a country's ability to peruse stable macroeconomic policies. It should be noted that the index of corruption can also be interpreted as a credit constraint measure, because of its high correlation with sovereign risk[11]. It has been widely argued that corruption enhances political agency problems or creates political distortion, with unfavourable implications for macroeconomic outcomes[12]. In the presence of endemic corruption, incumbent politicians face a trade-off between pleasing voters and extracting political rent. Additionally, in the absence of economic transparency politicians can hide the true size of the fiscal deficit to not only voters but also to international lenders, who therefore also fail to observe the intensity of corruption, and hence have a moral hazard problem. Voters, therefore, rationally do not trust the benevolent government and they attempt to "*starve the leviathan*" to reduce the scale of corruption. In this case, voters prefer additional spending or tax cuts during the good times fearing that the extra revenue in the upturn would otherwise be wasted or not used to retire debt and they do not want to leave the excess tax revenue to "*less-than-benevolent*" government. This forces the government to conduct procyclical policy that arises from voters' demands.

Our third variable – egalitarian democracy – is related to social inequality and hence to political instability[13]. Egalitarian democracy is achieved when the rights and freedoms of voters are protected equally across all social groups, and resources are distributed equally across all social groups. Lack of equality across the social groups makes voters hostile and weaken the support for the incumbent. However, at the presence of high level of social

[10] Macroeconomic transparency (e.g. monetary and fiscal policy) has received increasing attention in recent years. The International Monetary Fund (IMF), and The OECD have implemented the Code of *Best Practice for Fiscal Transparency*. The World Bank and the International Monetary Fund publish the reports on standard and codes (ROSC) for the *Code of Best Practice for Fiscal Transparency* on a regular basis for a broad range of countries.

[11] To quote, Alesina and Tabellini (2005, p. 20), "*The correlation coefficient between the variables S&P Rating and Control of Corruption is 0.92 In fact, these variables are correlated by construction. For instance Standard and Poor's may look (directly or indirectly) to perception of corruption as one of their inputs in assigning ratings to countries, and perceptions of corruption may in turn be influenced by foreigners' views of a country's credit-worthiness. As a result, it is very hard to disentangle the effects of one versus the other.*"

[12] See, for example, Tornell and Lane (1999); Lane (2003); Talvi and Végh (2005); Alesina and Tabellini (2005); and Woo (2009).

[13] See, for example, Woo (2009) and Drazen (2000).

inequality, it may be difficult for policymakers (i.e., representative of diverse socioeconomic groups) to agree upon an ideal economic policy. In the incidence of such varying preferences, policymakers may have higher motives to reduce the social inequality. This forces government to take expansionary fiscal policy during good times due to economic surpluses, resulting in procyclical policy stance[14]. It is indeed true that in a democratic environment government are accountable and they try to satisfy voters' demands through appropriate fiscal action, otherwise they will be removed from power. Social inequality is therefore often associated with political instability[15]. High level of political instability may make it more difficult for the incumbent to remain in power for a long period of time. With a shortened expected tenure governments may enact short-term policies at the cost of macroeconomic stability. Countries with such characteristics may not be able to tap into external finance during downturns and may be forced to run contractionary fiscal policy.

Based on the above discussion, we develop a composite index by combining measures of transparency, corruption and egalitarian democracy. Motivated by the work of Rothstein and Teorell (2008), we view this index as a reflection of "*government quality*". We find a strong positive correlation between credit rating and government quality[16]; countries with better (worse) government quality receive with high (low) credit rating, impacting the severity of borrowing constraints. This is because a country facing credit constraints due to low country credit rating may not be able to borrow during recessions limiting the scope of countercyclical fiscal policy[17].

In this chapter, we argue that quality of government is a key determinant of fiscal policy cyclicality. Our empirical work is closely related to Alesina and Tabellini (2005) where politicians are assumed to hide the true size of the deficit to voters and international lenders, who therefore fail to observe the level of political corruption (see, for example, Alt and Lassen, 2006; Andersen and Nelsen, 2010). We test the relevance of this mechanism in our empirical work, allowing a degree of transparency, where voters and international lenders may be able to observe the true size of the deficit, by using both corruption and transparency in composing the government quality index[18]. Additionally, Woo (2009)

[14] See, for example, Woo (2009).
[15] In the rational government budget cycle literature, for example Rogoff and Sibert (1988) and Rogoff (1990) propose that voters face an adverse selection problem and this leads to distortion in fiscal policy just before the election.
[16] Figure A2.1 shows a strong positive correlation ($\rho = +0.80$) between government quality and country credit rating.
[17] See, for example, Gavin and Perotti (1997); Riascos and Végh (2003); Alesina and Tabellini (2005) and Frankel *et al.*, (2013).
[18] It is true that countries with high levels of transparency may still experience corruption and these variables cannot be substituted for each other. According to Transparency International (2017), corruption is defined as "*the abuse of entrusted power for private gain*" and it can be classified as grand, petty and political, depending on the amounts of money lost and the sector where it occurs. In contrast they defined that transparency is about shedding light on rules, plans, processes and actions. Transparency ensures that public officials, civil servants, managers,

proposes that social inequality leads to polarisation that is also linked to the procyclicality bias. We complete our government quality index by considering an additional friction in this environment, covering not only the equality, but also the citizens' voting power to replace the government.

Relying on a novel set of data for 137 countries over the period 1970-2014, we find significant support for our hypothesis. We find that on average advanced economies as a group have better government quality compared to emerging and low-income developing countries. Moreover, the advanced world has experienced sustained improvements in government quality over the recent decades. In sharp contrast, our findings show that quality of government has been relatively stagnant for emerging and low-income developing countries, more specifically, for that group of countries who are in "*procyclicality trap*". We find government quality is strongly negatively associated with the degree of fiscal procyclicality, indicating a strong underlying link running from better government to a less procyclical outcome.

The rest of the chapter is organised as follows. The next section briefly discusses the underlying evidence from the previous literature on fiscal cyclicality and the underlying reasons of fiscal procyclicality. Section 2.3 presents the measurement techniques used to identify the cyclicality characteristics of fiscal policy and government quality, and also presents the empirical strategies to identify the determinants of fiscal procyclicality. Section 2.4 presents descriptive statistics of cyclicality of fiscal policy and government quality. Section 2.5 relates and discusses the systematic outcomes of government quality to the derived cyclicality measurements. Robustness and extension of the analysis are also presented in Section 2.5. Finally, Section 2.6 provides concluding remarks.

2.2 Evidence on fiscal cyclicality and the causes of fiscal procyclicality

Gavin and Perotti (1997) were the first to draw attention to the fact that Latin American countries exhibit procyclical fiscal policy. Talvi and Végh (2005) then showed that procyclical fiscal policy is not limited to Latin American countries, rather fiscal policy seemed to be overwhelmingly procyclical across the developing world, just as fiscal policy is acyclical in industrialised countries. In fact, Talvi and Végh's find that the correlation between cyclical component of government spending and GDP is positive for every

board members and businessmen act visibly and understandably, and report on their activities. It means that the general public can hold them to account. It is the surest way of guarding against corruption and helps increase trust in the people and institutions.

developing country in their sample. In sharp contrast, the correlation for G7 countries is found to be zero. Using a different methodology, Braun (2001) reaches similar results for developing countries, although he finds that fiscal policy is countercyclical in OECD countries. In the same vein, Lane (2003) shows that procyclical fiscal policy is evident in developing part of the world, whereas this characteristic is relatively absent in OECD countries. Kaminsky *et al.,* (2004) jointly examine the procyclicality of capital flows, fiscal and monetary policy, and find that many countries, specifically developing countries exhibit procyclical fiscal policy. However, the earliest evidence of Hallerberg and Strauch (2002), and Gali and Perotti (2003) propose that procyclicality mainly arises from subcomponents of government consumption and in overall discretionary government expenditure (i.e., the part that is directly controlled by fiscal authorities) in the European Union and OECD countries.

Thornton (2007) empirically investigate fiscal policy in 37 African countries and finds the real government expenditure in 32 of these countries to be overwhelmingly procyclical. Ilzetzki and Végh (2008), who investigate a different data-set for 49 countries find similar results. They conclude that procyclical fiscal policy is in fact truth and not friction. Recent work by Frankel *et al.,* (2013) propose new evidence and they show that over the last decades, about one-third of the developing world has been able to escape from procyclicality trap or "*graduation*" takes place, as this group of countries become more countercyclical in the recent decade compared to their earlier fiscal stances. However, they propose that a significant portion of developing countries fall into the trap of procyclicality and this phenomenon has become a part of the conventional wisdom.

Why would developing countries conduct procyclical fiscal policy that might aggravate the business cycle? Several explanations have been proposed to explain the puzzling behaviour of procyclical policy in developing countries. Existing work proposes three types of explanations: (a) restrictions on access to international credit markets that preclude developing countries from borrowing during bad times, (b) institutional weaknesses and political distortions encouraging rent-extracting activities, which in turn, result in excessive public spending during expansions not to leave fiscal surplus with the "*less-than-benevolent government*", (c) heterogeneity of political preferences or "*polarization*" related to social and income inequality.

The most common explanations are based on incomplete international credit markets or credit constraints. Gavin and Perotti (1997) first pointed to the procyclical fiscal policy by showing that Latin American countries face "*precarious creditworthiness*". According to

this hypothesis, developing countries have limited access to international credit markets and they may not be able to borrow in economic downturn and maybe even required to pay back, leading to contractionary fiscal policy. They also find that IMF emergency credit supply during these periods is higher compared to other periods and fiscal procyclicality is strongly associated with initial level of budget deficit. Gavin and Perotti (1997) considered these findings as an indication of creditors' willingness to supply credit during bad times to support the budget deficit. These propositions are consistent with Calvo and Reinhart (2000)'s observation of "*sudden stops*" in capital inflows to emerging markets, leading to collapse of investment, sharp real depreciation, and sharp fiscal stagnation as the countries are cut off from international capital markets. Similarly, Calderón and Schmidt-Hebbel (2008), propose that liberal access to foreign and domestic credit markets supports countries to run countercyclical fiscal policy. Riascos and Végh (2003) and Caballero and Krishnamurthy (2004) argue that inadequate financial depth and incomplete capital markets could explain the procyclicality stance as the consequence of a Ramsey problem without having to impose any additional frictions.

The second class of explanations focus on institutional weaknesses and political distortions rather than market failure. Tornell and Lane (1999) develop a political economy model in which the "*common pool*" problem that arises from multiple interest groups competing for a share of general tax revenue significantly impacts upon the cyclicality of fiscal policies. The presence of "*common pool*" problem generates procyclicality because, when the economy is performing well, no group will be eager to give up their share of claims on the revenue. The competition among the interest groups for the same share of the tax revenue leads to a more than proportionate reallocation effects when output increases. Although the dispute of fiscal policy cyclicality is not directly stated in their model, it follows that with potential tax revenue increases during booms, government expenditure will be prone to be procyclical.

In a similar vein, Talvi and Végh (2005) find that large variability in fiscal revenues are in themselves the cause of fiscal procyclicality, because such variability distorts political incentives. The authors predict that the political pressure to spend out of a fiscal surplus is an increasing convex function of the size of that surplus. Hence, the large tax base variability, as widely observed in developing countries, is likely to be associated with more procyclical fiscal spending. These arguments lead on to Alesina and Tabellini (2005), who show that voters prefer lower taxes during good times rather than keeping the excess tax revenue with "*less-than-benevolent*" government. Alesina and Tabellini (2005) also

provide empirical support for the proposition that procyclicality is positively associated with rent-seeking behaviour.

An alternative explanation is linked to institutional quality. Calderón *et al.,* (2004a&b) analyse fiscal behaviour of 20 emerging economies and find that procyclicality of fiscal policy is positively associated with weak institutional quality. Calderón and Schmidt-Hebbel (2008) update the database to 115 countries and propose that countries with high levels of institutional quality exhibit less procyclical stance. A similar argument is suggested by Inchauste *et al.,* (2004); they show that procyclicality tends to be less frequent in high-income countries where the political power is less concentrated, with higher institutional quality and larger public sectors. A recent study by Frankel *et al.,* (2013) analyses 94 countries in which they propose that about one-third of developing countries have been able to move from procyclical to countercyclical fiscal policy. They argue that institutional quality has been one of the major determinants in that transition.

A third explanation presents a slightly different public choice argument. Woo (2009) proposes that greater heterogeneity of preferences (or polarisation) of social groups is a key source of fiscal procyclicality. He argues that lack of equality across the social groups makes voters hostile and weaken the support for the incumbent. Hence, a high degree of social inequality may make it difficult for politicians who may represent diverse socioeconomic groups to agree upon ideal fiscal policies. In the presence of such varying preferences, heterogeneous politicians may have greater motives to reduce social inequality. Policymakers prefer to conduct expansionary policy during good times to reduce the inequality. Woo (2009) measures the social inequality by income and educational inequality, and these variables are consistently positively correlated with the procyclical fiscal policy for a cross-country tests for 96 countries.

2.3 Methodology

2.3.1 Identifying fiscal policy cyclicality

We start by examining the cyclical properties of fiscal policy for individual countries. The previous empirical literature on fiscal cyclicality uses various fiscal policy indicators, and there is no methodological unanimity on how the fiscal cyclicality should be measured[19].

[19] As Fatás and Mihov (2010) mention, the diversity of empirical findings on the sources of fiscal procyclicality may be an indication of this variety in the way that the cyclicality of fiscal policy is measured.

However, there is a common ground in the type of fiscal policy instruments to be used and in measuring the cyclical behaviour of fiscal policy.

The simplest measure of fiscal cyclicality is the correlation between the cyclical components of government expenditure and output that are filtered by Hodrick-Prescott method to focus only on the detrending cyclical components. Previous empirical work on fiscal cyclicality uses this method to identify the cyclicality of fiscal policy (see, for example, Frankel *et al.,* 2013; Kaminsky *et al.,* 2004; Talvi and Végh, 2005 and others). However, it can be argued that correlation coefficient can be ambiguous if countries have a different level of volatility for both government expenditure and output (see, for example, Forbes and Rigobon (2002). In this regards, Alesina and Tabellini (2005), Woo (2009) and McManus and Ozkan (2015) follow time-series regression-based estimation method where a measure of fiscal action is regressed on output and other control variables, and the estimated coefficient from time-series regression is taken to indicate the cyclicality of fiscal policy.

Fiscal policy cyclicality is usually measured by fiscal instruments (e.g. government expenditure and tax rates) rather than fiscal outcomes (e.g. tax revenue, fiscal balance and other fiscal instruments) that are endogenous and their cyclicality is likely to be ambiguous (see, for example, Kaminsky *et al.,* 2004). Even though such instruments have been used in the literature (see, for example, Gavin and Perotti, 1997; Calderón and Schmidt-Hebbel, 2003; Alesina and Tabellini, 2005 and others). According to Ilzetzki and Vegh (2008), the estimated cyclical properties may not be appropriate, specifically because of the cyclicality of tax revenues. The authors argue that even if the policy is acyclical (i.e., tax rates and government expenditure are independent of the business cycle), the fiscal balance would be a surplus in upturns (as the tax rate expands) and in deficit in downturns (as the tax rate contracts). An econometrician by investigating the fiscal balance may thus bring erroneous conclusion by proposing that the fiscal policy is countercyclical (i.e., fiscal authorities trying to smooth out the business cycle), but in reality, fiscal authorises are engaged in a neutral policy and smoothing both tax base and government expenditure. Similarly, the cyclicality behaviour of fiscal balance will estimate ambiguous cyclicality posture of fiscal policy (neoclassical prescription of Barro, 1979)[20].

[20] Emphasising on fiscal balance may also lead to the wrong conclusion when comparing the fiscal policy cyclicality across country groups. For example, several studies conclude that fiscal policy is countercyclical in advanced countries as opposed to that in developing world because the correlation between the business cycle and fiscal balance is positive in advanced countries and less-or-negative in the developing world (see, for example, Gavin and Perotti, 1997 and Alesina and Tabellini, 2005). According to Ilzetzki and Vegh (2008), this implication is not

Given the variety of empirical methodologies in the related literature, we propose three different estimation methods to examine the relationship between fiscal instruments and output. Our first specification is comparable to the ones used by Woo (2009), Alesina and Tabellini (2005), and is defined by equation (2.1) which is estimated for each country separately for the period 1970-2014[21].

$$\Delta logG_{it} = \alpha_i + \beta_i\, OUT\_GAP_{it} + \gamma_i\, logG_{it-1} + \delta_i T_{it} + \varepsilon_{it} \quad (2.1)$$

The term $\Delta logG_{it}$ is the change in the log of real government consumption expenditure. The term OUT_GAP_{it} (output gap) is the log deviation of real GDP from its Hodrick-Prescott trend to focus only on the cyclical components[22]. Since there is no readily available data of tax rates for the individual countries, we restrict out analysis to the spending side. Unlike Kaminsky *et al.,* (2004), we select a measure of central government expenditure over government spending. It is argued that government spending includes interest payments and transfers, which can add noise to this estimation method (see, for example, Halland and Bleaney, 2011). We therefore use general public expenditure as our fiscal policy measure. We also choose public expenditure over the fiscal budget to avoid the bias introduced by the simultaneous relation between output gap and the fiscal budget. Our choice is motivated both by empirical evidence showing that government spending does not react much to the cycle, as well as by the theoretical arguments that the political process in most countries does not permit for immediate changes in discretionary expenditure (see, for example, Fatás and Mihov, 2003). The budget deficit, on the other hand, is mainly influenced by macroeconomic conditions with serious endogeneity implications[23].

In specification (2.1) the two control variables are the lag of real government expenditure ($logG_{it-1}$), which allows for long-term mean reversion consistent with fiscal sustainability and correct for the first order autocorrelation problem and T_{it} a time trend. The estimated coefficient $\hat{\beta}_i$ measures the elasticity of fiscal cyclicality for each of the country i. A positive (negative) value of $\hat{\beta}_i$ indicates that government take procyclical (countercyclical) fiscal policy.

reasonable because it might be circumstances that tax rates and government expenditures behave similarly but tax revenues are more procyclical in the advanced world than in developing countries.

[21] Earlier empirical works estimate the cyclical properties of fiscal policy by taking panel approach (see, for example, Calderón and Schmidt-Hebbel, 2008 and others). In our analysis, we try to explore the time-series properties of data for each country separately.

[22] We follow the recommendation of Alberola and Montero (2007) for annual data and set the Hodrick-Prescott filter's parameter for smoothness $\lambda = 100$, which is referred to as '*de facto*' industry standards and delivers wider cycle (see, for example, Maravall and Rio, 2001).

[23] As argued by Fatás and Mihov (2003) and quantitative analysis proposed by Chalk (2002).

Our second specification is similar to Halland and Bleaney (2011) and McManus and Ozkan (2015), as is in equation (2.2) and is estimated for each country for the period 1970-2014.

$$\Delta log G_{it}^{CYC} = \bar{\alpha}_i + \bar{\beta}_i \, OUT\_GAP_{it} + \mu_{it} \tag{2.2}$$

where, $\Delta log G_{it}^{CYC}$ is the log deviation of real government consumption expenditure from its Hodrick-Prescott trend and output gap (OUT_GAP_{it}) defined as the log deviation of real GDP from its Hodrick-Prescott trend. The estimated coefficient of $\hat{\beta}_i$ from the specification (2.1) does not have the advantage of using the detrended statistics of government expenditure, and it will implicitly incorporate the government expenditure trend. This problem may lead to an upwardly (downward) biased estimation of $\hat{\beta}_i$ assuming an upward (downward) trend in government consumption expenditure. Specification (2.2) attempts overcome this problem, where government expenditure and output are both deviations from trend. Additionally, the Hodrick-Prescott filter allows us to consider only the cyclical components of both variables.

We correct for the first-order autocorrelation in the residuals (μ_{it}) by using a standard two steps Prais-Winsten technique based on country specific estimation[24]. The following transformation takes place in specification (2.2) during the estimation process for individual country i.

$$\mu_{it} = \rho_i \mu_{it-1} + \vartheta_{it} \tag{2.3}$$

$$\Delta log G_{it}^{CYC} = \bar{\alpha}_i(1 - \rho_i) + \rho_i \Delta log G_{it-1}^{CYC} + \bar{\beta}_i \left(OUT_{GAP\,it} - \rho_i OUT_{GAP\,it-1} \right) + \vartheta_{it} \tag{2.4}$$

The estimated $\hat{\bar{\beta}}_i$ measures the elasticity of the cyclical element of real GDP to the cyclical (discretionary) element of government consumption expenditure, where a positive (negative) value of $\hat{\bar{\beta}}_i$ denotes procyclical (countercyclical) fiscal policy.

One issue with the estimation of (2.1) and (2.2) is that they could provide us with an unbiased estimation of the cyclicality of fiscal policy only if the output is exogenous to fiscal policy. If output itself reacts to fiscal policy, as in most macro models, a simple OLS regression of fiscal policy on output will lead to a biased estimation, which captures the size of the fiscal multiplier rather than the policy reaction function. However, there is a large literature indicating that in the short-run fiscal policy does have an impact on

[24] However, during the estimation process for the specification (2.2), we find that some countries' error term μ_{it} is not only correlated in first-order; it can be correlated with second, third order and so forth. To identify the correct order of autocorrelation among the error term, we first estimate the specification (2.2) and investigate correlogram Ljung-Box Q-statistics of the partial autocorrelation function (PAC) to detect the correct order z. After that, we estimate AR (z) model to correct autocorrelation problem among the error term μ_{it} for the specification (2.2).

output (see, for example, Ilzetzki and Vegh, 2008). Another argument proposed by Rigobon (2004) in his observations on Kaminsky *et al.,* (2004) findings. The author points out that advanced economies and developing countries follow different fiscal policies due to both groups of countries are exposed to different kind of external shocks. In short, the estimation of $\hat{\beta}_i$ and $\hat{\bar{\beta}}_i$ is valid only if output is exogenous to government expenditure.

Hence, we follow Jaimovich and Panizza (2007) and Gali and Perotti (2003) and estimate $\hat{\beta}_i$ and $\hat{\bar{\beta}}_i$ by using an instrument that can deal with the reverse causality issue in a large sample of countries. The key problem is finding a valid instrument that needs to be correlated with OUT_GAP_{it} with no direct effect on the dependent variable (i.e., government expenditure). We argue that country's trading partners' export demand has these characteristics[25]. We define the trading partners' export demand ($EXPDEMAND_{it}$) as:

$$EXPDEMAND_{it} = \frac{EXP_i}{GDP_i}\sum_j \omega_{ij,t} GDPGR_{jt} \tag{2.5}$$

where i denotes the domestic country who are exporting to their trading partners j (or foreign country). EXP_i/GDP_i measures domestic country i's average exports expressed as a share of its real output (i.e., trade openness). $GDPGR_{jt}$ measures real output growth in foreign country j in period t, $\omega_{ij,t}$ is the fraction of export from domestic country i going to foreign country j in period t[26].

For brevity of our analysis for rest of the chapter, we estimate the specification (2.2) to measure the cyclicality of fiscal policy by using two-stage least square (TSLS) method for each country separately. We also estimate specification (2.1) by using TSLS method (the instrument $EXPDEMAND_{it}$ for OUT_GAP_{it}). However, we have found that estimated results for model (2.1) are broadly similar to model (2.2). In this case, we proceed the analysis based on the model (2.2). The TSLS method is defined by specification (2.7) and it is estimated for each country separately. Due to data availability for the instrument $EXPDEMAND_{it}$, we estimate $\hat{\bar{\beta}}_i^{IV}$ for 30 years period (1985-2014) for each country to measure the cyclicality of fiscal policy. Our first stage regression model is defined by:

[25] This instrument is earlier used by Jaimovich and Panizza (2007, p.13) to investigate the cyclical properties of fiscal policy for a panel of 95 countries. In our analysis, we utilize this instrument to investigate the cyclical properties of fiscal policy for each country separately by exploring time-series properties of data.

[26] Precisely weight $\omega_{ij,t} = \frac{EXP_j}{Total\ Export\ to\ World_i}$, where EXP_i is defined as domestic country's i export to its trading partner country j and $Total\ Export\ to\ World_i$ is defined as each country's i export to rest of the world. Note that specification (2.5) use a time-invariant measure of exports over GDP because a time-variant measure would be affected by real exchange rate fluctuations, and, therefore, by domestic factors. This is not the case for the fraction of exports going to a given country $\omega_{ij,t}$, because the variation of the exchange rate that is due to domestic factors has an equal effect on both the numerator and denominator.

$$OUT\_GAP_{it} = \pi_i + \sigma_i EXPDEMAND_{it} + \varphi_{it} \quad (2.6)$$

Second stage regression is defined as:

$$\Delta log G_{it}^{CYC} = \bar{\alpha}_i + \bar{\beta}_i^{IV} OUT\_GAP_{it} + \bar{\mu}_{it} \quad (2.7)$$

In the model (2.7), estimated $\hat{\bar{\beta}}_i^{IV}$ measures cyclicality of fiscal policy for each of the country i, where reverse causality issues of the model (2.2) have been handled by using instrumental approach[27]. Similar techniques proposed for the model (2.2) have been implemented on the model (2.7) to detect autocorrelation problem of the error term ($\bar{\mu}_{it}$) and corrected accordingly. A positive (negative) value of $\hat{\bar{\beta}}_i^{IV}$ specifies procyclical (countercyclical) fiscal policy. In our estimation process of fiscal cyclicality ($\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$), the data for dependent, explanatory variables and instrument variables are collected from different sources; please refer Table A2.1 for their sources and data description.

2.3.2 Government quality as a determinant of procyclical fiscal policy

To explore whether there is a statistically significant link between the compiled cyclicality of fiscal policy and government quality, we estimate the following cross-country dimension of data for 137 countries over the period 1970-2014. The baseline regression model is as follows:

$$Fis\widehat{Cycl}Ind_{it} = \alpha_0 + \alpha_1 log(LRGDPCH)_{i70} + \alpha_2 GEXP_{it} + \alpha_3 GQ_{it} + \phi X_{it} + \xi_{it} \quad (2.8)$$

where $Fis\widehat{Cycl}Ind_{it}$ denotes the relevant estimated fiscal cyclicality indicators ($\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$) from the equation (2.1), (2.4) and (2.7) respectively. Each of the fiscal cyclicality indicators ($\hat{\beta}_i$, $\widehat{\bar{\beta}_i}$, and $\hat{\bar{\beta}}_i^{IV}$) enter the regression specification separately, and their results are tested and presented in an isolation of one another. Our baseline specification (2.8) is in line with Woo (2009) and includes $log(LRGDPCH)_{i70}$, log of initial real GDP per capita in 1970 to capture the potential impact of the level of economic development on fiscal cyclicality; $GEXP_{it}$, the government size (government expenditure to GDP) to capture the economic stabilisation impact of government size on output; X_{it}, the set of appropriate control variables. Our core variable of interest is a composite index of government quality (GQ_{it}), measured by the average of the normalized variables of corruption, transparency

[27] In order to estimate by using TSLS method, the specification (2.1) and (2.2) must satisfy the order condition for identification, which indicates that there must be at least as many instruments as there are coefficients in the equations. There is an additional rank condition which must also be satisfied (see, for example, Davidson and MacKinnon, 1993). To resolve this issue, along with $EXPDEMAND_{it}$, we also include constant and lags of the regressors in the instrumental variable set.

and egalitarian democracy index. Based on our earlier arguments, we expect the coefficient α_3 to be negative. The negative coefficient of GQ_{it} would confirm that an increase in government quality reduces the degree of procyclicality.

Our preferred method is cross-country analysis over the panel estimation for two underlying reasons. The cross-country dimension allows us to address issues of endogeneity between complied cyclicality indicators and government quality. Succinctly, we use the cross-sectional variation in political characteristics to instrument for cyclicality of fiscal policy. Second, an empirical study purely based on time series data cannot use this information because country's political characteristics (i.e., GQ_{it} for our analysis) do not systematically change very frequently (argued by Fatás and Mihov, 2003). Hence, we estimate specification (2.8) by exploiting the cross-country variability as opposes to within-country variability. However, to explore cross-country variabilities further, we will also use panel estimation method proposed by Calderón and Schmidt-Hebbel (2008), Alesina and Tabellini (2005), and Frankel *et al.,* (2013). The extension of the analysis and the estimation method along with their results will be discussed later.

The data are collected from a wide range of sources; please refer Table A2.2 for their sources and elaborative definition. Given that heteroscedasticity is an important concern in cross-country regressions, we estimate specification (2.8) based on white-heteroscedasticity consistent covariance matrix approach and report the standard errors accordingly.

2.4 Descriptive statistics

2.4.1 The prevalence of fiscal policy procyclicality

We estimate the cyclicality of fiscal policy ($\hat{\beta}_i$, $\hat{\bar{\beta}}_\iota$ and $\hat{\bar{\beta}}_i^{IV}$) using equations (2.1), (2.4) and (2.7) respectively. We utilize data from 137 countries (i.e., 30 advanced, 59 emerging and 48 developing country) over the 1970-2014[28]. Table 2.1 shows the average cyclicality of fiscal policy ($\hat{\beta}_i$, $\hat{\bar{\beta}}_\iota$ and $\hat{\bar{\beta}}_i^{IV}$) based on data from all available years from each sample country; these statistics have then been aggregated across the country group classification. Results presented in Table 2.1 helps us to make two clear points. First, on average fiscal procyclicality are heavily observed across the globe. This is not only true

[28] Although, previous literature uses much longer time series data back to 1960 (see, for example, McManus and Ozkan, 2015, Woo, 2009, and others). Only a minority of the sample countries have time series data for many years before 1970. In this case, we select 1970 as the starting point of the data for the whole set of countries, so that the fiscal statistics can be comparable among the countries and even between the countries' income groups. Note also that our 45 years of time series data is still greater than most in the previous literature; for example, Alesina and Tabellini (2005) use 16 years of data, while Halland and Bleaney (2011) investigate 25 years of data.

for low-income developing countries, as it is also noticeable in emerging countries. On the contrary, advanced economies tend to follow acyclical, or slightly procyclical policy compared to other group. The findings indicate that there is an inverse relation between procyclicality with the countries' level of development[29]. Second, there is a positive pairwise correlation among the estimated $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$. However, the correlation between $\hat{\beta}_i$ and $\hat{\bar{\beta}}_i$ is 0.813, which is higher than other pairwise correlations. $\hat{\bar{\beta}}_i^{IV}$ has relatively low correlation with the other measures and a higher standard deviation. This is probably because $\hat{\bar{\beta}}_i^{IV}$ is estimated from IV approach, when we instrumented the model (2.2)'s output gap (OUT_GAP_{it}) by trading partners' export demand ($EXPDEMAND_{it}$). Nevertheless, $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$ have positive pairwise correlations among themselves, which indicates the consistency of measurement across $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$.

TABLE 2.1: CYCLICALITY OF FISCAL POLICY 1970-2014

Country Group	Estimated Cyclicality of Fiscal Policy					
	$\hat{\beta}$		$\hat{\bar{\beta}}$		$\hat{\bar{\beta}}^{IV}$	
	Mean [St.Dev]	Observations	Mean [St.Dev]	Observations	Mean [St.Dev]	Observations
All Country Group	0.68 [0.64]	137	0.66 [0.68]	137	1.11 [1.42]	128
Advanced Economies	0.17 [0.38]	30	0.07 [0.37]	30	0.02 [0.60]	28
Emerging Market	0.75 [0.51]	59	0.78 [0.56]	59	1.12 [1.41]	54
Low Income Developing Economies	0.91 [0.75]	48	0.87 [0.81]	48	1.77 [1.38]	46

CORRELATION MATRIX OF FISCAL POLICY CYCLICALITY

	$\hat{\beta}$	$\hat{\bar{\beta}}$	$\hat{\bar{\beta}}^{IV}$
$\hat{\beta}$	1		
$\hat{\bar{\beta}}$	0.813	1	
$\hat{\bar{\beta}}^{IV}$	0.442	0.425	1

Note: We estimate $\hat{\beta}_i$ and $\hat{\bar{\beta}}_i$ for 45 years (1970-2014) for individual country to measure the cyclicality of fiscal policy. Due to data availability for the instrument $EXPDEMAND_{it}$, we estimate $\hat{\bar{\beta}}_i^{IV}$ for 30 years period (1985-2014) for individual country to measure the cyclicality of fiscal policy. We take average and standard deviation of fiscal cyclicality indicators for each country group to present the above summery statistics. A simple correlation statistics is calculated by utilizing the country indicators of $\hat{\beta}$, $\hat{\bar{\beta}}$ and $\hat{\bar{\beta}}^{IV}$. The country group classification is from Nielsen (2011).

It is clear that fiscal procyclicality has been widespread in emerging and developing countries, compared to advanced world. However, these findings are coming from average data of $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$, without country specific weight. It can be argued that these results may be misleading because of considerable variation across the sample countries within each group. In this case, it is necessary to investigate the individual country's cyclicality

[29] This is the most common results found in the literature (see, for example, Woo, 2009; Kaminsky *et al.*, 2004 and others).

of fiscal policy. We represent the estimated $\hat{\beta}_i$, $\hat{\bar{\beta}}_\iota$ and $\hat{\beta}_i^{IV}$ in Figures 2.1-2.3 respectively[30]. Results presented in Figure 2.1-2.3 allow us to propose one clear observations. The tendency of running procyclical fiscal policy (blue and red bars) is widely observed in emerging and developing countries compared to advanced world. For example, in Figure 2.1, $\hat{\beta}_i$ show that tendency of running high degree of procyclical fiscal policy (i.e., red bars, $\hat{\beta}_i \geq 1$, government spending is sensitive to output gap) is widely present in both emerging markets (15 out of 59) and developing countries (20 out of 48); conversely in advanced economies, this behaviour is almost absent (1 out of 30). The estimated cyclicality $\hat{\bar{\beta}}_\iota$ reveal a similar profile (Figure 2.2).

However, emerging and developing countries' high procyclicality (red bars) characteristics are relatively more evident from $\hat{\beta}_i^{IV}$, compared to $\hat{\beta}_i$ and $\hat{\bar{\beta}}_\iota$ (Figure 2.3 vs. Figure 2.1-2.2). On the contrary, advanced economies' cyclicality profile based on $\hat{\beta}_i^{IV}$ is fairly similar to that coming from $\hat{\beta}_i$ and $\hat{\bar{\beta}}_\iota$ (Figure 2.3 vs. Figure 2.1-2.2). These results remain intact, when we instrumented model (2.2)'s output gap by trading partners' export demand to estimate $\hat{\beta}_i^{IV}$. These findings indicate that advanced economies and developing countries follow different fiscal policies due to output movement that arises from external shocks (i.e., trading partneres' export demand)[31]. Nevertheless, Figure 2.1-2.3 indicate advanced economies lie overwhelmingly on the left-hand side of the cyclicality specification, while the right is dominated by emerging and developing countries.

2.4.2 The graduation hypothesis

The above findings establish that fiscal policy procyclicality has been the norm rather than an exception in many emerging and low-income developing countries during the last 45 years (1970-2014), while the advanced economies followed slightly procyclical or countercyclical policies. This section revisits the "*graduation hypothesis*" proposed by Frankel *et al.*, (2013) who document a shift in the cyclical behaviour of fiscal policy over the last decades (1960-99 vs. 2000-09). They argue that several emerging and developing

[30] Table A2.3-A2.5 provide cyclicality measures ($\hat{\beta}_i, \hat{\bar{\beta}}_\iota$ and $\hat{\beta}_i^{IV}$) estimated for individual countries for the period 1970-2014, which updates the evidence presented by Kaminsky *et al.*, (2004) and Frankel *et al.*, (2013), both of which base their findings on simple correlations between the cyclical components of government spending and GDP. In our case, we use time-series estimation as basis of our cyclicality measures.

[31] As Rigobon (2004) points out that the external shocks on the developing countries are different from those hit advanced economies. The author also argues that emerging and developing countries fiscal shocks are dominated by output shocks that are mainly originated from external shocks.

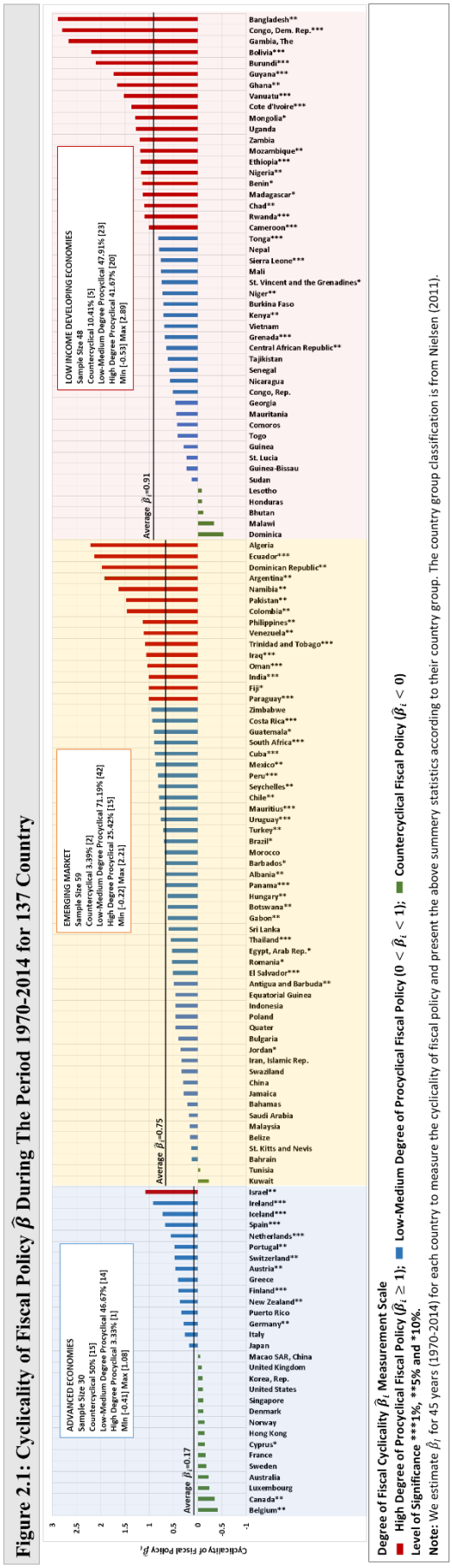


Figure 2.1: Cyclicality of Fiscal Policy $\hat{\beta}$ During The Period 1970-2014 for 137 Country
ADVANCED ECONOMIES
Sample Size 30
Countercyclical 30% [15]
Low-Medium Degree Procyclical 46.67% [14]
High Degree Procyclical 3.33% [1]
Min [-0.41] Max [1.08]
EMERGING MARKET
Sample Size 59
Countercyclical 3.39% [2]
Low-Medium Degree Procyclical 71.19% [42]
High Degree Procyclical 25.42% [15]
Min [-0.22] Max [2.21]
LOW INCOME DEVELOPING ECONOMIES
Sample Size 48
Countercyclical 10.41% [5]
Low-Medium Degree Procyclical 47.91% [23]
High Degree Procyclical 41.67% [20]
Min [-0.55] Max [2.89]
Average $\hat{\beta}_i$=0.17
Average $\hat{\beta}_i$=0.75
Average $\hat{\beta}_i$=0.91
Cyclicality of Fiscal Policy $\hat{\beta}_i$
Degree of Fiscal Cyclicality $\hat{\beta}_i$ Measurement Scale
High Degree of Procyclical Fiscal Policy ($\hat{\beta}_i \geq 1$); Low-Medium Degree of Procyclical Fiscal Policy ($0 < \hat{\beta}_i < 1$); Countercyclical Fiscal Policy ($\hat{\beta}_i < 0$)
Level of Significance ***1%, **5% and *10%.
Note: We estimate $\hat{\beta}_i$ for 45 years (1970-2014) for each country to measure the cyclicality of fiscal policy and present the above summery statistics according to their country group. The country group classification is from Nielsen (2011).

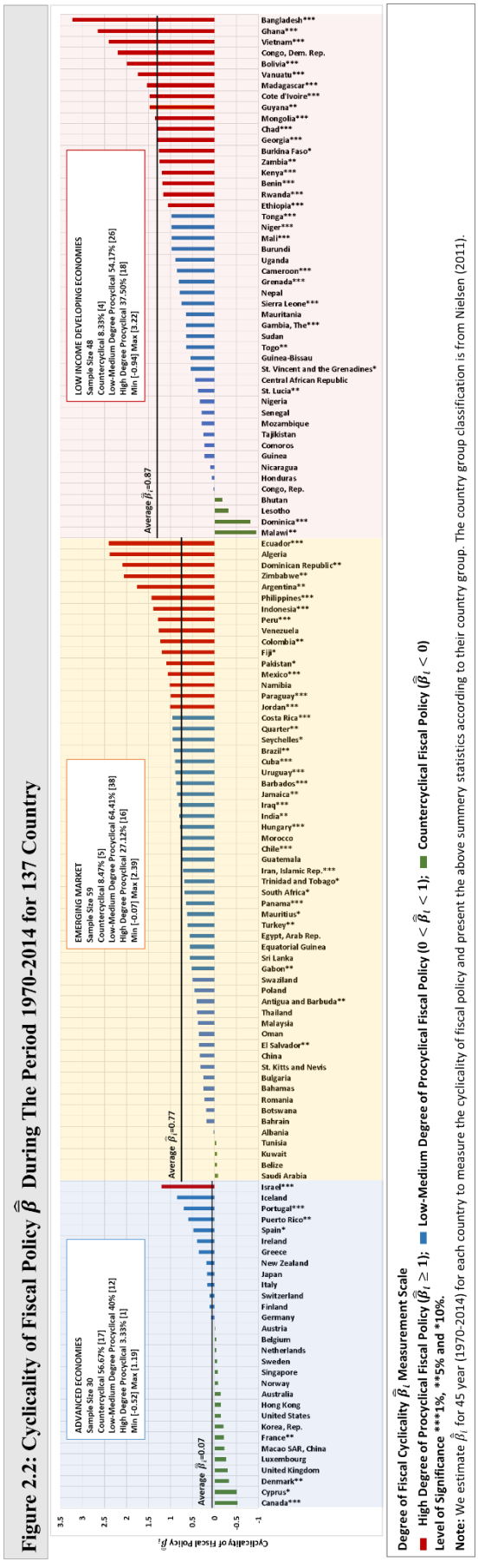


Figure 2.2: Cyclicality of Fiscal Policy $\hat{\hat{\beta}}$ During The Period 1970-2014 for 137 Country
ADVANCED ECONOMIES
Sample Size 30
Countercyclical 56.67% [17]
Low-Medium Degree Procyclical 40% [12]
High Degree Procyclical 3.33% [1]
Min [-0.52] Max [1.19]
EMERGING MARKET
Sample Size 59
Countercyclical 8.47% [5]
Low-Medium Degree Procyclical 64.41% [38]
High Degree Procyclical 27.12% [16]
Min [-0.07] Max [2.39]
LOW INCOME DEVELOPING ECONOMIES
Sample Size 48
Countercyclical 8.33% [4]
Low-Medium Degree Procyclical 54.17% [26]
High Degree Procyclical 37.50% [18]
Min [-0.94] Max [3.22]
Average $\hat{\hat{\beta}}_i$=0.07
Average $\hat{\hat{\beta}}_i$=0.77
Average $\hat{\hat{\beta}}_i$=0.87
Cyclicality of Fiscal Policy $\hat{\hat{\beta}}_i$
Degree of Fiscal Cyclicality $\hat{\hat{\beta}}_i$ Measurement Scale
High Degree of Procyclical Fiscal Policy ($\hat{\hat{\beta}}_i \geq 1$); Low-Medium Degree of Procyclical Fiscal Policy ($0 < \hat{\hat{\beta}}_i < 1$); Countercyclical Fiscal Policy ($\hat{\hat{\beta}}_i < 0$)
Level of Significance ***1%, **5% and *10%.
Note: We estimate $\hat{\hat{\beta}}_i$ for 45 year (1970-2014) for each country to measure the cyclicality of fiscal policy and present the above summery statistics according to their country group. The country group classification is from Nielsen (2011).

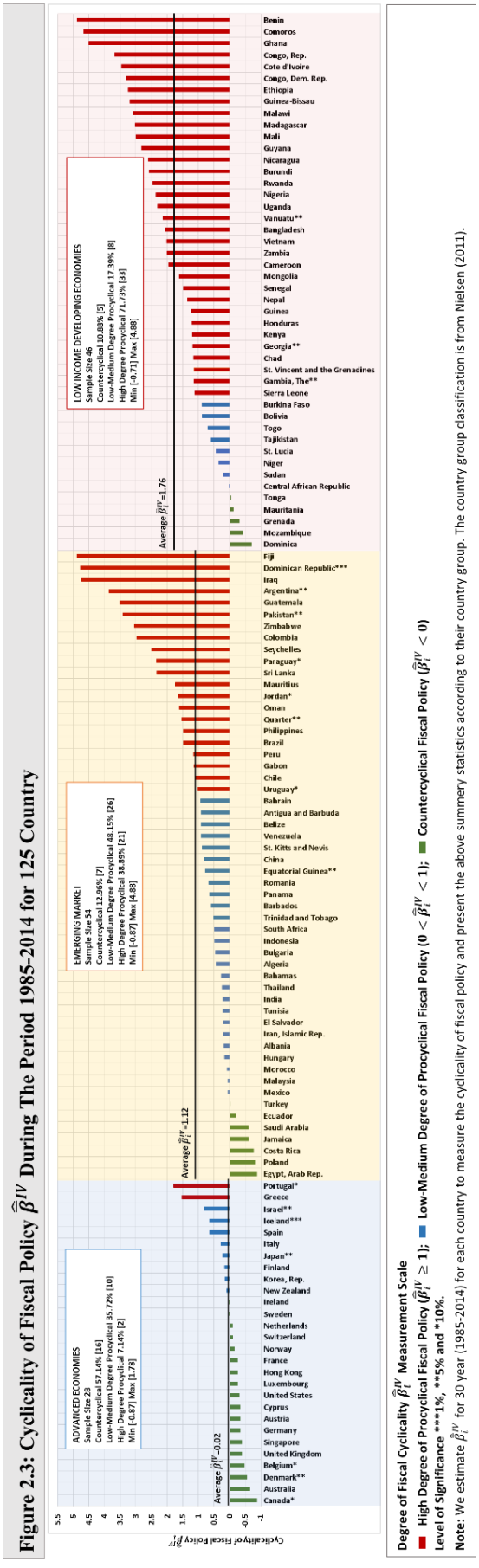


Figure 2.3: Cyclicality of Fiscal Policy $\widehat{\beta}^{IV}$ During The Period 1985-2014 for 125 Country
Cyclicality of Fiscal Policy $\widehat{\beta}_i^{IV}$
ADVANCED ECONOMIES
Sample Size 28
Countercyclical 57.14% [16]
Low-Medium Degree Procyclical 35.72% [10]
High Degree Procyclical 7.14% [2]
Min [-0.87] Max [1.78]
Average $\widehat{\beta}_i^{IV}$=-0.02
EMERGING MARKET
Sample Size 54
Countercyclical 12.96% [7]
Low-Medium Degree Procyclical 48.15% [26]
High Degree Procyclical 38.89% [21]
Min [-0.87] Max [4.88]
Average $\widehat{\beta}_i^{IV}$=1.12
LOW INCOME DEVELOPING ECONOMIES
Sample Size 46
Countercyclical 10.88% [5]
Low-Medium Degree Procyclical 17.39% [8]
High Degree Procyclical 71.73% [33]
Min [-0.71] Max [4.88]
Average $\widehat{\beta}_i^{IV}$=1.76
Degree of Fiscal Cyclicality $\widehat{\beta}_i^{IV}$ Measurement Scale
High Degree of Procyclical Fiscal Policy ($\widehat{\beta}_i^{IV} \geq 1$); Low-Medium Degree of Procyclical Fiscal Policy ($0 < \widehat{\beta}_i^{IV} < 1$); Countercyclical Fiscal Policy ($\widehat{\beta}_i^{IV} < 0$)
Level of Significance ***1%, **5% and *10%.
Note: We estimate $\widehat{\beta}_i^{IV}$ for 30 year (1985-2014) for each country to measure the cyclicality of fiscal policy and present the above summery statistics according to their country group. The country group classification is from Nielsen (2011).

economies have been able to overcome the problem of conducting the procyclical policy and became countercyclical in recent decades. Note that these results are based on country correlations between cyclical components of real government expenditure and real GDP[32]. To our end, we reinvestigate "*graduation hypothesis*" by taking the time-series regression-based approach in our sample to investigate how the cyclicality behaviour of fiscal policy has changed over the sample period. We find that our findings are still consistent with Frankel *et al.,* (2013) regarding the "*graduation hypothesis*".

We follow Frankel *et al.,* (2013) and divide the period 1970-2014 into two sub-periods: 1970-1999 (pre-1999s) and 2000-2014 (post-1999s) for each country. We estimate the fiscal cyclicality $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$ for each country over the two sub-periods[33]. Figure 2.4 (Panel A, B and C) presents a scatter plot with pre-1999s' fiscal cyclicality on the horizontal axis and post-1999s' fiscal cyclicality on the vertical axis. Figure 2.4 divides into four quadrant along the zero axes for $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$. By dividing the scatter plot into four quadrants, we can classify the countries into four categories[34].

a) *Recent graduates* (bottom-right): These are the countries that were procyclical during the pre-1999s period, and became countercyclical over the last decade (post-1999s). $\hat{\beta}$ (Panel A) indicate that in total 34 out of 137 sample countries have recently graduated. The majority of these are emerging (18) and developing (11) countries. Figure 2.4 Panel B and C also convey the same message for $\hat{\bar{\beta}}$ and $\hat{\bar{\beta}}_i^{IV}$.
b) *Established graduates* (bottom-left): These are the countries that have always been countercyclical. It can be seen that 11 out of 137 sample countries have always been countercyclical over the time 1970-2014 (Panel A). Not surprisingly, the majority of the developed countries (7) belongs to this category. Panel B and C also denote similar findings for $\hat{\bar{\beta}}$ and $\hat{\bar{\beta}}_i^{IV}$.
c) *Back to school* (top-left): These are the countries that were countercyclical during pre-1999s and turned to procyclical over the last decade (post-1999s). $\hat{\beta}$ indicate (Panel A) that a small group of countries (14 out of 137) fall into these categories. This small

[32] Frankel *et al.* (2013) analyse 94 countries data for the period 1960-2009.

[33] As a result, we estimate $\hat{\beta}_i$ and, $\hat{\bar{\beta}}_i$ for 30-year horizon for pre-1999s period (1970-1999) and 15-year horizon for post-1999s (2000-2014). Due to data availability for the instrument $EXPDEMAND_{it}$, we estimate $\hat{\bar{\beta}}_i^{IV}$ for 15-year horizon for pre-1999s period (1985-1999) and 15-year horizon for post-1999s (2000-2014). This maximizes the number of observations for regressions whilst at the same time allowing for appropriate intervals for the variables to be measured over. Because we are testing for fiscal cyclicality, we need to observe at least two or three cycle. Alesina and Tabellini (2005) also point to the importance of observing a full business cycle in the sample and thus include at least 16 years of data for each country. McManus and Ozkan (2015) also follow a similar approach, where they estimate fiscal cyclical stance for 15-year horizons using time series regression approach. The two sub-period cyclicality results are presented in Table A2.3-A2.5.

[34] We borrow the expression of the coordinate's name from Frankel *et al.*, (2013).

group of countries is split between advanced (6), emerging (3) and developing countries (5). Panel B and C visual image also convey the same result for $\hat{\tilde{\beta}}$ and $\hat{\tilde{\beta}}_i^{IV}$.

d) *Procyclicality trap* (top-right): These are the countries that continued to show procyclicality over the last forty-five years. Panel A shows that 78 out of 137 sample countries fall under this "*procyclicality trap*". Not surprisingly, majority of them are emerging (36) and developing countries (30) fall under procyclicality trap. $\hat{\tilde{\beta}}$ and $\hat{\tilde{\beta}}_i^{IV}$ conveys essentially the same message (Figure 2.4, Panel B and C).

The emerging and developing countries overcoming the problem of procyclicality (i.e., graduation hypothesis) is a welcome development. However, Figure 2.4 feature a substantial number of emerging and developing countries (i.e., $\hat{\beta}$=66, $\hat{\tilde{\beta}}$=62, and $\hat{\tilde{\beta}}_i^{IV}$=62) that are locked in the "*procyclicality trap*", which are our major interest in this Chapter. On average, we observed that for these group of countries used to be less procyclical during pre-1999s, and fiscal policy became more procyclical during post-1999s (Table 2.2). We present the change of cyclicality of fiscal policy over the two sub-time periods: pre1999s to post1999s. We have found that on average $\Delta\hat{\beta}$ is +0.19, $\Delta\hat{\tilde{\beta}}$ is +0.17 and $\Delta\hat{\tilde{\beta}}^{IV}$ is +0.29, where positive (+) values of change confirm that these group countries' procyclicality have increased over the 1970-2014 period and becoming more procyclical. (Table 2.2).

2.4.3 The prevalence of government quality

What explains the ability of emerging and developing countries that escape from the "*procyclicality trap*"? Clearly many macroeconomic and institutional factors come into play, and we believe that government quality is one of the major factors that can help countries overcome the problem. To this effect, we construct a composite index of government quality (GQ) by taking average of three normalized variables: corruption ($POLCORR$), transparency ($RELINF$) and egalitarian democracy index ($EGLDEMO$)[35]. It is important to note that our selected measures to compute GQ index are entirely different from Frankel *et al.,* (2013)'s institutional quality (IQ) index. Indeed, they measure IQ by considering investment profile, law and order, corruption, and bureaucratic quality from ICRG (International Country Risk Guide)[36]. There is no standard (or established)

[35] The GQ index calculation is based on 133 countries' annual data covering the time 1970-2014. The GQ index ranges between 0 (lowest government quality) and 1 (highest government quality). Table A2.2 provide more details on data description, construction method and their sources. Table A2.3-A2.5 provide the constructed value for GQ index.

[36] Institutions as a system of rights, rules, decision-making procedures, and programmes that give rise to social and economic practices, assign roles to nodes of government and guide interactions among the political agents of the relevant nodes (see, for example Graham *et al.,* 2003; Delmas and Young, 2009). In this regard, "*institutions*" are the tools or constitutive part of government that they will adopt to implement the policy. Better quality institutions can facilitative superior government practices.

approach to measure the GQ. In our approach, we try to incorporate only those variables that reflect how the government's power and responsibilities are exercised. More specifically, we utilize Alesina and Tabellini (2005) (rent-seeking proxied by corruption), Andersen and Nelsen (2010) (for information transparency); and Woo (2009) (for social inequality) and incorporate related variables into our GQ index to explore the link with procyclical fiscal policy.

We present the calculated GQ index in Figure 2.5, where the blue (red) bars indicate cases where the country's GQ is above (below) the sample average (0.48). Results presented in Figure 2.5 allow us to make one clear observation; advanced economies possess better GQ and their GQ Index is above the sample average (blue bars) as expected and *vice versa* for emerging and low-income developing countries (red bars). On average advanced economies have the highest GQ (0.75) compared to emerging economies (0.45) and low-income developing countries (0.35) (Table 2.3).

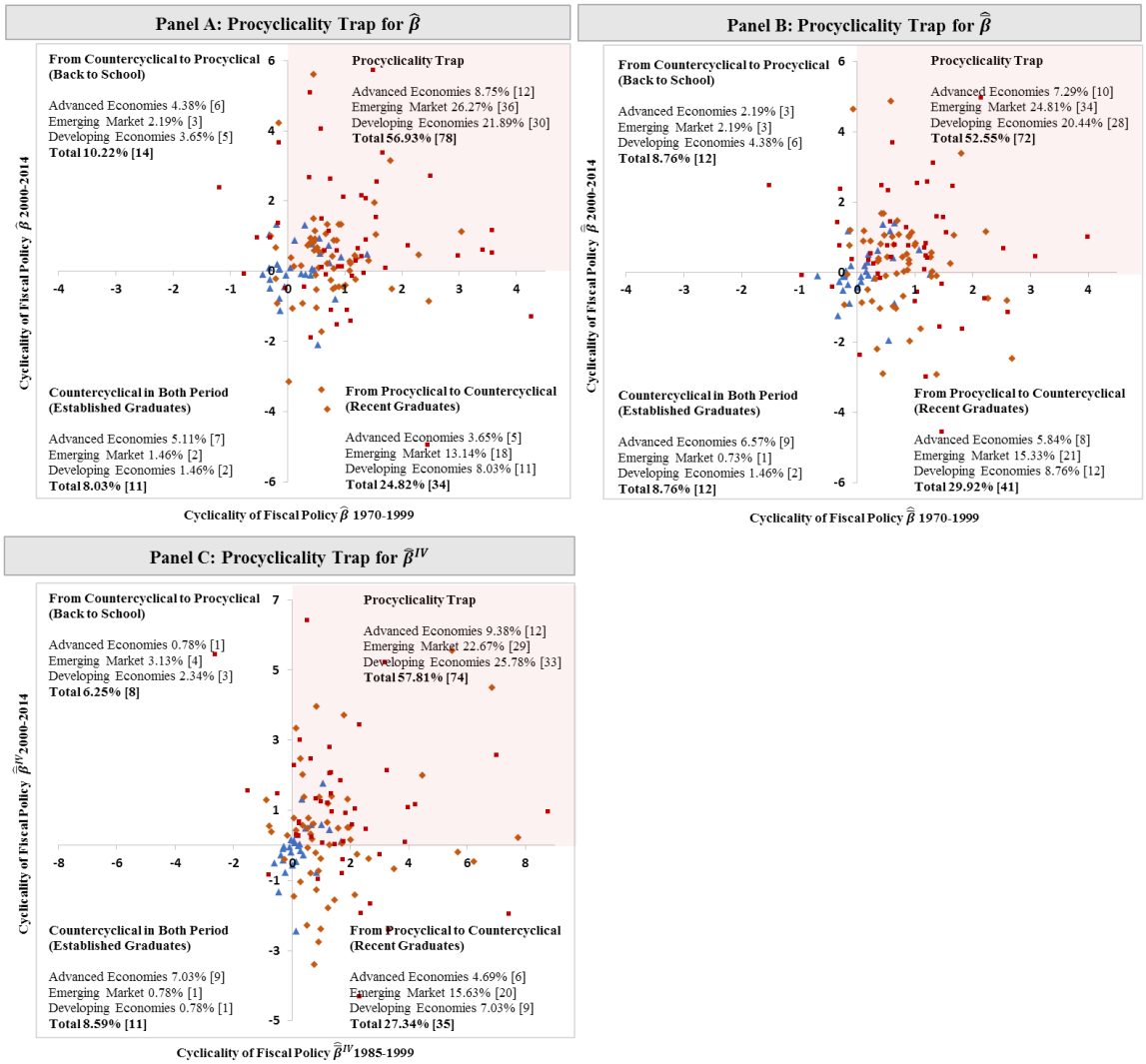
Next, we decompose GQ measures in each country group into two sub-components; initial GQ ($GQ^{1970(INITIAL}$) and change of GQ (ΔGQ). $GQ^{1970(INITIAL)}$, referring to the initial (or earliest) value of GQ observed in 1970 and ΔGQ is the difference between the average GQ value and $GQ^{1970(INITIAL)}$. Table 2.3 results denotes that advanced economies have the highest level of initial GQ (0.69) compared to emerging markets (0.40) and low-income developing countries (0.34). Additionally, highest ΔGQ values are reported for advanced world (0.07) compare to emerging (0.05) and developing countries (0.017), as is consistent with Fatás and Mihov (2003)'s arguments. Indeed, "*procyclicality trap*" countries' average GQ values are significantly lower compared to that of the advanced world (i.e. as a benchmark). "*Procyclicality trap*" countries also have the lowest improvement in GQ from the initial state of GQ (Table 2.3).

2.5 Empirical results

2.5.1 Government quality as a determinant of procyclical fiscal policy

In this section, we show that over the last few decades (1970-2014) several emerging and developing countries have been under the "*procyclicality trap*" due to a lack of better government quality (GQ). We first start by results of simple bivariate analysis. Figure 2.6 illustrates scatter plot of GQ and fiscal cyclicality ($\hat{\beta}_i$,$\widehat{\widehat{\beta}}_i$ and $\hat{\hat{\beta}}_i^{IV}$) over the period 1970-2014. We find a clear negative relationship between GQ and fiscal cyclicality.

Figure 2.4: Procyclicality Trap Over The Period 1970-2014



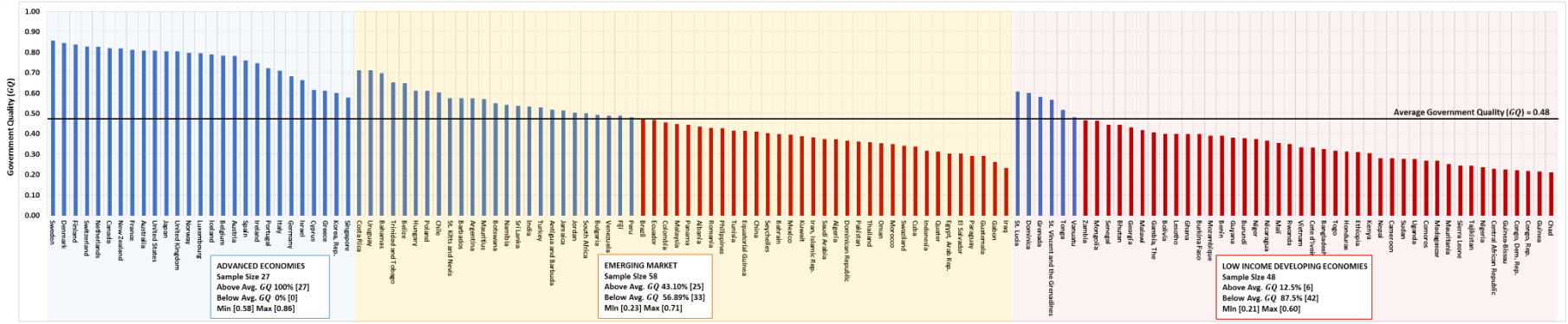
Note: We estimate $\widehat{\beta}_i$ and $\widehat{\beta}_i$ for two sub-time period 1970-1999 (pre-1999s, 30 years) and 2000-2014 (post-1999s, 15 years) for individual country. Due to data availability for the instrument $EXPDEMAND_{it}$, we estimate $\widehat{\beta}_i^{IV}$ for two sub-time period 1985-1999 (pre-1999s, 15 years) and 2000-2014 (post-1999s, 15 years) for individual country. We then presents a scatter plot with pre-1999s' estimated cyclicality indicators on the horizontal axis and post-1999s' cyclicality indicators on the vertical axis. The country group classification is from Nielsen (2011).

TABLE 2.2: CHANGE OF FISCAL CYCLICALITY OVER THE TIME 1970-2014 (PRE 1999s vs. POST 1999s)

Country Group	$\widehat{\beta}$			$\widehat{\beta}$			$\widehat{\beta}^{IV}$		
	Pre-1999s	Post-1999s	$\Delta\widehat{\beta}$	Pre-1999s	Post-1999s	$\Delta\widehat{\beta}$	Pre-1999s	Post-1999s	$\Delta\widehat{\beta}^{IV}$
All Country Group	0.794	0.456	**-0.338↓**	0.731	0.313	**-0.418↓**	1.326	0.487	**-0.838↓**
Advanced Economies	0.211	0.097	**-0.114↓**	0.150	0.014	**-0.136↓**	0.227	-0.078	**-0.304↓**
Emerging Market	0.752	0.296	**-0.456↓**	0.787	0.268	**-0.519↓**	1.478	0.369	**-1.108↓**
Developing Economies	1.211	0.878	**-0.333↓**	1.027	0.557	**-0.470↓**	1.816	0.969	**-0.846↓**
Procyclicality Trap	0.943	1.132	**+0.189↑↑**	0.919	1.091	**+0.172↑↑**	1.024	1.333	**+0.291↑↑**

Note: We estimate $\widehat{\boldsymbol{\beta}}_{\boldsymbol{I}}$ and $\widehat{\boldsymbol{\beta}}_{\boldsymbol{i}}$ for two sub-time period 1970-1999 (pre-1999s, 30 years) and 2000-2014 (post-1999s, 15 years) for individual country. Due to data availability for the instrument $\boldsymbol{EXPDEMAND_{it}}$, we estimate $\widehat{\boldsymbol{\beta}}_{\boldsymbol{i}}^{\boldsymbol{IV}}$ for two sub-time period 1985-1999 (pre-1999s, 15 years) and 2000-2014 (post-1999s, 15 years) for each country. We then take average of the cyclicality indicators for two-sub time period (pre-1999s and post-1999s) for each country group to present the above summery statistics. Change Δ calculated from 2000-2014 (post-1999s) average value minus 1970-1999 (pre-1999s) average value of $\widehat{\boldsymbol{\beta}}_{\boldsymbol{I}}$, $\widehat{\boldsymbol{\beta}}_{\boldsymbol{i}}$and $\widehat{\boldsymbol{\beta}}_{\boldsymbol{i}}^{\boldsymbol{IV}}$. The –ve (or +ve) value of Δ indicates that country groups are moving from procyclical characteristics to less (more) procyclical policy. The country group classification is from Nielsen (2011).

Figure 2.5: Government Quality (GQ) During The Period 1970-2014 for 133 Country



Government Quality (GQ) Measurement Scale

Government Quality Above Average ($GQ \geq 0.48$); Government Quality Below Average ($GQ < 0.48$)

Note: Government quality (GQ) is a normalized index ranges between 0 (lowest government quality) and 1 (highest government quality). The index is calculated by taking the average of three components: political corruption, release of information by government and egalitarian democracy index for each country. The average government quality is measured by taking a simple average of 133 country's government quality. The country group classification is from Nielsen (2011).

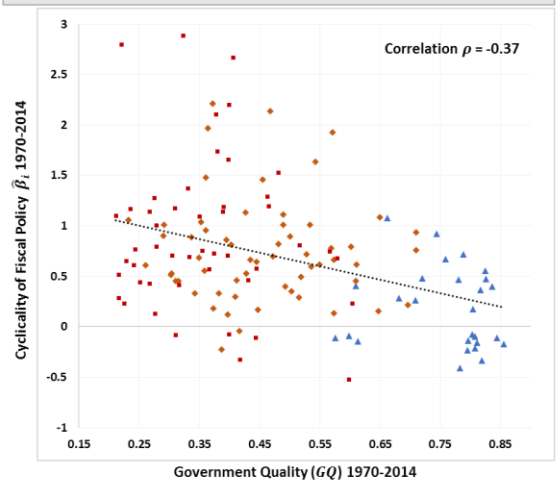
TABLE 2.3: CHANGE OF GOVERNMENT QUALITY(GQ) OVER THE TIME 1970-2014

Country Group	$GQ^{1970(INITIAL)}$	$Avg.GQ$	ΔGQ	St.Dev of GQ	Sample
All Country Group	0.437	0.481	**0.044**↑	0.18	133
Advanced Economies	0.689	0.758	**0.070**↑↑	0.08	27
Emerging Market	0.401	0.455	**0.054**↑	0.12	58
Low Income Developing	0.341	0.358	**0.017**↑	0.11	48
Procyclicality Trap $\hat{\beta}$	0.419	0.464	**0.045**↑	0.17	77
Procyclicality Trap $\hat{\beta}$	0.408	0.454	**0.046**↑	0.16	71
Procyclicality Trap $\hat{\beta}^{IV}$	0.418	0.456	**0.038**↑	0.17	74

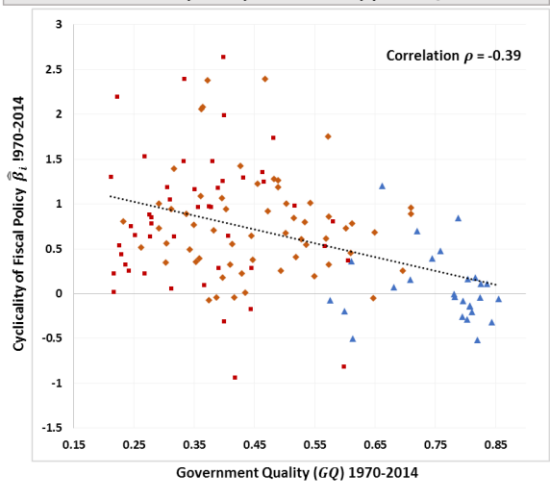
Note: Government quality (GQ) is a normalized index ranges between 0 (lowest government quality) and 1 (highest government quality). The index is calculated by taking the average of three components: political corruption, release of information by government and egalitarian democracy index. $Avg.GQ$ refer to the average government quality from 1970-2014 for each country group. $GQ^{1970(Initial)}$ refers average government quality in 1970 for each country group. $\Delta GQ = Avg.GQ - GQ^{1970(Initial)}$. We take standard deviation of GQ for each country group to present the St.Dev of GQ. The country group classification is from Nielsen (2011).

Figure 2.6: Cyclicality of Fiscal Policy and Government Quality (GQ) Over the Period1970-2014

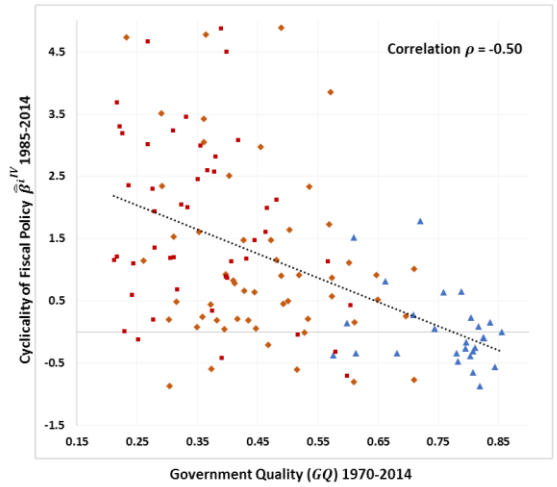
Panel A: Cyclicality of Fiscal Policy $\widehat{\beta}$ and GQ



Panel B: Cyclicality of Fiscal Policy $\widehat{\beta}$ and GQ



Panel C: Cyclicality of Fiscal Policy $\widehat{\beta}^{IV}$ and GQ



Advanced Economies
Emerging Market
Developing Economies

Note: We estimate $\widehat{\beta}_i$ and $\widehat{\beta}_i$ for 45 years (1970-2014) and $\widehat{\beta}_i^{IV}$ for 30 years period (1985-2014) for each country to measure the cyclicality of fiscal policy. GQ refer to the average government quality from 1970-2014 for each country. Government quality (GQ) is a normalized index ranges between 0 (lowest government quality) and 1 (highest government quality). The index is calculated for each country by taking the average of three components: political corruption, release of information by government and egalitarian democracy index.The country group classification is from Nielsen (2011).

The negative correlation implies that the lower (higher) the GQ in a country, the more procyclical (countercyclical) is fiscal policy. The correlation dissimilarity are observed due to the variation of fiscal cyclicality ($\hat{\beta}_i$,$\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$) estimation methods. Figure 2.6 also indicates that majority of advanced countries (blue dots) fall on the right-hand side, indicating a clear evidence of co-existing of high GQ and low level of procyclicality or even countercyclicality of fiscal policy. On the contrary, majority of the emerging (orange dots) and developing countries (red dots) are located on the left.

To formally explore whether there is a statistically significant link between the compiled fiscal cyclicality ($\hat{\beta}_i$,$\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$) and GQ, we estimate the specification (2.8), and the results of which are presented in Table 2.4. Our baseline specification is similar to Woo (2009), hence we include the initial real GDP per-capita in 1970 ($LRGDPCH$) to control for the potential impact of the level of economic development and backwardness on fiscal policy. According to Woo (2009), less developed countries may have relatively insufficient tax revenue and expenditure systems that may reflect on their fiscal policy, and hence fiscal authorities become more likely to follow procyclical policy. Additionally, $LRGDPCH$ may reflect the socio-political condition of the less developed world on fiscal outcome. Hence, $LRGDPCH$'s coefficients are expected to enter with a negative sign.

Next, we include government size ($GEXP$) measured by government expenditures as a percentage of GDP. $GEXP$ to capture the impact of government size on output (see, for example, Fatás and Mihov, 2003; Gali, 1994). It is argued that the strength of automatic stabilisers can be measured by using the size of the government ($GEXP$). That is, countries with larger governments are more likely to exhibit countercyclical fiscal policy. Hence, $GEXP$ coefficients are expected to enter the regression with a negative sign.

Our key indicator is government quality (GQ), which yields results as hypothesised earlier. The coefficients of GQ enter with an expected negative sign that are statistically significant at the 1% to 10% level (Table 2.4), suggesting that an increase in GQ reduces the degree of procyclicality. It is noticeable that the coefficient values of $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$ differ from one another. Specifically, higher coefficient values are reported for $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$ compared to $\hat{\beta}_i$. The variation in the coefficient values mainly arise from different estimation methods constructing the fiscal cyclicality measures ($\hat{\beta}_i$,$\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$). However, the impact of GQ is statistically significant with correct negative (-) sign for all computations in all three cases. The OLS estimates in Table 2.4, Col 1 imply that 0.10 unit of increase in GQ reduces the fiscal policy procyclicality by 0.97%. We also explore the

relation between individual parts of GQ ($POLCORR$, $RELINF$ and $EGLDEMO$) and the compiled fiscal cyclicality ($\hat{\beta}_i$,$\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$)[37].

We now further investigate "*procyclicality trap*" countries' data; as is presented in Table 2.4 as can be seen. The coefficient of GQ for this group are statistically significant at the 5% to 10% level with the correct negative sign (except, Table 2.4, Col 4 and 5). The coefficient values for this group are relatively low compared to the full set of countries. These results are mainly due to a high variability (i.e., standard deviation) of GQ within "*procyclicality trap*" countries, compared to the full sample of countries (see, Table 2.3).

Similar to the above, we now decompose the index GQ into its initial value $GQ^{1970(INITIAL)}$ and change of GQ (ΔGQ). The initial institutional quality is expected to be positively associated with the economic performance (see, for example, Acemoglu *et al.,* 2012). We therefore propose that initial GQ should reflect on fiscal behaviour. Table 2.5 presents cross-country regression findings for the two sets of measures ($GQ^{1970(INITIAL)}$ and ΔGQ) along with control variables $LRGDPCH$ and $GEXP$, from specification (2.8). The coefficient values of $GQ^{1970(INITIAL)}$ are statistically significant at 1% to 10% with correct negative sign except in Col 4 and 5. The negative coefficients of $GQ^{1970(INITIAL)}$ suggest that countries with better initial GQ tend to exhibit less procyclical policy. The coefficient values of ΔGQ also enter with correct negative sign. However, none of the ΔGQ coefficient values are statistically significant.

We also run a separate set of estimation by utilising specification (2.8) for "*procyclicality trap*" countries for the decomposed variables $GQ^{1970(INITIAL)}$ and ΔGQ. We get statistical significant results with correct negative sign for $GQ^{1970(INITIAL)}$ within this group of countries (Table 2.5). Some interesting results emerge by investigating the coefficient values of ΔGQ for this group of countries. The coefficient values (in an absolute term) for ΔGQ are high for "*procyclicality trap*" countries compared to the whole sample (Table 2.5, procyclicality trap Col 4, 9 and 14 vs. all country sample Cols). This result points to the importance of GQ improvements as a necessary step to overcome the fiscal procyclical trap.

[37] To formally explore whether there is a statistically significant link between the individual parts of GQ (i.e. political corruption $POLCORR$, transparency $RELINF$ and egalitarian democracy $EGLDEMO$) and the compiled fiscal cyclicality ($\hat{\beta}_i$,$\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$), we estimate the baseline specification (2.8) but the independent variable GQ is replaced by $POLCORR$, $RELINF$ and $EGLDEMO$, and the results of which are presented in Table A2.6. The coefficients of $POLCORR$, $RELINF$ and $EGLDEMO$ enter with an expected negative sign Table A2.6 show that higher $EGLDEMO$ reduce the tendency of running procyclical fiscal policy and the coefficient values of $EGLDEMO$ are statistically significant at 5% to 10% in majority of the specification. However, this effects is not found to be statistically significant for $POLCORR$ and $RELINF$. The underlying reason is the higher positive correlation among the individual parts of GQ – $POLCORR$, $RELINF$ and $EGLDEMO$ that may cause multicollinearity problems while we conduct the regression analysis (See, Table A.2.6 for the correlation matrix).

We incorporate two other important control variables in our baseline specification (2.8). We first include trade openness ($TRADE$). The argument is that countries that are more open to trade may experience greater external shock (i.e. trading partners' export demand), which may need offsetting through fiscal adjustments. Rodrik (1998) in his well-known paper argues that more open economies should have larger governments to smooth out fluctuations by conducting countercyclical fiscal policy. If so, $TRADE$ coefficients are expected to enter with negative sign. However, results in Table 2.4 and 2.5 do not support these hypotheses.

Second, we incorporate political instability ($PINSTAB$) in the baseline regression specification (2.8). Woo (2009) shows that political instability may lead to procyclical fiscal policy. The argument is that political uncertainty may shorten the policymakers' expected tenure and result in short-term policies, which may lead to procyclical fiscal policy. We follow the approach of Woo (2009) and develop a composite index for $PINSTAB$. We utilize five variables to construct the index; which is measured by government crises, revolutions, military coups, constitutional changes, and politically motivated assassination[38]. The coefficients of $PINSTAB$ are expected to enter with a positive sign. Table 2.4 and 2.5, $PINSTAB$ coefficient enter with correct positive sign but they are only statistically significant for $\hat{\beta}$.

Estimates presented in Table 2.4 and 2.5 suggest that the statistical significance and the size of coefficients of GQ, $GQ^{1970(INITIAL)}$ and ΔGQ are robust to incorporating the two control variables $TRADE$ and $PINSTAB$. We also investigate the robustness of the results to potential outliers. We, therefore, use weighted and reweighted OLS regression (WLS and RWLS method) to control for outliers[39]. Interestingly, however, the statistical significance and the size of the coefficients of GQ, $GQ^{1970(INITIAL)}$ and ΔGQ remain much the same even after controlling for the outliers (Table 2.4 and 2.5, All RCol).

2.5.2 Other determinants of procyclical fiscal policy

While it seems natural to think that GQ affect the way in which fiscal policy is conducted, our findings so far could reflect the effect of omitted variables that are related to GQ. To address this issue, we include a set of control variables X_{it} in the specification (2.8), the

[38] We use the following weights to each of the variables, as proposed by Woo (2009). More precisely, $PINSTAB = 0.04 * GOVTCRIS + 0.24 * REVOLS + 0.44 * COUPS + 0.33 * CONSTCHG + 0.07 * ASSASSIN$. The data description and the sources are presented in Table A2.2.

[39] Under the estimation process, two types of weights are used. In Huber weighting, observations with small residuals get a weight of 1, the larger the residual, the smaller the weight. With biweighting, all cases with a non-zero residual get down-weighted at least a little. The two different kinds of weight are used because Huber weights can have difficulties with severe outliers, and biweights can have difficulties converging or may yield multiple solutions. Using the Huber weights first, helps to minimise problems with the biweights.

results of which are presented in Table 2.6. Our control variables X_{it} are in line with Woo (2009) and Frankel *et al.*, (2013), as widely discussed in previous literature and they also aim at capturing the alternative theories related to cyclicality of fiscal policy. The control variables X_{it} are collected from a wide range of sources[40].

First, we use political constraint ($POLCON$) and checks and balances ($CHEKBALC$) to account for institutional quality. We consider the degree of institutional constraints for a number of reasons. Higher institutional constraints act as a checks-and-balances mechanism, which may prevent the co-ordination failure among the politicians to determine the fiscal outcomes. Second, high level of institutional constraints may have implication for public finances. More specifically, institutional constraints as a reflection of better institutional quality can improve the tax collection system and provide better monitoring on public finance disbursement (see, for example, Woo, 2009). Such constraint can therefore help as an aggregate demand management tool (i.e. countercyclical fiscal policy). Third, when the institutional constrains are well established, keeping the conflict of interest among the policy makers in check, the "*common pool*" problems and fragmented policymaking may be less harmful in determining the fiscal policy (see, for example, Velasco, 1999; Tornell and Lane, 1999; Woo, 2009), hence allowing fiscal policy to smooth out the business cycle. The variable $POLCON$ measures the intensity to which the policymakers face political constraint in executing their policies (see, for example, Henisz, 2002). Results presented in Table 2.6 (Col 1, 7 and 13) suggest that $POLCON$ coefficients enter with the expected negative sign, suggesting that higher $POLCON$ does reduce the scale of fiscal procyclicality.

We also incorporate a measure of appropriate checks and balances ($CHEKBALC$) face by politicians. Persson *et al.,* (1997) argue that appropriate checks and balances alleviate the rent extraction behaviour of the politicians, hence improve the resources allocation process. Alesina and Tabellini (2005) also highlight the importance of the rent-seeking behaviour in relation to fiscal policy outcomes. They propose that political distortions arise from rent-seeking behaviour and in democratic regimes voters demand greater public expenditure to prevent governments from appropriating rents when an economy is performing well. Stronger checks and balances impose constraints on politicians. Politicians in democratic regimes are also held more accountable to the public, relative to an autocratic regime. In a more democratic regime, the expected returns to rent-seeking activities are lower. Thus, one can argue that improved checks and balances may lead to

[40] Please refer Table A2.2 for their sources and elaborative definition.

better fiscal policy outcome by decreasing harmful rent extraction effects on fiscal stance (see, for example, Alesina and Tabellini, 2005). In Table 2.6 (Col 2, 8 and 14) results show that $CHECKBALC$ coefficients enter with correct negative sign. The negative sign indeed suggests that better checks and balances reduce the tendency of running procyclical fiscal policy. However, this effects is not found to be statistically significant.

Next, we control for political economy arguments related to the "*common pool*" problem. According to Velasco (1999) government resources (e.g. tax revenues) are a "*common property*", out of which policymaker can finance expenditure on their preferred social welfare. He argues that a society is divided into several influential interest groups and each of which benefits from government spending on their preferred social area. At the presence of weak institutional quality, each interest group and their representatives may influence the fiscal authority to set net transfer on the group's target expenditure at some desired level. Hence at the presence of common pool problem, the fiscal policy making become "*fragmented*" and interest groups try to fully internalise the benefits of the spending they propose.

The "*common pool*" problem is typically associated with the number of participates in the cabinet (see, for example, Tornell and Lane, 1998). It is argued that overspending attitude and fiscal deficit mainly arise from the diversified opinion of the policymakers and co-ordination failure regarding different economic objectives. According to this view, a fiscal deficit may arise because a group of politicians fail to internalise the implications of their expenditure financed through the common tax revenue. These problems become acute when there is a lack of coordination in the decision-making process with several political participates. Fragmented policy-making process combined with multiple objectives may create procyclical fiscal policy by triggering greater budget deficits in response to an increase in government revenue (i.e. by considering tax base variability). To examine this argument, we include $CABSIZE$ (size of the cabinet measured by the number of ministers) in our baseline specification (2.8). As is seen in Table 2.6 (Col 3, 9 and 15) $CABSIZE$ coefficients enter with a correct positive sign, however, they are insignificant.

We now consider three variables concerning the popular view of credit constraints impacting on procyclical fiscal policy. As in summarised above, it has been argued that procyclical policy arises due to cut-off from international credit markets in downturns, either because of incomplete international credit markets or credit constraints due to poor credit ratings (see, for example, Riascos and Végh, 2003; Gavin and Perotti, 1997 and others). According to this hypothesis, developing countries have limited access to

international credit markets, and they may not be able to borrow in recessions and maybe even forced to pay back during crises, leading to contractionary fiscal policy. To test this hypothesis, we incorporate country credit rating (CCR), as a measure of the borrowing constraints and access to international credit markets. We measure the CCR by using Trading Economics Credit Ratings (2014), where greater values of CCR imply better country credit ratings. Countries with better credit ratings have better access to credit markets to conduct fiscal policy in a countercyclical manner, hence CCR are expected to enter with a negative sign, as is the case in Table 2.6 (Col 4, 10 and 16). The OLS estimates in Table 2.6, Col 4 imply that 1 unit of increase in CCR reduces the fiscal policy procyclicality by 0.006%.

Second, we control for the degree of financial depth and integration. We measure the financial integration by using the Chinn-Ito financial openness index ($FINOPEN$) to measure country's accessibility in international capital market. Greater values of the $FINOPEN$ indicate better access to international capital market or better integration to international capital markets. Riascos and Vegh (2003) and Frankel *et al.,* (2013) argue that limited access to international capital markets (particularly in recession) may restrict the ability of fiscal authorities to conduct countercyclical policies. Results presented in Table 2.6 show that coefficients of $FINOPEN$ enter with correct negative sign and they are statistically significant at 1% to 5% level (except Col 17). The OLS estimates in Table 2.6, Col 5 imply that 0.10 unit of increase in $FINOPEN$ reduces the fiscal policy procyclicality by 0.55%. That is, countries with greater financial openness are indeed associated with less procyclical/more countercyclical policy.

Lastly, we incorporate financial depth ($FINDEPTH$) in specification (2.8) by using liquid liabilities over GDP. High-level of liquid liabilities may represent greater integration with foreign capital markets. Countries with a high level of liquid liabilities can be seen as to have the appropriate financial cushion to conduct countercyclical fiscal policy to smooth out the business cycle, particularly during downturns. In other words, it should be easier for fiscal authorities to conduct countercyclical policy in an environments where financial markets are deep and better integrated. Our measure of external liquid liability ($FINDEPTH$) is taken from IFS *International Financial Statistics*. The estimation results presented in Table 2.6 suggest that $FINDEPTH$ coefficients enter with correct negative sign and they are statistically significant at 1% to 10% level (except Col 18). The OLS estimates in Table 2.6, Col 6 imply that 1% of increase in $FINDEPTH$ reduces the fiscal

policy procyclicality by 0.38%. Thus, high levels of external liquid liabilities allow a country to run less procyclical or more countercyclical fiscal policy.

Results presented in Table 2.6 (Col 1 to 18) also show that government quality (GQ) remains a strong determinant of fiscal procyclicality, even after accounting for important determinants that have been widely discussed in previous literature. This is the expected direction of empirical findings – higher level of government quality (GQ) lead to lower level of procyclicality and it is statistically significant in majority of the specification (Table 2.6, Col 1 to 18). Moreover, the quantitative effect of GQ becomes larger compared to other important determinates (i.e., $POLCON$, $CHEKBALC$, $CABSIZE$, CCR, $FINOPEN$, $FINDEPTH$) of fiscal procyclicality.

2.5.3 Addressing the potential endogeneity of government quality

In this section, we try to address the potential endogeneity of GQ and cyclicality of fiscal policy by using an instrument variable (IV) approach. We address the potential endogeneity problems of cross-country analysis by using the baseline specification (2.8). We utilize two-step GMM estimation method as an IV regression to produce a consistent and efficient estimator in the presence of potential heteroscedasticity[41]. The estimation results are presented in Table 2.7.

It can be argued that the possible negative relation between GQ and fiscal cyclicality ($\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$) may arise from the fact that procyclical fiscal policies tend to destabilise the economy, which might worsen the government quality (GQ). This argument received support from the growth literature; evidence suggests that there is a strong negative effect of fiscal procyclicality on economic growth, thus development (see, for example, Woo, 2009; McManus and Ozkan, 2015). In Chapter 4, we will also systematically argue that procyclical fiscal policy is costly for macroeconomic outcomes; for example, procyclical countries have lower rates of economic growth. That is, a negative impact of procyclical fiscal policy on development may be harmful for better government quality (GQ), and not the other way around. Additionally, Frankel *et al.,* (2013) propose that procyclical fiscal policies could accelerate the chances of governments to face debt sustainability issues, especially during downturns. These critical financial requirements could then lead to

[41] We utilize GMM approach rather than conventional TSLS IV approach for the following reasons. The conventional approach of IV produces efficient estimation; however, it fails to present consistent standard errors. The issues can be handled partly by using Huber-White standard errors; yet, the IV approach fail to handle this problems at the presence of heteroscedasticity.

expropriations (i.e. act of a government confiscating privately owned property), rejection of public contacts, and intervention in different nodes of governments hierarchy. Moreover, the turmoil closely associated with debt crises can increase the tendency of corruption in the political system; deteriorating overall efficiency of public administration, hence governance quality. That is, indirect causality may also run from cyclicality of fiscal policies to government quality (GQ).

We instrumented GQ by using three different variables. First, we follow Acemoglu *et al.,*'s (2012) and instrument GQ by using European settlements ($EUSETMENT$) in 1900. They propose that European mortality rates are negatively correlated with colonized countries' institutional quality[42]. In other word, low settler mortality leads to better settlements that ensure better quality institutions, which reflects on current performance. The IV regression results in Table 2.7 confirm Acemoglu *et al.,*'s (2012) arguments. The first-stage regression results show that $EUSETMENT$ coefficients are statistically significant at 1% level with a correct positive sign (Col 1-3). The findings indeed suggest that countries with the early settlement of European Colony in 1900 have better government quality (GQ).

Second, we follow La Porta *et al.,* (1999) to instrument average government quality (GQ) by using country's legal origin[43]. The legal traditions were originated in England, Germany, France, Scandinavian, and the Soviet Union but they spread around the world through conquest, colonisation, imitation, and voluntary adoption. There are substantial distinctions among social, civil and common law traditions (La Porta *et al.,* 1999). Our objective is not to discuss these differences in depth rather we focus on only English common law ($BRITLAW$) and how it is distinct from others as a valid instrument for government performance[44].

The English common law traditions are entirely different with an old heritage; dating back to the 17th century. It has been shaped by the Parliament and the aristocracy at the expense of the Crown, and hence it has reflected a much greater extent, the intent to limit the power of the sovereign (see, for example, David and Brierley, 1978, p.303). As a result

[42] For example, Belgian Colonisation (1876-1885) of the Congo regarded as "*extractive states*". These institutions did not introduce much protection for the extractive action of government, nor did the institution provide with appropriate checks and balances against government expropriations (Acemoglu *et al.,* 2012). On the other extreme, low settler mortality rates were in favour of the development of European settlements in many parts of the world. In this part of the world, many Europeans settled in a number of colonies creating "*Neo-Europe*" states, the settlers replicate the European institutions with checks of government power and its inappropriate use. A classic example includes United States, New Zealand, Australia and Canada.

[43] We divide our sample into English law, French civil law, German civil law, Scandinavian law and Socialist law. Table A2.2 presents definitions and the data construction process.

[44] See, for example, Porta *et al.*, (1999) for a comprehensive evaluation of the distinctions among French civil law, German civil law, Scandinavian law and Socialist law.

of this influence, common law "*put the emphasis on the private rights of individuals and in particular on the property rights*" (Finer, 1997, p.1348). There is also the emphasis on restraining the government and on protecting the civilians against the government. An English common law ($BRITLAW$) tradition, then, can be taken as a valid instrument for the government quality (GQ).

Additionally, Scandinavian countries and Germany have not had many Colonies like the French and the British; hence their legal traditions are restricted to many un-colonised countries. Friedrich (1960) argued that the English common law tradition was superior to the French civil law, which was developed during the Napoleonic era to restrain judges' interference with state policies (see also, Lipset, 1994). We use English common law ($BRITLAW$) as a dummy variable 1 if a country follows English common law, and 0 otherwise. The estimation results in Table 2.7 confirm the above arguments. The first-stage regression results show that $BRITLAW$ coefficients are statistically significant at 5% level with a correct positive sign (Col 1-3). The findings indeed suggest that countries with tradition British common law ($BRITLAW$) have better government quality (GQ).

Third, we instrumented GQ by emphasising the importance of Colonial origin. More recently, La Porta *et al.,* (1997, 1999 and 2008) stress the importance of Colonial origin on current institutions, and propose that the English common-law countries and former British Colonies have better developed financial markets and property rights. Similarly, Landes (1998, Chapters 19 and 20) and North *et al.,* (1998) argue that former British Colonies ($BRITCOL$) flourished relative to the former French, Spanish, and Portuguese Colonies because of the good political and economic institutions and culture, values and norms that they have inherited from Britain. In this regard, a British Colonies ($BRITCOL$), then, can be taken as a valid instrument for the government quality (GQ). British Colonies ($BRITCOL$) is a dummy variable that is 1 if the country is Colonised by British and 0 otherwise. We fail to bring any robust conclusion for $BRICOL$ variables as their coefficients are not statistically significant and with wrong negative sign (Table 2.7. Col 1-3).

After using the above listed instruments, Table 2.7 (Col 1 to 3 for all country sample) second-stage results strongly suggest that higher GQ leads to a lower tendency of procyclical fiscal policy rather than the other way round. The estimated coefficients of GQ enter with correct negative sign and they are statistically significant at 5% to 10% level. We also investigate the sample countries under "*procyclicality trap*" separately using GMM approach to address endogeneity issue (Table 2.7, Col 4-6). The procyclicality trap countries' GQ coefficients are also statistically significant at 1% to 10% level (except, Col

4), again suggesting that better GQ is required to overcome the fiscal procyclical trap. The IV results presented in Table 2.7 are largely consistent with the OLS baseline regression results presented in Table 2.4, however the quantitative effect of GQ on fiscal cyclicality become much larger with higher values of coefficient being recorded.

Our instrumental variables satisfy two major requirements of GMM estimations: they must be orthogonal to the error term and correlated with the incorporated endogenous variables. Table 2.7 (Col 1-6) shows that *F*-test statistics indicate a test of the joint significance of the (excluded) instruments, which are presented in the first-stage regressions. The overidentification test presented in Hansen *J*-test statistics is presented to test whether the instrument is uncorrelated with the error term. The results are consistent with the presence of a general form of heteroscedasticity. The Hansen *J*-statistics indicates that our proposed instruments satisfy the orthogonality conditions (except, Table 2.7, Col 4).

2.5.4 Robustness checks

We check the robustness of our results by utilising alternative measures of cyclicality from the earlier studies. In this approach, we use our baseline specification (2.8) but the dependent variable of cyclicality of fiscal policy $Fis\widehat{Cycl}nd_{it}$ is replaced by fiscal cyclicality index, which was developed by previous literature (i.e., Frankel *et al.,* 2013; Talvi and Végh, 2005, Kaminsky *et al.,* 2004; Alesina and Tabellini, 2005). This method helps us to examine the link between our constructed GQ index and the earlier literature's fiscal cyclicality index. Please note all the fiscal cyclicality indices are developed by utilising correlation approach, not a regression-based approach (except, Alesina and Tabellini, 2005). One issue with the availability of the fiscal policy cyclicality measurement from the previous studies is the reduced number of observations compared to our cyclicality measurement. Nonetheless, the estimation results are conclusive and they are presented in Table 2.8.

First, we use Frankel *et al.,* (2013) cyclicality index ($FVV2013$). They present the indicator based on country correlations between the cyclicality components of real GDP and real central government expenditures for a sample of 94 countries for the period 1960 to 2009. According to their index, a positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. Table 2.8 shows both OLS (presented in Col 1) and robust regression (controlled for outliers; presented in RCol 2) results. All estimated coefficients

of GQ are statistically significant at 1% level with correct negative sign. The findings confirm our earlier findings.

Second, we consider Talvi and Végh (2005) cyclicality index ($TV2005$). Their index is similar to the $FVV2013$ index, but Talvi and Végh use general government expenditure compared to central government expenditure, and their sample size is 56 counties for the period 1970-1994. The estimated coefficients of GQ are statistically significant at 5% to 10% with correct negative sign (Table 2.8, Col 3) but it is not statistically significant when we control for outliers (RCol 4). The negative coefficient of GQ indeed suggests that better government quality reduces the tendency to run procyclical policy.

Third, we use Kaminsky *et al.,* (2004) index, which is developed for 104 sample countries for 1960 to 2003. They present the indicator based on the correlation of real GDP growth with cyclical components of central government spending ($KRV2004CGEXP$). According to their index, a positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. They utilize an alternative measure the correlation of real GDP with cyclical components of inflation tax as a proxy for tax rate ($KRV2004INFTAX$). This index implies that a positive (negative) correlation indicates countercyclical (procyclical) fiscal policy. They also develop a composite index of fiscal cyclicality based on the correlation of cyclical components of real GDP and real government expenditures, the correlation between the cyclical components of real GDP and inflation tax, and the amplitude of the real government expenditure cycle. We denoted this indices by $KRV2004INDEX$, whereby a positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. After using all the three cyclicality indices from Kaminsky *et al.,* (2004), we find that GQ coefficients are statistically significant at 1% level and with correct negative sign for $KRV2004CGEXP$ and $KRV2004INDEX$ (Table 2.8, Col 5-6 and Col 9-10). The negative coefficient of GQ indeed suggests that better government quality reduces the tendency to run procyclical fiscal policy. GQ coefficients enter with positive sign for $KRV2004INFTAX$ (Table 2.8, Col 7-8). The positive sign suggests that better government increases (decreases) tax rates in economic good (bad) times to avoid the procyclical fiscal policy.

Finally, we utilise Alesina and Tabellini (2005) index, who consider the regression-based approach, where fiscal variables are regressed on statistical measures of output and other control variables. They utilize fiscal variables such as budget surplus and government tax revenue as a percentage of GDP and government spending as a share of GDP for each country. We denote the fiscal cyclicality index as $AT2005SURPLUS$ when using budget surplus as a measure of fiscal action and $AT2005REVENUE$ with government tax revenues.

As is suggested by Alesina and Tabellini (2005), $AT2005SURPLUS$ index with negative (positive) coefficient values implies procyclical fiscal policies (countercyclical), and *vice versa* for $AT2005REVENUE$. We find that GQ coefficients are statistically significant at 5% to 10% level (Table 2.8, Col 11-13) and with a correct positive sign. The positive sign indicates that countries with better government quality adjust the tax revenues (i.e. tax rate) and expenditures to stabilize the business cycle by conducting countercyclical fiscal policy.

Results presented in Table 2.8 again show that government quality (GQ) remains a strong determinant for fiscal procyclicality regarding sign and statistically significance, even after accounting for the alternative measures of fiscal cyclicality index from earlier studies. We also account for other determinants $LRGDPCH$, $GEXP$, $TRADE$ and $PINSTAB$ in the regression as a control variable, but their coefficients are occasionally significant. We also consider WLS and RWLS to control for outliers and denoted by RCol. Nevertheless, government quality (GQ) remains a strong determinant of fiscal procyclicality concerning sign and statistical significance.

2.5.5 Further extensions: addressing cross-country variability

We have observed (Table 2.2 and 2.3) cyclical behaviour of fiscal policy and the GQ impact of varied in different sample periods; 1970-1999 (pre-1999s) and 2000-2014 (post-1999s). Although there may be a noticeable improvement (deterioration) of fiscal policy cyclicality stances as the GQ improves (deteriorates) across the sample group; however, large variations remain within the sample countries' cyclicality and GQ relationship.

To explore further, we use panel data regressions to explore within-country variability as opposed to cross-country variability that we have already estimated by using specification (2.8). We attempt to capture the interaction between the measure of fiscal cyclicality and GQ, and our specification takes the following form[45].

$$\Delta logG_{it}^{CYC} = \beta_i^P\ OUT\_GAP_{it} + \vartheta_i^P GQ_{it} + \gamma_i^P (OUT\_GAP_{it} \cdot GQ_{it}) + \delta_i^P\ (OUT\_GAP_{it} \cdot X_{it}) +\ \alpha_i + \eta_t + \xi_{it} \quad (2.9)$$

As defined earlier $\Delta logG_{it}^{CYC}$ is the cyclical components of real government consumption and output gap (OUT_GAP_{it}) is the cyclical components of real GDP. Cyclical components are measured by log deviations from Hodrick-Prescott trend. Our key variable of interest

[45] Our preferred method is similar to Calderón and Schmidt-Hebbel (2008), Alesina and Tabellini (2005) and Frankel *et al.*, (2013).

is government quality (GQ_{it}), as defined earlier. X_{it} is a vector of other controls that we have discussed in cross-country analysis, and α_i, η_t, ξ_{it} are unobserved error terms.

The interaction term in specification (2.9) between the government quality (GQ_{it}) with output cycle (OUT_GAP_{it}) will determine whether the GQ_{it} plays a role the way which fiscal authorities respond to business cycle fluctuations. More precisely, under the specification (2.9), the degree of cyclicality of fiscal policy is determined by the following equation.

$$\frac{\partial(\Delta log G_{it}^{CYC})}{\partial(OUT\_GAP_{it})} = \beta_i^P + \gamma_i^P GQ_{it} + \delta_i^P X_{it} \tag{2.10}$$

Specification (2.10) indicates that at the presence of better GQ_{it}, we expect the interaction term coefficient γ_i^P to be negative. More specifically, a negative value of the coefficient ($\hat{\gamma}_i^P < 0$) will indicate the causal link running from stronger government quality to less procyclical or more countercyclical fiscal policy. In other words, countries with more procyclical fiscal policy need the higher quality of government.

We estimate specification (2.9) by using yearly panel data, pulling all countries together for the period 1970-2014. As we include country fixed effects, the estimates only reflect within-country variations. We also use cross-sectional weighting matrix assuming the presence of cross-section heteroscedasticity. Please note, we estimate the specification (2.9) by utilising the OLS method, although there is the probability of potential endogeneity problem. The underlying reason is the lack of appropriate time variant instruments for GQ_{it} to perform GMM estimation.

Table 2.9 (Col 1-2) present panel data regression results by interacting the OUT_GAP_{it} with a measure of GQ_{it}. The interaction term coefficients $\hat{\gamma}_i^P$ enters with correct negative sign, and they are significant at 1% level (Table 2.9, Col 1-2). As is also presented in Table 2.9 (Col 3-8), estimated coefficient $\hat{\gamma}_i^P$ for "*procyclicality trap*" countries enter with correct negative signs and they are statistically significant at 1% level. The findings confirm that procyclical policy is more prevalent countries with lower government quality countries. Our main result from panel data continues to hold along with the cross-country regression results presented in Table 2.4. In sum, both panel and cross-country estimation results suggest that an increase in government quality (GQ_{it}) reduces the degree of procyclicality. Results presented in Table 2.9 (Col 9-16) also depict a causal link running from stronger $GQ^{1970(INITIAL)}$ combined with the enhancement in ΔGQ_{it} to less procyclical or more countercyclical fiscal policy.

We incorporate three additional regressors ($LRGDPCH$, $GEXP$, $TRADE$ and $PINSTAB$) as control variables. These variables are identical to cross-country regression specification (2.8), but now they are presented with an interaction term with OUT_GAP_{it}. The interaction term allows us to capture cyclical characteristics of a country along with the economic condition captured by the proposed control variables. The interaction term coefficients of $LRGDPCH$, $GEXP$, $TRADE$, and $PINSTAB$ enter with correct sign in line with our cross-country regression results presented in Table 2.4 and 2.5. After incorporating the above control variables in the panel repression; the statistical significance and the sign of interaction term coefficients of GQ_{it}, $GQ_{it}^{1970(INITIAL)}$ and ΔGQ_{it} remain the same (Table 2.9), which we have already observed in cross-country regression.

We also carry out a comprehensive analysis of omitted variables in panel regression similar to earlier that are also major determinants of cyclicality of fiscal policy. To address this issue, we include set of control variables X_{it}, which we have discussed in the cross-country method, but now they are presented with an interaction term with OUT_GAP_{it} in panel regression and the results are presented in Table 2.10. The interaction term allows us to capture cyclical characteristics of a country along with the political and financial indicators. The interaction term coefficients of control variables $POLCON$, $CHEKBAL$, $CABSIZE$, CCR, $FINOPEN$, and $FINDEPTH$ enter with correct signs in line with our cross-country regression results presented in Table 2.6. Table 2.10 show that the key variable term GQ_{it} remains a strong determinant of fiscal procyclicality. Having examined the cross-country variability using panel estimation process, we conclude that GQ_{it} remains strongly negatively related to the cyclicality of fiscal policy, suggesting that better government quality is required to reduce the observed procyclicality.

2.6 Conclusions

We have shown that over the past few decades a substantial number of emerging and developing countries have been trapped in a procyclical fiscal policy stance, in the sense of not being able to escape from procyclical to countercyclical fiscal policy. Further, we have found that government quality is a critical determinant of the way fiscal policy is conducted, by formally linking the degree of fiscal procyclicality with government quality. Our empirical findings show that government quality is strongly and negatively associated with the degrees of fiscal procyclicality. The empirical findings remain robust to other determinants a large number of alternative specification. We have also used a different set of procyclicality index from previous literature and find that government

quality remains an important determinant for cyclical characteristics of fiscal policy. Finally, we focused on cross-country variability via panel data estimation. Our findings suggest that there is a strong underlying link running from better government quality (i.e., low corruption, high transparency and high level of egalitarian democracy index) to less procyclical fiscal outcome.

Our findings point to the importance of the theoretical arguments related to political-economy constraints. Voters do not believe corrupt government with additional fiscal surpluses and demand increase in government expenditure during economic boom. Otherwise, they fear that fiscal resources would be wasted in corruption at the presence of low transparency and egalitarian democracy. For the similar reason voters do not permit government to accumulate fiscal surpluses, on the contrary voter demand a level of debt that forces the government to use the surpluses to payback the interest rather than use it for political rent. Therefore this political distortion, associated to the "starve the leviathan" argument, leads to a higher than procyclical fiscal policy. In addition, credit restrictions (i.e., restricted access to international capital markets) come into play indirectly because political distortion may force the government to take certain amount of debt that are at the limit of what government can repay back (i.e., debt sustainability), therefore at the constraints of international credit.

Three policy implications can be drawn from our study. First, emerging and developing countries' countercyclical policy is severely hampered by rent extraction behaviour and low transparency. Strengthening checks and balances may restrict the rent extraction behaviour by imposing constraints on politicians in a democratic regimes. Improved checks and balances may lead to better fiscal policy outcomes by decreasing harmful rent extraction effects on fiscal stance (see, for example, Alesina and Tabellini, 2005). Second, government should enhance the fiscal transparency to reduce the moral hazard problem between international lenders and fiscal authorities. At the presence of better transparency, the international lender can observe the true size of the fiscal authorities' balance sheet liabilities and therefore countries with more transparency are less likely to face credit constraints, particularly during the downturns and helping them to run countercyclical policy. Third, in many countries there may be a scope for fiscal rules that limit the discretion for procyclical fiscal policy during upturns in the business cycle. The policy rules may improve both procyclicality bias and fiscal deficit at the same time.

However, countercyclical policies that contribute to a deficit bias will not be sustainable[46]. Appropriate designed policy rules may help to cope with the political distortion for those group of countries that are behind to conduct countercyclical policies, and are in fiscal deficit. Policy rules may help to accumulate surpluses in good times by keeping surpluses out of the reach of political pressure associated with discretionary budgetary practices. The policy rules give credibility to the sustainability of deficits in downturns, if countries experienced fiscal surpluses in upturns. Because such deficits will be limited by the fiscal rules, and it is possible to overcome the problems of asymmetric information about fiscal policies, therefore improving the likelihood that fiscal deficits can be financed in recession to conduct countercyclical policy (see, for, example, Perry and Servén, 2008).

The procyclical policy accentuates macroeconomic volatility, with harmful effects on growth. McManus and Ozkan (2015) demonstrate that procyclical fiscal policy is positively associated with output volatility and inflation volatility. In Chapter 4, we also find that procyclical fiscal policy is costly for the macroeconomic outcomes; in a sense, procyclical countries have lower rates of economic growth, higher rates of output volatility and inflation volatility. Escaping procyclicality trap, however, can be a long and arduous road and does require clear transparent policy making process and a strong political consensus. Improving government quality is not an easy process and often occurs slowly over a period. Additionally, appropriate checks and balances are needed to monitor the public decision-making process along with rent extraction behaviour that are important determinants for the cyclical properties of fiscal policy. In particular, countries with low government quality may improve on the policy making process by integrating stringent constitutional rules on policymaking.

In this Chapter, we proxied government quality by measures of corruption, transparency and democratic equality. However, overall government quality is also related to socio-economic conditions, government stability, internal conflict, external conflict, religious tensions and ethnic tensions, the rule of law, the quality of accountability, and the quality of bureaucracy among other measures. However, a comprehensive data set for a large sample of countries over a long horizon period is not available. In this case, there remains an important question regarding the most efficient ways to compose and measure the government quality and its' link with fiscal policy. This will be an interesting avenue for future research.

[46] Perry and Servén (2008) advised that fiscal rules that attempts to reduce the fiscal deficit and achieve fiscal solvency, while increasing procyclicality, also likely to prove unsustainable over the medium-run.

TABLE 2.4: CROSS-COUNTRY REGRESSION OF FISCAL CYCLICALITY WITH GOVERNMENT QUALITY (GQ), 1970-2014
(DEPENDENT VARIABLE: CYCLICALITY OF FISCAL POLICY)

	ESTIMATION METHOD: OLS														
	Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\beta}_i$					**Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\widehat{\beta}_i}$**					**Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\widehat{\beta}_i}^{IV}$**				
	All Countries			**Procyclicality Trap Sample**		**All Countries**			**Procyclicality Trap Sample**		**All Countries**			**Procyclicality Trap Sample**	
REGRESSORS	**Col 1**	**Col 2**	**RCol 3**	**Col 4**	**RCol 5**	**Col 6**	**Col 7**	**RCol 8**	**Col 9**	**RCol 10**	**Col 11**	**Col 12**	**RCol 13**	**Col 14**	**RCol 15**
LRGDPCH	-0.111 (0.149)	-0.084 (0.143)	-0.087 (0.132)	-0.120 (0.170)	-0.073 (0.166)	-0.018 (0.151)	0.010 (0.154)	-0.029 (0.149)	0.046 (0.142)	0.116 (0.156)	-0.497 (0.329)	-0.496 (0.353)	-0.383 (0.335)	-0.406 (0.436)	-0.503 (0.416)
GEXP	-0.022* (0.012)	-0.010 (0.012)	-0.004 (0.011)	-0.004 (0.015)	0.007 (0.013)	-0.032** (0.014)	-0.024* (0.014)	-0.015 (0.012)	-0.021 (0.017)	-0.007 (0.013)	-0.011 (0.029)	0.021 (0.027)	0.011 (0.026)	0.036 (0.032)	0.064 (0.040)
GQ	-0.973*** (0.306)	-0.756** (0.317)	-0.577 (0.353)	-0.424 (0.315)	-0.316 (0.428)	-1.247*** (0.332)	-1.275*** (0.334)	-1.152*** (0.398)	-0.799** (0.328)	-0.703* (0.408)	-2.739*** (0.792)	-2.450*** (0.790)	-2.48*** (0.851)	-2.532** (1.033)	-2.70** (1.017)
TRADE		-0.002** (0.001)	-0.001 (0.001)	0.001 (0.002)	0.001 (0.002)		-0.002** (0.001)	-0.002 (0.001)	-0.001 (0.002)	0.001 (0.002)		-0.002 (0.002)	-0.002 (0.003)	-0.005 (0.006)	-0.006 (0.005)
PINSTAB		1.288** (0.631)	1.212** (0.578)	1.534* (0.887)	1.758** (0.728)		0.276 (0.668)	0.195 (0.653)	0.410 (0.638)	0.764 (0.680)		1.391 (1.149)	1.708 (1.327)	0.359 (1.588)	0.257 (1.431)
STATISTICS															
ADJUSTED R^2	15.46%	20.20%	17.08%	8.42%	8.79%	19.00%	20.07%	16.71%	7.36%	8.96%	23.76%	22.92%	22.87%	9.33%	14.76%
OBSERVATIONS	**134**	**126**	**126**	**71**	**71**	**134**	**126**	**126**	**65**	**65**	**127**	**119**	**119**	**67**	**67**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Col estimation is based on white heteroscedasticity-consistent standard errors & covariance.
RCol estimation is based on weighted and reweighted OLS regression to control for outliers.
Procyclicality trap are the sample countries conducting procyclical fiscal policy in both sub-period 1970-1999 and 2000-2014.
See data appendix for variable definitions and sources.

TABLE 2.5: CROSS-COUNTRY REGRESSION OF FISCAL CYCLICALITY WITH INITIAL GOVERNMENT QUALITY (GQ) AND CHANGE OF GOVERNMENT QUALITY (ΔGQ), 1970-2014
(DEPENDENT VARIABLE: CYCLICALITY OF FISCAL POLICY)

	ESTIMATION METHOD: OLS														
	Dependent Variable: Cyclicality of Fiscal Policy $\hat{\beta}_i$					**Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\beta_i}$**					**Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\beta}_i^{IV}$**				
	All Countries			**Procyclicality Trap Sample**		**All Countries**			**Procyclicality Trap Sample**		**All Countries**			**Procyclicality Trap Sample**	
REGRESSORS	**Col 1**	**Col 2**	**RCol 3**	**Col 4**	**RCol 5**	**Col 6**	**Col 7**	**RCol 8**	**Col 9**	**RCol 10**	**Col 11**	**Col 12**	**RCol 13**	**Col 14**	**RCol 15**
LRGDPCH	-0.133 (0.147)	-0.102 (0.141)	-0.104 (0.134)	-0.119 (0.163)	-0.066 (0.170)	-0.051 (0.150)	-0.019 (0.154)	-0.054 (0.149)	0.046 (0.140)	0.119 (0.160)	-0.491 (0.334)	-0.425 (0.348)	-0.398 (0.342)	-0.411 (0.423)	-0.472 (0.416)
GEXP	-0.019 (0.012)	-0.010 (0.012)	-0.004 (0.011)	-0.004 (0.015)	0.007 (0.013)	-0.029** (0.014)	-0.023 (0.015)	-0.013 (0.012)	-0.021 (0.017)	-0.007 (0.013)	-0.003 (0.027)	0.006 (0.027)	0.010 (0.027)	0.041 (0.032)	0.064 (0.039)
$GQ^{1970(INITIAL)}$	-1.028*** (0.304)	-0.791** (0.314)	-0.632* (0.363)	-0.426 (0.354)	-0.279 (0.444)	-1.321*** (0.332)	-1.329*** (0.331)	-1.183*** (0.406)	-0.791** (0.389)	-0.686** (0.315)	-3.081*** (0.801)	-2.632*** (0.779)	-2.56*** (0.844)	-3.156*** (1.085)	-3.32*** (1.123)
ΔGQ	-0.263 (0.683)	-0.286 (0.714)	-0.022 (0.702)	-0.437 (0.747)	-0.555 (0.816)	-0.247 (0.696)	-0.551 (0.737)	-0.518 (0.785)	-0.808 (0.579)	-0.812 (0.777)	-2.530 (1.617)	-2.708 (1.651)	-2.500 (1.649)	-2.955 (1.892)	-2.851 (1.971)
TRADE		-0.002** (0.001)	-0.002** (0.001)	0.001 (0.002)	0.001 (0.002)		-0.002** (0.001)	-0.002 (0.001)	-0.001 (0.002)	0.001 (0.002)		-0.002** (0.001)	-0.002 (0.003)	-0.006 (0.006)	-0.008 (0.005)
PINSTAB		1.281** (0.623)	1.242** (0.583)	1.536*** (0.890)	1.750** (0.736)		0.265 (0.657)	0.216 (0.652)	0.416 (0.644)	0.756 (0.690)		1.178 (1.188)	1.144 (1.084)	0.326 (1.599)	0.498 (1.425)
STATISTICS															
ADJUSTED R^2	15.40%	19.53%	17.24%	7.00%	7.23%	19.36%	19.75%	15.88%	5.72%	7.29%	24.06%	22.51%	21.81%	9.81%	15.34%
OBSERVATIONS	**134**	**126**	**126**	**71**	**71**	**134**	**126**	**126**	**65**	**65**	**127**	**119**	**119**	**67**	**67**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term
Col estimation is based on white heteroscedasticity-consistent standard errors & covariance.
RCol estimation is based on weighted and reweighted OLS regression to control for outliers.
Procyclicality trap are the sample countries conducting procyclical fiscal policy in both sub-period 1970-1999 and 2000-2014.
See data appendix for variable definitions and sources.

TABLE 2.6: CROSS-COUNTRY REGRESSION OF FISCAL CYCLICALITY WITH ADDITIONAL EXPLANATORY VARIABLES, 1970-2014
(DEPENDENT VARIABLE: CYCLICALITY OF FISCAL POLICY)

	ESTIMATION METHOD: OLS																	
	Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\beta}_i$						**Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\widehat{\beta}_i}$**						**Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\widehat{\beta}_i}^{IV}$**					
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**	**Col 7**	**Col 8**	**Col 9**	**Col 10**	**Col 11**	**Col 12**	**Col 13**	**Col 14**	**Col 15**	**Col 16**	**Col 17**	**Col 18**
LRGDPCH	-0.127 (0.159)	-0.062 (0.166)	-0.094 (0.134)	0.082 (0.179)	-0.031 (0.155)	-0.079 (0.134)	-0.004 (0.174)	0.013 (0.183)	-0.057 (0.156)	0.069 (0.219)	0.009 (0.172)	0.010 (0.148)	-0.420 (0.375)	-0.599 (0.393)	-0.663* (0.353)	0.161 (0.509)	-0.429 (0.435)	-0.459 (0.347)
GEXP	-0.011 (0.013)	-0.010 (0.013)	-0.010 (0.012)	-0.012 (0.013)	-0.004 (0.013)	-0.011 (0.013)	-0.025 (0.016)	-0.027 (0.016)	-0.021 (0.014)	-0.023 (0.016)	-0.018 (0.016)	-0.026* (0.015)	0.027 (0.025)	0.014 (0.030)	0.031 (0.023)	0.033 (0.025)	0.023 (0.029)	0.019 (0.027)
GQ	-0.570 (0.533)	-0.797* (0.461)	-0.688** (0.333)	-0.684 (0.570)	-0.321 (0.282)	-0.389 (0.343)	-1.133* (0.578)	-1.069** (0.515)	-1.114* (0.344)	-1.413** (0.653)	-0.837** (0.323)	-0.973** (0.377)	-3.063*** (1.054)	-1.954* (1.006)	-2.613*** (0.829)	-2.571* (1.290)	-2.136** (0.845)	-2.080** (0.859)
TRADE	-0.002 (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.002* (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.001 (0.001)	-0.002** (0.001)	-0.001 (0.003)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
PINSTAB	1.269* (0.624)	1.080 (0.677)	1.142* (0.623)	1.314* (0.684)	1.032* (0.566)	1.283** (0.610)	0.113 (0.683)	0.092 (0.682)	0.080 (0.669)	0.290 (0.790)	-0.233 (0.631)	0.286 (0.657)	1.430 (1.202)	1.202 (1.195)	1.278 (1.131)	2.528 (1.558)	1.416 (1.202)	1.233 (1.158)
POLCON	-0.327 (0.564)						-0.379 (0.603)						-0.369 (1.039)					
CHEKBALC		-0.022 (0.074)						-0.056 (0.074)						-0.069 (0.094)				
CABSIZE			0.004 (0.008)						0.013 (0.011)						0.025 (0.019)			
CCR				-0.006** (0.003)						-0.008** (0.004)						-0.020** (0.008)		
FINOPEN					-0.547** (0.223)						-0.652** (0.264)						-0.313 (0.585)	
FINDEPTH						-0.388*** (0.131)						-0.298* (0.155)						-0.458 (0.306)
STATISTICS																		
ADJUSTED R^2	20.93%	19.24%	19.34%	36.53%	23.70%	22.26%	20.18%	19.79%	19.10%	29.72%	24.31%	21.01%	24.51%	23.06%	24.97%	30.85%	20.35%	23.31%
OBSERVATIONS	**118**	**115**	**120**	**93**	**113**	**125**	**118**	**115**	**120**	**93**	**113**	**125**	**112**	**112**	**113**	**89**	**108**	**119**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term
All the estimation is based on white heteroscedasticity-consistent standard errors & covariance.
See data appendix for variable definitions and sources.

TABLE 2.7: IV REGRESSION OF FISCAL CYCLICALITY WITH GOVERNMENT QUALITY (GQ), 1970-2014

PANEL A: GMM ESTIMATION (SECOND STAGE REGRESSION)

	ALL COUNTRIES			PROCYCLICALITY TRAP SAMPLE		
EXPLANATORY VARIABLE	**Dependent Variable $\widehat{\beta}_i$**	**Dependent Variable $\widehat{\beta}_i$**	**Dependent Variable $\widehat{\beta}_i^{IV}$**	**Dependent Variable $\widehat{\beta}_i$**	**Dependent Variable $\widehat{\beta}_i$**	**Dependent Variable $\widehat{\beta}_i^{IV}$**
	Col 1	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**
LRGDPCH	-0.031 (0.186)	0.147 (0.198)	-0.651 (0.434)	-0.151 (0.242)	0.253 (0.219)	-0.624 (0.489)
GEXP	-0.015 (0.015)	-0.039** (0.016)	0.029 (0.033)	-0.008 (0.024)	-0.058** (0.024)	0.069 (0.056)
GQ	-1.186* (0.671)	-1.807** (0.711)	-3.286** (1.317)	-0.729 (0.839)	-1.439* (0.786)	-5.098*** (1.849)
TRADE	-0.002** (0.001)	-0.003* (0.002)	-0.003 (0.003)	-0.001 (0.003)	0.001 (0.003)	-0.009 (0.006)
PINSTAB	0.968 (0.779)	0.088 (0.826)	0.902 (1.197)	0.940 (1.073)	0.082 (0.968)	2.232 (1.699)

PANEL B: FIRST STAGE REGRESSION

EXCLUDED INSTRUMENTS	**Dependent Variable GQ**					
EUSETMENT	0.003*** (0.0003)	0.003*** (0.0003)	0.003*** (0.000)	0.003*** (0.0005)	0.003*** (0.0004)	0.003*** (0.0005)
BRITLAW	0.073** (0.028)	0.073** (0.028)	0.064** (0.031)	0.105*** (0.035)	0.162*** (0.048)	0.141*** (0.050)
BRITCOL	-0.026 (0.032)	-0.026 (0.032)	-0.039 (0.034)	-0.012 (0.037)	-0.052 (0.047)	-0.103** (0.049)
STATISTICS						
CENTRED R^2	25.55%	26.62%	35.97%	16.83%	23.43%	34.49%
UNDERIDENTIFICATION TEST[1] ***(LM STATISTIC)***	*43.31* *(P=0.000)*	*43.31* *(P=0.000)*	*39.12* *(P=0.000)*	*26.52* *(P=0.000)*	*25.44* *(P=0.000)*	*18.11* *(P=0.000)*
WEAK IDENTIFICATION F-TEST ON JOINT SIGNIFICANCE OF EXCLUDED INSTRUMENTS[2]	*F= 24.11*	*F= 24.11*	*F= 21.02*	*F= 15.52*	*F= 16.05*	*F= 8.224*
OVERIDENTIFICATION TEST (*J-STATISTICS*)[3] ***Null: The instruments are valid instruments***	*Sargan Statistics = 2.789* *(P=0.248)* **Accept Null**	*Sargan Statistics = 0.774* *(P=0.679)* **Accept Null**	*Sargan Statistics = 2.675* *(P=0.262)* **Accept Null**	*Sargan Statistics = 5.378* *(P=0.068)* **Reject Null**	*Sargan Statistics = 3.703* *(P=0.157)* **Accept Null**	*Sargan Statistics = 0.869* *(P=0.648)* **Accept Null**
OBSERVATIONS	**96**	**96**	**90**	**51**	**45**	**46**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term. See data appendix for variable definitions and sources.
[1] The test is essentially the test of the rank of a matrix: under the null hypothesis that the equation is underidentified. A rejection of the null indicates that the matrix is full column rank, i.e., the model is identified.
[2] Weak identification arises when the excluded instruments are correlated with the endogenous regressors, but only weakly. Estimators can perform poorly when instruments are weak, and different estimators are more robust to weak instruments (e.g., LIML) than others (e.g., IV); see, e.g., Stock and Yogo (2002) for further discussion. Under the null, the excluded instruments are correlated with the endogenous regression, but only strongly. A rejection of null indicates that the excluded instruments are correlated with the endogenous regressors, but only weakly.
[3] The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. A rejection of null indicates that the instruments are not valid instruments.

TABLE 2.8: ROBUSTNESS CHECK: ALTERNATIVE MEASURES OF FISCAL CYCLICALITY FROM Frankel *et al.* (2012), Talvi And Vegh (2005), Kaminsky *et al.* (2004), Alesina And Tabellini (2005)

	FVV2013[1]		TV2005[2]		KRV2004 CGExp[3]		KRV2004 InfTax[4]		KRV2004 Index[5]		AT2005 Surplus[6]		AL2005 Revenue[7]	
REGRESSORS	**Col 1**	**RCol 2**	**Col 3**	**RCol 4**	**Col 5**	**RCol 6**	**Col 7**	**RCol 8**	**Col 9**	**RCol 10**	**Co 11**	**RCol 12**	**Col 13**	**RCol 14**
LRGDPCH	-0.063 (0.089)	-0.036 (0.084)	0.017 (0.165)	-0.052 (0.183)	0.046 (0.130)	0.084 (0.128)	-0.403 (0.427)	-0.045 (0.110)	0.024 (0.084)	0.013 (0.081)	-0.072 (0.116)	-0.083 (0.117)	-0.229** (0.087)	-0.136 (0.087)
GEXP	0.005 (0.010)	0.006 (0.009)	-0.003 (0.011)	-0.03** (0.009)	0.001 (0.007)	-0.000 (0.009)	-0.006 (0.015)	0.005 (0.007)	-0.001 (0.010)	-0.002 (0.005)	0.004 (0.008)	0.009 (0.007)	0.003 (0.006)	0.001 (0.005)
GQ	-1.17*** (0.198)	-1.30*** (0.201)	-0.84** (0.383)	-0.428 (0.395)	-1.15*** (0.282)	-1.18*** (0.284)	1.234 (0.790)	0.591** (0.242)	-0.83*** (0.183)	-0.81*** (0.180)	0.669** (0.253)	0.552** (0.258)	0.33* (0.187)	0.315 (0.185)
TRADE	0.001 (0.000)	0.001 (0.001)	0.002** (0.001)	0.004*** (0.001)	0.000 (0.001)	0.000 (0.001)	0.005 (0.005)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.002** (0.001)	-0.003*** (0.001)	-0.000 (0.001)	-0.000 (0.001)
PINSTAB	-0.349 (0.383)	-0.363 (0.376)	-0.46* (0.267)	-0.456 (0.373)	-0.416 (0.393)	-0.305 (0.411)	1.852 (2.027)	-0.086 (0.348)	-0.291 (0.272)	-0.099 (0.260)	-0.053 (0.276)	-0.216 (0.310)	-0.327 (0.242)	-0.216 (0.227)
STATISTICS														
ADJUSTED R^2	41.15%	43.11%	30.68%	38.25%	26.86%	25.06%	10.26%	12.22%	31.70%	34.88%	17.97%	22.16%	19.98%	16.22%
OBSERVATIONS	**80**	**80**	**52**	**51**	**84**	**84**	**87**	**87**	**84**	**84**	**76**	**75**	**69**	**68**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Please note, Col estimation is based on white heteroscedasticity-consistent standard errors & covariance, and RCol estimation procedure by using Weighted and reweighted OLS regression method to control for outliers.
See data appendix for variable definitions and sources.

[1] Country correlation between the cyclical component of real central government expenditure and real GDP for the time period 1960-2009. The cyclical component have been estimated using the Hodrick-Prescott filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. The index is from Frankel *et al*. (2013).

[2] Country correlation between the cyclical component of real government expenditure and real GDP for the time period 1970-1994. The cyclical component have been estimated using the Hodrick-Prescott filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. The index is from Talvi and Vegh (2005).

[3] Country correlation between cyclical components of real central government expenditure and real GDP (1960-2003). A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. The index is from Kaminsky *et al*. (2004).

[4] Country correlation between cyclical components of real GDP with inflation tax (1960-2003). A negative (positive) correlation indicates procyclical (countercyclical) fiscal policy. The index is from Kaminsky *et al.* (2004).

[5] Index of cyclicality of fiscal policy. It is a composite index that includes two measure of correlations of the cyclical components of fiscal policy instruments (real central government expenditure and the inflation tax). The index runs from 1 to -1. A positive (negative) index value indicates procyclical (countercyclical) fiscal policy. The index is from Kaminsky *et al*. (2004).

[6] Estimated time series relation between central government's overall budget surplus as percentage of GDP and output gap, defined as the log deviation of GDP from Hodrick-Prescott trend. A positive (negative) coefficient value implies that a cyclical boom is associated with an increase (decrease) budget surplus, meaning that the behaviour of fiscal policy is countercyclical (procyclical). The index is from Alesina and Tabellini (2005).

[7] Estimated time series relation between central government's overall tax revenue as percentage of GDP and output gap, defined as the log deviation of GDP from Hodrick-Prescott trend. A positive (negative) coefficient value implies countercyclical (procyclical) fiscal policy. The index is from Alesina and Tabellini (2005).

TABLE 2.9: PANEL REGRESSION OF FISCAL CYCLICALITY WITH GOVERNMENT QUALITY (GQ), 1970-2014
(DEPENDENT VARIABLE: CYCLICAL COMPONENTS OF REAL GOVERNMENT EXPENDITURE)

	ALL COUNTRIES		PROCYCLICALITY TRAP SAMPLE ($\widehat{\beta}_i$)		PROCYCLICALITY TRAP SAMPLE ($\widehat{\beta}_i$)		PROCYCLICALITY TRAP SAMPLE ($\widehat{\beta}_i^{IV}$)		ALL COUNTRIES		PROCYCLICALITY TRAP SAMPLE ($\widehat{\beta}_i$)		PROCYCLICALITY TRAP SAMPLE ($\widehat{\beta}_i$)		PROCYCLICALITY TRAP SAMPLE ($\widehat{\beta}_i^{IV}$)	
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**	**Col 7**	**Col 8**	**Col 9**	**Col 10**	**Col 11**	**Col 12**	**Col 13**	**Col 14**	**Col 15**	**Col 16**
OUT_GAP	1.299***	1.047***	0.596**	0.634**	0.637**	0.766**	1.315***	0.745**	1.155***	0.883***	0.534*	0.214	0.586**	0.674**	1.223***	0.562
	(0.202)	(0.223)	(0.276)	(0.310)	(0.286)	(0.368)	(0.295)	(0.334)	(0.208)	(0.231)	(0.283)	(0.319)	(0.293)	(0.261)	(0.300)	(0.344)
OUT_GAP * LRGDPCH	-0.052	-0.021	-0.148	-0.333***	-0.134	-0.323***	-0.138	-0.047	-0.004	-0.074	-0.187**	-0.363***	-0.171	-0.345***	-0.091	-0.013
	(0.069)	(0.076)	(0.090)	(0.099)	(0.093)	(0.102)	(0.099)	(0.111)	(0.070)	(0.078)	(0.094)	(0.105)	(0.097)	(0.108)	(0.100)	(0.114)
OUT_GAP * GEXP	-0.001	-0.001	-0.003	-0.007	-0.004	-0.007	-0.003	-0.008	-0.001	-0.001	-0.004	-0.002	-0.005	-0.001	-0.001	-0.005
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.006)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)
GQ	-0.047***	-0.046***	-0.074***	-0.067***	-0.081***	-0.081***	-0.062***	-0.062***								
	(0.006)	(0.007)	(0.008)	(0.011	(0.009)	(0.011)	(0.009)	(0.010)								
OUT_GAP * GQ	-0.755***	-0.689***	-0.681***	-0.665***	-0.578***	-0.519**	-0.679***	-0.701***								
	(0.128)	(0.149)	(0.171)	(0.200)	(0.178)	(0.207)	(0.206)	(0.240)								
OUT_GAP * $GQ^{1970(INITIAL)}$									-0.808***	-0.718***	-0.842***	-0.666***	-0.770***	-0.533**	-0.359*	-0.171
									(0.134)	(0.156)	(0.199)	(0.244)	(0.216)	(0.258)	(0.212)	(0.258)
ΔGQ									-0.043***	-0.039***	-0.068***	-0.063***	-0.075***	-0.076***	-0.061***	-0.061***
									(0.006)	(0.007)	(0.009)	(0.011)	(0.010)	(0.011)	(0.009)	(0.011)
OUT_GAP * ΔGQ									-0.465**	-0.213	-0.399	-0.517	-0.277	-0.368	-0.130	-0.174
									(0.215)	(0.264)	(0.279)	(0.330)	(0.286)	(0.341)	(0.321)	(0.404)
OUT_GAP * TRADE		-0.001		-0.001		-0.001		-0.001		-0.001		-0.001		-0.001		-0.001
		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)
OUT_GAP * PINSTAB		0.058		0.083		0.249		0.285**		0.069		0.073		0.242		0.222
		(0.101)		(0.142)		(0.153)		(0.137)		(0.101)		(0.141)		(0.152)		(0.137)
STATISTICS																
OVERALL R^2	40.45%	42.66%	43.50%	46.02%	42.07%	44.32%	39.27%	40.33%	41.06%	43.54%	42.15%	44.45%	42.64%	45.09%	39.52%	40.84%
OBSERVATIONS	**4756**	**3544**	**2753**	**2005**	**2521**	**1825**	**2537**	**1850**	**4648**	**3450**	**2692**	**1954**	**2466**	**1779**	**2479**	**1801**
NUMBER OF COUNTRIES	**134**	**126**	**77**	**70**	**71**	**65**	**71**	**64**	**134**	**126**	**77**	**70**	**71**	**65**	**71**	**64**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Least square estimation are performed using cross sectional country fixed effect and cross sectional weighting matrix assuming the presence of cross-section heteroscedasticity.
For brevity constant, country fixed effect results, GEXP, TRADE, and PINSTAB terms are not reported.
Procyclicality trap are the sample countries conducting procyclical fiscal policy in both sub-period 1970-1999 and 2000-2014.
See data appendix for variable definitions and sources.

TABLE 2.10: PANEL REGRESSION OF FISCAL CYCLICALITY WITH ADDITIONAL EXPLANATORY VARIABLES, 1970-2014
(DEPENDENT VARIABLE: CYCLICAL COMPONENTS OF REAL GOVERNMENT EXPENDITURE)

	ALL COUNTRIES					
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**
OUT_GAP	0.994*** (0.225)	0.574** (0.234)	1.079*** (0.244)	0.519** (0.219)	0.882*** (0.244)	0.735*** (0.035)
OUT_GAP * LRGDPCH	-0.036 (0.076)	-0.158** (0.080)	-0.021 (0.077)	-0.450 (0.149)	-0.022 (0.082)	-0.023 (0.076)
OUT_GAP * GEXP	-0.001 (0.003)	-0.003 (0.003)	-0.002 (0.004)	-0.009*** (0.003)	-0.007 (0.004)	-0.006** (0.003)
GQ	-0.058*** (0.008)	-0.039*** (0.009)	-0.043*** (0.007)	-0.010 (0.009)	-0.041*** (0.007)	-0.045*** (0.007)
OUT_GAP * GQ	-0.693*** (0.184)	-0.589*** (0.190)	-0.673*** (0.150)	-0.516* (0.296)	-0.347** (0.161)	-0.689*** (0.149)
OUT_GAP * TRADE	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.001)
OUT_GAP * PINSTAB	0.043 (0.101)	0.095 (0.107)	0.039 (0.102)	0.069 (0.149)	0.085 (0.104)	0.058 (0.100)
OUT_GAP * POLCON	-0.016 (0.149)					
OUT_GAP * CHEKBALC		-0.014 (0.019)				
OUT_GAP * CABSIZE			0.014*** (0.004)			
OUT_GAP * CCR				-0.010*** (0.002)		
OUT_GAP * FINOPEN					-0.175* (0.088)	
OUT_GAP * FINDEPTH						-0.411*** (0.046)
STATISTICS						
OVERALL R^2	43.28%	47.01%	43.24%	51.79%	41.28%	42.66%
OBSERVATIONS	**3525**	**2981**	**3517**	**1383**	**3364**	**3291**
NUMBER OF COUNTRIES	**124**	**120**	**125**	**58**	**123**	**124**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Least square estimation are performed using cross sectional country fixed effect and cross sectional weighting matrix assuming the presence of cross-section heteroscedasticity.
For brevity constant, country fixed effect results, GEXP, TRADE, PINSTAB, POLCON, CHECKBAL, CABSIZE, CCR, FINOPEN and FINDEPTH terms are not reported.
See data appendix for variable definitions and sources.

Chapter 3

Is fear of free floating responsible for procyclical monetary policy?

3.1 Introduction

How should monetary policy be conducted to stabilise the economy over the business cycle? Similar to fiscal policymaking, conventional wisdom suggests that countries should follow a countercyclical policy stance. This advice dates back to at least Wicksell (1907) and has proven enduring during the past century. The countercyclical monetary policy was recommended by the "*Chicago Plan*" to maintain a high level of employment (see, for example, Mints, 1946 and Friedman, 1948). The Keynesian IS-LM model proposed by Hicks (1937), also prescribes a countercyclical monetary policy stance. In this setting, monetary policy is required to restore the full employment and reduce the output gap. Phelps and Taylor (1977) and Fischer (1977) re-established the optimality of monetary policy stabilisation in a rational expectation framework. According to Taylor (1993) and much of the other New-Keynesian literature also call for countercyclical monetary policy towards economic stability (see, for example, Woodford, 2001; Giannoni and Woodford, 2002)

Again similar to fiscal policy, both the traditional Keynesian and New-Keynesian models of the business cycle calls for a countercyclical monetary policy that is contractionary during the period of economic acceleration and expansionary during downturns to stabilise output fluctuations. Accordingly, monetary authorities are expected to reduce policy rate in bad times and raise rates in good times. Existing literature document that advanced economies tended to follow the monetary policy that is countercyclical or at worst acyclical. On the other hand, emerging and low-income developing countries are shown to have pursued procyclical monetary policy by violating the Keynesian's or New-Keynesian's prescription; they have increased interest rates during economic downturns and reduce it during the period of economic expansion[47].

It has been argued that this feature of policy deprived emerging and developing countries of important macroeconomic stabilisation tools, and might partially explain the higher

[47] See, for example, Kaminsky *et al.*, (2004); Calderón *et al.* (2004a&b); Yakhin (2008); Takats (2012); McGettigan *et al.*, (2013); Vegh and Vuletin (2012); and Duncan (2014).

volatility of inflation and output in these group of countries compared with advanced one (see, for example, Lane, 2003; McGettigan *et al.,* 2013; Aguiar and Gopinath, 2007). Economists suggest that such procyclical policies that amplify fluctuations in real output should be avoided, for these economies suffer from prolonged recession in bad times and inflationary pressures in good times. This is especially the case given the prevalence of procyclical fiscal policies in these countries, as documented in Chapter 2. Motivated by the consequences of procyclical monetary policy, our goal in this chapter is twofold: first, we attempt to provide empirical evidence of the cyclical properties of monetary policies (i.e., countercyclical, acyclical or procyclical); second to uncover the potential sources of the cyclical stance of monetary policies.

With regards to our first goal, we attempt to refine the earlier results along two dimensions. First, we control for the periods in which the monetary regime is not categorised as either managed floating or freely floating (e.g. monetary authorities follow crawling pegs or certain types of bands). More specifically, we use *de facto* exchange rate classification proposed by Ilzetzki *et al.,* (2011), and restrict our sample to countries with a period of dirty floating or floating exchange rate regimes. Second, we exclude observations of very large nominal interest rates during hyperinflation episodes above the 99th percentile to remove outliers. After carefully incorporating the two restrictions on the sample countries' time frame and conducting exhaustive battery of time series econometric tests for 100 countries' annual data (29 advanced, 46 emerging and 25 low-income developing countries) over the period 1960-2014, we find that, very similar to the case with fiscal policy, procyclical monetary policy is observed across the emerging and developing countries, and it should be viewed as the norm rather than the exception. On the contrary, we find that majority of the advanced countries consistently follow countercyclical monetary policy.

We also investigate how the cyclicality behaviour changed over the past few decades for our sample countries. Interestingly, over the last 55 years, we find that more than 40 percent of our sample countries pursued countercyclical policy and the majority of them are advanced countries with inflation targeting regime. We have also observed that several emerging and developing countries have been able to overcome the problem of procyclicality recently. We also document that many of them are inflation targeters. In sharp contrast, we find that a substantial number of emerging and low-income developing countries (18.56 percent of the sample countries) have been trapped within the procyclical monetary policy, in the sense of not being able to move from procyclical to countercyclical

monetary policy. We also observed that many emerging and developing countries turned into procyclical (8.24 percent of sample countries), who used to conduct countercyclical policy during 1960-1999. We have documented that these group of countries never adopted inflation targeting regime.

Our second goal is related to the following critical question; why are emerging and low-income developing countries caught within a trap of procyclical policy or, even worse, turned to procyclical monetary policy over the past few decades? More specifically, what drives this de-stabilizing procyclical policy behaviour? A common answer from the literature relies upon their access to the international credit market and lack of financial depth[48]. Again similar to the case with fiscal policy, it is widely argued that during bad times, many emerging and developing countries are unable to borrow, or can only do so with very high or excessive interest rates (see, for example, Gavin and Perotti, 1997). Alternatively, governments have to depend on central bank's credit to finance state-owned entities or to support the budget deficit. The fiscal dependence makes it challenging for the central bank to retain the control of monetary policy[49]. At the presence of fiscal dominance, monetary policy is frequently subordinated to the requirements of an expansionary fiscal policy. More specifically, during downturns, a government with limited access to international credit markets may rely on money creation to finance a major fraction of government expenditures, forcing monetary authority to conduct procyclical monetary policy (i.e., increase the interest rate to ensure the external and internal credit supply).

Even in good times, political pressures for procyclical fiscal policy are hard to resist, particularly when there is a genuine need for more government spending in the critical social area[50]. In fact, the main root of the debt crisis in many emerging and developing countries are all too often oriented in public sectors that go through sessions of high borrowing and spending, when the international capital is plentiful during good times[51]. Fiscal expansion during upturns leaves little scope for monetary authorities to conduct countercyclical policies during downturns. As they are "*forced*" to repay in bad times, in fact, coinciding with sudden reversals of capital flows, the so-called "*sudden stop*" of capital inflows[52]. As a result, sharp real depreciation follows as countries are cut off from

[48] For example Gavin and Perotti (1997) were the first to discuss the Latin American countries' facing credit constraints from the international capital market; then Catão and Sutton (2002), Riascos and Végh (2003) and Kaminsky *et al.,* (2004) pointed out that this is not a Latin American phenomenon only; borrowing constraints are common in many emerging and low-income developing countries.
[49] A condition described by Sargent and Wallace (1981).
[50] See, for example, Talvi and Vegh (2005); Lane and Tornell (1999).
[51] See, for example, Reinhart *et al.,* (2003) for an analysis of borrowing /default cycles.
[52] See, for example, Gavin and Perotti (1997) and Calvo and Reinhart (2002).

international capital markets and need to repay their debt. Such circumstances force monetary authorities to raise interest rates to reverse capital outflows. Tighter rate also reduce the pressure on the exchange rate, instead of leaving the currency value to float freely (i.e., *fear of free floating*)[53]. This is a key concern for these countries as defaults and general debt servicing difficulties mount if the exchange rate is allowed to swing significantly.

It is widely recognized that emerging and developing countries are exposed to the limited access to international capital markets, and have fragile domestic financial systems (i.e., high indebtedness in foreign currency). These features force authorities in these economies to raise rates in bad times and hence follow procyclical monetary policy. This evidence raises the question, are the emerging and developing countries able to overcome the monetary policy procyclicality trap? This question is applicable even for "*recent graduate*" countries', who recently shifted from procyclical monetary policy to countercyclical policy. The argument is that the countercyclical monetary policy might not be optimal given such structural features; for example, a large fraction of short-term debts and foreign currency denominated liabilities. Under such circumstances, the adverse balance sheet effects of an exchange rate depreciation induced by the countercyclical policy could more than offset any potential cost of a procyclical policy[54].

In what follows we argue that at the presence of foreign currency debt, emerging and developing countries' monetary authorities may want to maintain their credibility. The credibility issues may be manifested in multiple ways, including fear of free floating and sovereign credit ratings. The fear is the depreciation of domestic currency (typically characterised by rapid capital outflows) would force monetary authorities to raise interest rates to defend the domestic currency. The reluctance to allow the exchange rate to adjust significantly and rapidly is also manifest in the many episodes during which monetary authorities go to great lengths to avoid a devaluation. During economic crises, the fear becomes severe under financial autarky, when the currency depreciates rapidly and "*balance sheet effect*" (i.e. fear of bankruptcy of public and private sector) plunge the economy into deeper crisis by encouraging further capital outflows combined with "*sudden stop*" phenomenon. The need to raise interest rates to defend domestic currency would hamper the ability of monetary authorities to conduct countercyclical policy. A key contribution of this Chapter is to document that procyclical stop-and-go policies are

[53] We borrow the expression "*Fear of Free Floating*", of course, from Calvo and Reinhart (2000).
[54] As recent experience in European sovereign debt crisis, some euro countries, which perused countercyclical monetary policies over the past decades transformed to procyclical policies (see, for example, Takats, 2012).

intensified when the economy features to "*fear of free floating*", resulting in procyclical monetary policy.

Our empirical work is motivated by Yakhin's (2008) theoretical work. This New-Keynesian model suggests that under full financial integration (i.e., when the economy can borrow and lend freely in the international capital markets), the optimal policy is countercyclical, while under financial autarky (i.e., when economy denied access in the international capital markets, the optimum policy is procyclical). The model also proposes that the transition from procyclical to countercyclical monetary policy is monotonic in the level of financial integration. The main force behind the results is that greater integration stabilises the exchange rate, which in turn, hampers its usefulness as a shock absorber and therefore calls for a countercyclical monetary policy to step in. Lack of integration, on the contrary, induces excess volatility of the exchange rate and central banks' attempt to moderate its movement results in a procyclical monetary policy stance. We test the relevance of this mechanism in our empirical work; more specifically, we investigate how the level of "*fear of free floating*" affects the optimal monetary policy stance. In doing that, we uncover a key source of monetary procyclicality in the form of "*fear of free floating*".

To investigate this relationship, we follow Calvo and Reinhart (2002, p.4) to construct an indicator for "*fear of free floating*". We find that on average advanced economies as a group have limited evidence of "*fear of free floating*", with no evidence of it over the recent decades. In sharp contrast, we find that "*fear of free floating*", is increasingly a defining characteristic of many emerging and developing countries. More specifically, it has increased over the last decade for that group of countries who are in "*procyclicality trap*" and those who "*move back to procyclicality*".

We have systematically linked the evidence of "*fear of free floating*" with the cyclicality of monetary policy. After an exhaustive battery of tests by utilising cross-country and panel data estimation methods for 100 countries' (29 advanced, 46 emerging and 25 low-income developing countries) over the period 1960-2014, we document that "*fear of free floating*" is negatively associated with the degree of monetary policy countercyclicality. Our results reveal countercyclical monetary policy for low levels of "*fear of free floating*" and procyclical policies as "*fear of free floating*" increases.

The rest of the chapter is organised as follows. The next section briefly discusses the existing evidence on monetary policy cyclicality and its sources. Section 3.3 discusses our methodology for estimating monetary policy cyclicality and fear of free floating.

Descriptive statistics are presented in section 3.4. Section 3.5 relates and discusses the systematic outcomes of fear free floating to the derived cyclicality measures. Robustness and extension of the analysis are presented in Section 3.5. Finally, Section 3.6 provides concluding remarks.

3.2 Evidence on monetary policy cyclicality and the causes of monetary policy procyclicality

Kaminsky *et al.,* (2004) were the first to examine the cyclical properties of monetary policy of broad set of countries covering both advanced and emerging economies by relying primarily on short-term interest rates. Using 104 countries' annual data over 1960-2003, they estimate Taylor rule for individual countries and propose that most industrial countries follow countercyclical policy, while monetary policy is overwhelmingly procyclical across the developing countries. These results were later confirmed by Calderón *et al.,* (2004a&b) and Yakhin (2008). The later work utilised higher frequency data and limited the sample to countries with managed floating and flexible exchange rate regimes only. Yakhin (2008) investigates 30 countries' quarterly data for the period 1974-2004 and estimates the cyclical properties of monetary policy by looking at the correlation between a measure of the business cycle and short-term policy rate. The author finds that the average correlation is negative (-0.18) in developing countries and positive (0.26) is developed countries and confirms the evidence to support the notion that monetary policy in developing countries is procyclical.

In the same vein, the recent evidence by Vegh and Vuletin (2012) utilises a correlation based approach for a sample of 68 countries for the period 1960-2009, pointing to widespread procyclical monetary policy in the developing world, in contrast to that in industrial countries. Duncan (2014) use higher frequency data for 56 countries ranging from 1984Q1 to 2008Q4 restricts the sample period based on the lack of independent monetary policy (i.e., periods in which monetary regimes were freely floated or managed float). After carefully selecting the sample period and using the correlation based approach, it is concluded that procyclical monetary policy is a fact in emerging countries and not fiction. Recent work by McGettigan *et al.,* (2013) used short-term real interest rate rather than nominal rates to estimate the cyclicality properties, and they argue that the correlation between real output and nominal interest rates could be problematic, especially for emerging countries with a large swing with inflation.

Recent work presents empirical evidence on emerging and developing countries' recent shift from procyclical monetary policy to countercyclical policy, similar to developments in their fiscal policy cyclicality. Using annual data from 68 countries, Vegh and Vuletin (2012) argue that over the last few decades (1960-99 vs. 2000-09) several emerging and developing economies have been able to overcome the problem of conducting the procyclical monetary policy and became countercyclical. They refer to this group of countries as "*recent graduates*". A recent paper by McGettigan *et al.,* (2013) support the evidence of "*recent graduate*" hypothesis, and they show that emerging and developing economies increasingly adopting countercyclical monetary policy during the post-1999s. Nevertheless, Vegh and Vuletin (2012) and McGettigan *et al.,* (2013) propose that a substantial number of emerging and developing countries continued to exhibit procyclicality over the last 55 years and even several countries' policy stance recently reversed to procyclicality that had been countercyclical.

Why would emerging and developing countries conduct a procyclical monetary policy that might aggravate the business cycle? Put it differently, what are the underlining forces behind this destabilising behaviour? Several explanations have been proposed to explain this puzzling behaviour of procyclical monetary policy. The literature essentially reveals four types of explanations: (a) restrictions on access to international credit markets that preclude them from borrowing during recessions combined with rapid capital outflows; (b) reputation and credibility explanations typically based on the hypothesis that recession forces an increase in the interest rate to prevent the exchange rate devaluation; (c) institutional weaknesses hampering the ability of policymakers to conduct countercyclical policy; (d) absence of inflation targeting regime and lack of central bank independence hindering the effectiveness of monetary policy.

The most common explanations are widely based on incomplete international credit markets or credit constraints during the economic crisis. The Asian crisis and other emerging market crises triggered a strand of literature on the optimal response of monetary policy to large external shocks. An increasingly common view blames fixed exchange rates, precisely "*soft pegs*" for these financial meltdowns (see, for example, Goldstein *et al.,* 1999). Calvo and Reinhart (2002, p.2) and Kaminsky *et al.,* (2004) argue that emerging countries do not adopt countercyclical stabilisation policies because when the economy contracts, it experiences capital outflows. Rapid capital outflows trigger currency depreciation, intensifying the "*sudden stops*" (see, for example, Calvo, 1999). Monetary authorities are forced to raise interest rates to compensate for the effect on the

exchange rate. Otherwise, defaults and general debt servicing difficulties mount if the exchange rate is allowed to float freely. The need to raise interest rates to defend domestic currency would prevent emerging economies to conduct countercyclical policy.

There is also a large body of research that studies monetary policy under financial constraints. It has been argued that optimal stabilization policy in emerging countries is hindered by external borrowing constraints (see, for example, Perotti, 1999; Calvo and Reinhart, 2000), fragile domestic financial systems (Riascos and Vegh, 2003; Lane, 2003); and the interaction between domestic and external financial imperfections (Caballero, 2002). In a New-Keynesian small open economy model, Yakhin (2008) proposes that under full financial integration (i.e., when the economy can borrow and lend freely in the international capital markets), the optimal policy is countercyclical, while under financial autarky (i.e., when economy denied access in the international capital markets), the optimum policy is procyclical. He also proposes that financial autarky induces excess volatility of the exchange rate and central banks' attempt to moderate its movement results procyclical policy. However, Céspedes *et al.,* (2003) proposed that procyclical policy might be required if the economy is characterised by balanced-sheet effects and financial vulnerabilities (i.e., high indebtedness in foreign currency)[55].

It is clear that in the presence of financial constraints and high indebtedness in foreign currency, monetary authorities will want to maintain the credibility of their currency regime. Under such conditions, even a short-term monetary relaxation may have a negative effect on confidence, raising risk premium in external borrowing (see, for example, Lane, 2003). A study by Calderón *et al.,* (2003) of the cyclicality monetary policy in emerging economies, finds that credibility of the policy is a key factor. As emphasised by Calvo and Reinhart (2002), Caballero (2002), and Mendoza (2002), exchange rate devaluation further loses its effectiveness if the monetary authorities lack credibility. Under the proposed hypothesis, during crises, when the currency depreciates rapidly balance sheet effect (i.e., fear of bankruptcy of private and public sectors indebted in foreign currency) plunges the economy into deeper crisis by encouraging further capital outflows, forcing a rise in the interest rate to prevent the currency devaluation, resulting in procyclical policy. Devereux and Lane (2003) confirms that countries with a greater dependence on foreign currency debt are more likely tailor the monetary policy to minimise the exchange rate volatility. They also propose that monetary policy

[55] The authors, however, acknowledge that implausible values for the model parameters would be necessary for an economy to be in that situation.

significantly depends on external debt maturities and debt with shorter maturities has affected the perceived solvency of emerging economies during the crisis.

Another factor that is found to impact on the ability of policymakers to conduct countercyclical policy is the strength of institutional quality. Calderón *et al.,* (2004a&b) and Vegh and Vuletin (2012) find systematic evidence of the link between cyclicality of monetary policy and the quality of institutions. In a similar vein, Duncan (2014) in his theoretical work argues that when there are positive external demand shocks, the reduction in the value of foreign debt caused by the real exchange rate is smaller. Given this low wealth effect, the real appreciation leads to lower consumption, wages drop, and inflation declines. The central bank reacts by cutting its policy rate to stabilise inflation, thus adopting a procyclical policy stance. Duncan (2014) also presents supporting empirical evidence.

In addition to institutional quality and credibility issues, researchers also pointed to the importance of the link between inflation targeting regimes and the cyclicality of monetary policy. A low inflation environment facilitates the loosening of monetary policy, consistent with the Taylor rule's prescription. Inflation could also capture the independence of the central bank and, hence credibility of monetary policy. Several studies document that monetary authorities in lower inflation countries are more independent (see, for example, Alesina and Summers, 1993) and central bank independence improves the efficiency of monetary policy (see, for example, Mishkin, 2011). Coulibaly (2012) and McGettigan *et al.,* (2013) empirically show that inflation targeting appears to have been most successful in implementing countercyclical monetary policy.

3.3 Methodology

3.3.1 Identifying monetary policy cyclicality

Our main focus in this chapter is on the consequences of fear of floating for the cyclicality of monetary policy. The first essential step in any such study is to detect the cyclical properties of monetary policy. The simplest measure of monetary policy cyclicality is the correlation between the cyclical components of short-term nominal interest rate and real output that are filtered by Hodrick-Prescott method to focus only on the detrending cyclical components. Previous empirical work on monetary cyclicality uses this method to identify the cyclicality of monetary policy[56]. However, the correlation coefficient can be

[56] See, for example, Kaminsky *et al*., (2004); Yakhin (2008); Vegh and Vuletin (2012); Duncan (2014); McGettigan *et al*., (2013).

ambiguous if countries have a different level of volatility for both nominal interest rate and real output, requiring a more formal estimation procedure. A clear alternative is to resort to estimating Taylor rules, where a measure of short-term nominal interest rate cyclicality components is regressed on a measure of real output cyclicality and other control variables[57]. The estimated coefficient can then be taken to indicate the cyclicality of monetary policy.

Monetary policy cyclicality is generally measured by monetary policy instruments (e.g. nominal short-term interest rate) rather than other monetary variables (e.g. real interest rate and real money balance M1 and M2)[58]. Kaminsky *et al.,* (2004) suggest that the expected correlations between monetary instruments (e.g. real interest rate and real money balance M1 and M2) and output are more complex. They point out that the cyclicality behaviour measured by real interest rate estimate ambiguous cyclicality posture of monetary policy cyclicality[59], although the instrument (i.e., real interest rate) has been used in the literature. In contrast McGettigan *et al.,* (2013) argue that the correlation between real output and nominal interest rates could be problematic, especially for emerging and developing countries with a large swing with inflation. Notwithstanding this concern, the majority of the previous studies have used nominal short-term interest rates, rather than the real rates (see, for example, Kaminsky *et al.,* 2004; Yakhin, 2008; Vegh and Vuletin, 2012; and Duncan, 2014).

In this Chapter, we also use the short-term nominal interest rate as the monetary policy instrument. This is based on the fact that short-term interest rate is a common policy instrument under flexible and managed floating exchange rate regimes (see, for example, Kaminsky *et al.,* 2004 and Vegh and Vuletin, 2012). More specifically, we use central bank's short-term discount rate or money market rate or interbank rate depending on data availability as a proxy for monetary policy instruments. For countries where the discount rate is not available, we use lending rate or Treasury bill rate. Table A3.3-A3.5

[57] See, for example, Clarida *et al.*, (1998); Kaminsky *et al.*, (2004); Yakhin (2008); Duncan (2014); and McGettigan *et al.*, (2013).
[58] Theoretically, any standard open economy macro-model with imperfect asset substitution would allow central banks to use the interest rate as a policy instruments (see, for example, Calvo and Vegh, 1995; Flood and Jeanne, 2005).
[59] According to Kaminsky *et al.*, (2004), "*…..in the absence of an active monetary policy, real money balances (i.e., interms of monetry aggregate) are high in good times and low in bad times (i.e., positive correlation with the business cycle) and real interest rate is low in good times and high in bad times (i.e., negatively correlated with cycle). However, a negative correlation between output and real interest mainly arises from a standard endowment economy model (i.e., a model with exogenous output) in which high real interest rates today may signal today's scarcity of goods relative to tomorrow. In a production economy driven by technology shocks, however, this relationship could have the opposite sign. In addition, demand shocks, in and of themselves, would lead to higher real interest rates in good times and vice versa. Given these different possibilities, any inferences drawn on the cylicality stance of monetary policy from the behaviour of real interest rates should be treated with extreme caution*."

provide more details on the country-specific policy rates that we have utilised in this chapter.

We estimate monetary policy cyclicality for 100 countries covering the period 1960-2014. Our empirical strategy is mainly motivated by Kaminsky *et al.,* (2004), where we attempt to refine their results. Our first refinement is linked to incorporating the role of exchange rate regimes; it is common practice for monetary authorities to raise some short-term interest rate to defend a fixed (or more rigid) exchange rate. Accordingly, our sample includes periods of dirty floating and floating exchange rate regimes with at least 15 observations, following Ilzetzki *et al.,* (2011) for exchange rate *de facto* classification[60]. Second, we exclude observations of very large nominal interest rates during hyperinflation episodes above the 99th percentile to handle the potential outlier problem. The hyperinflation episodes were observed in Latin America in the 1980s and many emerging and low-income developing economies in the 1990s. Table A3.3-A3.5 provide more details on the country-specific sample periods, exchange rate regimes and hyperinflation episodes.

Two underlying reasons for such precaution that are related to our analysis by focusing on the cyclical components of interest rate. First cyclical components of interest rates may be wrongly identified from Hodrick-Prescott trend if we incorporate both peg and flexible exchange regimes in the time series properties of the data. Conceptually, under hard peg regime monetary authorities day to day actions are more committed towards open market operations (i.e., buy and sell its currency) or using interest rates to defend currency[61]. Second, the cyclicality components of interest rates may be wrongly estimated from Hodrick-Prescott trend if we incorporate hyperinflation periods, when the nominal short-term interest are very large compared to normal period.

In what follows, we first present correlation between cyclical components of the short-term interest rate (i^{cycle}) and the natural logarithm of real output gap (Y^{cycle}) for each country. The cyclical components are measured by removing Hodrick-Prescott (HP) trend from the time series[62]. Clearly, a positive correlation between short-term interest rate (i^{cycle}) and real output gap (Y^{cycle}) would indicate countercyclical monetary policy (i.e.,

[60] Obstfeld and Rogoff (1995), and Calvo and Reinhart (2002) propose that in many countries, there is a discrepancy between *de jure* and *de facto* exchange rate regimes and countries appear to actively limit fluctuations in the external value of their national monies. That is, many countries that announce they float the exchange rate, in fact intervene heavily in the foreign exchange market. Similarly, many countries that say they are in fixed regime, in fact devalue when trouble arises. To avoid this problem, we use *de facto* classification rather *de jure* one.

[61] Adopting such hard peg regimes indicates the complete surrender of the central banks' independent control over domestic monetary policy (see, for example, IMF, 2017).

[62] We use HP filter with a frequency $\lambda = 100$ for annual data. These values are referred to as the "*de facto* industry standards" (see, for example, Giorno *et al.*, 1995).

the policy rate increases in good times and reduced in bad times, thus $corr(i^{cycle}, Y^{cycle}) > 0$). A negative correlation between between short-term interest rate (i^{cycle}) and real output gap (Y^{cycle}) would indicate procyclical monetary policy (i.e., the policy rate is reduced in good times and increased in bad times, thus $corr(i^{cycle}, Y^{cycle}) < 0$).

We then estimate monetary policy cyclicality by estimating the Taylor rule for each country for which data are available. Following Clarida *et al.,* (1999) and Kaminsky *et al.,* (2004), our specification takes the following form:

$$i_{it}^{cycle} = \alpha_i + \gamma_i^Y \cdot \pi_{it}^{cycle} + \beta_i^Y \cdot Y_{it}^{cycle} + \varepsilon_{it} \tag{3.1}$$

where, i_{it}^{cycle} is the deviation of policy rate from its trend, π_t^{cycle} captures deviations of inflation from its trend and Y_{it}^{cycle} is the logarithm of real output gap, measured as the cyclical components of from its trend. We estimate specification (3.1) by using ordinary least square method (OLS). We correct for the first-order autocorrelation in the residuals by using a standard two steps Prais-Winsten procedure based on country specific estimation[63]. The following transformation takes place during autocorrelation correction procedure for individual country i.

$$\varepsilon_{it} = \rho_i \varepsilon_{it-1} + \vartheta_{it} \tag{3.2}$$

$$i_{it}^{cycle} = \alpha_i(1-\rho_i) + \rho_i i_{it-1}^{cycle} + \gamma_i^Y \cdot (\pi_{it}^{cycle} - \rho_i \pi_{it-1}^{cycle}) + \beta_i^Y \cdot (Y_{it}^{cycle} - \rho_i Y_{it-1}^{cycle}) + \vartheta_{it} \tag{3.3}$$

Model (3.3), estimated $\hat{\beta}_i^Y$ measures cyclicality of monetary policy stance over a business cycle for each country i. A positive (negative) value of $\hat{\beta}_i^Y$ specifies that monetary authorities take countercyclical (procyclical) monetary policy over the business cycle – over and above the monetary authorities concern about the inflation which are measured by the estimated coefficient γ_i^Y. In our estimation process of monetary policy cyclicality indicator $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$, the data are collected from different sources; please refer Table A3.1 for their sources and data description.

Several observations are in order regarding the specification (3.1) for annual data. First, we are assuming that historical inflation is a good predictor of future inflation. Second, we maintain that the trend inflation (i.e., mean rate estimated by HP filter) is a good prediction of some implicit/explicit inflation target on the basis that monetary authorities

[63] However, during the estimation process for the specification (3.1), we find that some countries' error term ε_{it} is not only correlated in first-order; it can be correlated with second, third order and so forth. To identify the correct order of autocorrelation among the error term, we first estimate the specification (3.1) and investigate correlogram Ljung-Box Q-statistics of the partial autocorrelation function (PAC) to detect the correct order z. After that, we estimate AR (z) model to correct autocorrelation problem among the error term ε_{it} for the specification (3.1).

choose to deliver based on the trend of an inflation rate that they desire. Third, given the potential endogeneity problem, the estimated coefficient of monetary policy cyclicality stance in the specification (3.1) is viewed as the best interpretation of a long-run cointegrating relationship. Fourth, by estimating the $\hat{\beta}_i^Y$ and $\hat{\gamma}_i^Y$, the specification (3.1) does not mean to imply that the sample country has followed some type of Taylor rule throughout our sample. Rather, we are using the specification (3.1) in a potential useful way to characterize the relation between the output gap and a short-term interest rate, where we control for monetary authorities explicit/implicit inflation target.

3.3.2 Identifying fear of free floating

To explore the relationship between the fear of floating and procyclical monetary policy, our second step is to compose an index of fear of floating (hereafter FOF) for each country. The simplest measure of FOF is the correlation between the cyclical components of the exchange rate and the short-term interest rate that are filtered by Hodrick-Prescott (see, for example, Vegh and Vuletin, 2012). Calvo and Reinhart (2002) argue that under the managed or free floating regimes, monetary policy can certainly be thought of in terms of some short-term interest rate, since changes in the money supply will directly influence interest rates, thus the exchange rate. In this case, under managed floating or free floating regimes, the only assumption needed to construct the FOF indicator is that short-term interest rates can represent common monetary policy instruments and there is some imperfect substitution between foreign and domestic assets. It is common practice for monetary authorities to raise short-term interest rate to defend domestic currency under managed floating exchange rate (see, for example, Kaminsky *et al.,* 2004).

To measure FOF, we fist compute the cyclical components of rate of change in the nominal exchange rate (EXE^{Cycle}) from its trend for each country[64]. Where, a positive (negative) value of EXE^{Cycle} denotes currency depreciation (appreciation). Second, we compute the cyclical components of the short-term interest rate i^{cycle} from its trend[65]. As standard, the cyclical components are measured by removing Hodrik-Prescott (HP) trend from the time series. We then measure the FOF indicator by constructing the correlation between the cyclical component of exchange rate (EXE^{cycle}) and the short-term nominal interest rate

[64] We use nominal exchange rate of domestic currency against the US dollar. For European countries, we use the nominal effective exchange rate. Please refer Table A3.1 for the data description. Table A3.3-A3.5 provide more details on the country-specific sample period and exchange rate regime.

[65] Kaminsky *et al.*, 2004 propose that short-term interest rate is a common policy instrument under flexible and managed floating exchange rate regimes. More specifically, we use central bank's short-term discount rate or money market rate or interbank rate depending on data availability as a proxy for monetary policy instruments. For countries where the discount rate is not available, we use lending rate or Treasury bill rate. Table A3.3-A3.5 provide more details on the country-specific policy rates that we have utilised in this paper.

(i^{cycle}). A positive correlation specifies that monetary authorities increase the short-term policy rate (i^{cycle}) when the domestic currency is depreciating, indicating the presence of FOF $[corr(i^{cycle}, EXE^{cycle}) > 0]$. Similarly, a zero or negative correlation $[corr(i^{cycle}, EXE^{cycle}) \leq 0]$ indicates that central bank does not systematically react to exchange rate movements[66]. In other words, our measure of FOF reflects the likelihood of relative movements in interest rates in response to the exchange rates movement over a business cycle, representing monetary authorities' willingness to use interest rate as a means of stabilizing the exchange rate[67].

3.4 Descriptive statistics

3.4.1 The prevalence of monetary policy procyclicality

Table 3.1 shows the average monetary policy cyclicality indicators [$corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$] based on data from all available years for each country; these statistics have then been aggregated across the country group classification. Results presented in Table 3.1 helps us to make two clear points. First, on average monetary policy procyclicality are observed in emerging economies (i.e., all the cyclicality indicators values are negative). Low-income developing countries tend to follow acyclical monetary policy, or slightly procyclical policy. On the contrary, advanced economies' monetary policies are heavily countercyclical (i.e., all the cyclicality measures are positive). Second, there is a strong degree of pair-wise correlation between the cyclicality indicators, indicating consistency of measurement across the computed cyclicality indicators, with a correlation between $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$ (around 0.81).

The above-presented results establish that on average emerging and developing countries follow procyclical monetary policy. However, these findings are coming from average values of cyclicality indicators and thus may not necessarily be representative, particularly if there is substantial cross-country variation in the making of monetary policy. Hence it is important to examine monetary policy cyclicality for individual countries, as is presented in Figure 3.1 and 3.2[68]. As can be seen in Figure 3.1 and 3.2, the

[66] In an open economy, a negative correlation between exchange rate and the short-term interest rate may indicate that monetary authorities decreases short-term policy rate, when the domestic currency appreciating. The negative interest rate response is mainly arise from the currency appreciations' contractionary effect on aggregate demand; the appreciation makes foreign goods cheaper and domestic goods more expensive, thereby reduce the net export. The cut of interest rate mitigates this condition (see, for example, Ball, 1999; Svensson, 2000; Taylor, 2001).

[67] If interest parity condition hold in practice, our measure of FOF would be questionable because FOF would always be positive by using simple correlation (considering variability in international interest rates are not significant). But, empirically, it is acclaimed that interest parity condition does not hold, more specifically in the short-run (see, for example, Vegh and Vuletin, 2012; Mishkin, 1984; Frankel, 1991; Chinn and Meredith, 2004; Akram, *et al.*, 2008; and Burnside *et al.*, 2011).

[68] Table A3.3-A3.5 provide estimated cyclicality statistics of $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$ for individual country over the period 1960-2014.

TABLE 3.1: CYCLICALITY OF MONETARY POLICY 1960-2014

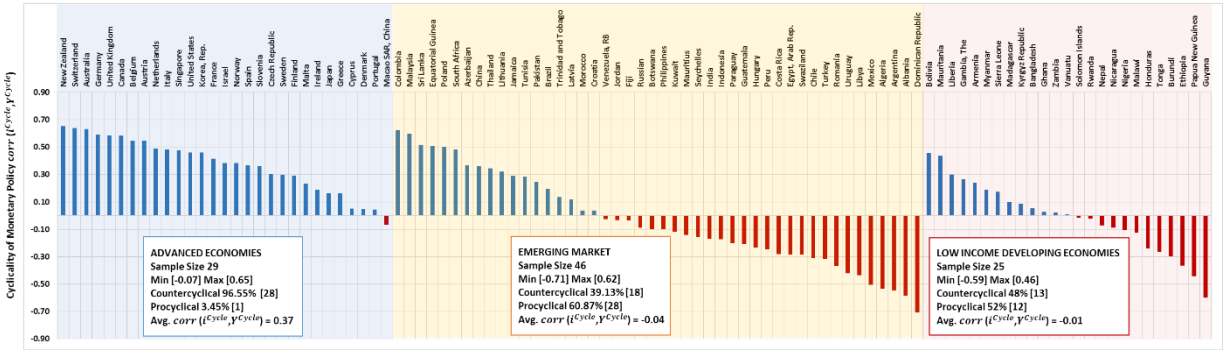
Country Group	Cyclicality of Monetary Policy		
	$Corr\ (i^{Cycle}, Y^{Cycle})$ Mean [St.Dev]	$\widehat{\beta}^{Y}$ Mean [St.Dev]	Observations
All Country Group	0.08 [0.33]	0.11 [0.59]	**100**
Advanced Economies	0.37 [0.20]	0.52 [0.40]	**29**
Emerging Market	-0.04 [0.35]	-0.10 [0.65]	**46**
Low Income Developing Economies	-0.01 [0.26]	0.02 [0.37]	**25**

CORRELATION MATRIX OF MONETARY POLICY CYCLICALITY

	$corr\ (i^{Cycle}, Y^{Cycle})$	$\widehat{\beta}^{Y}$
$Corr\ (i^{Cycle}, Y^{Cycle})$	**1**	
$\widehat{\beta}^{Y}$	**0.81**	**1**

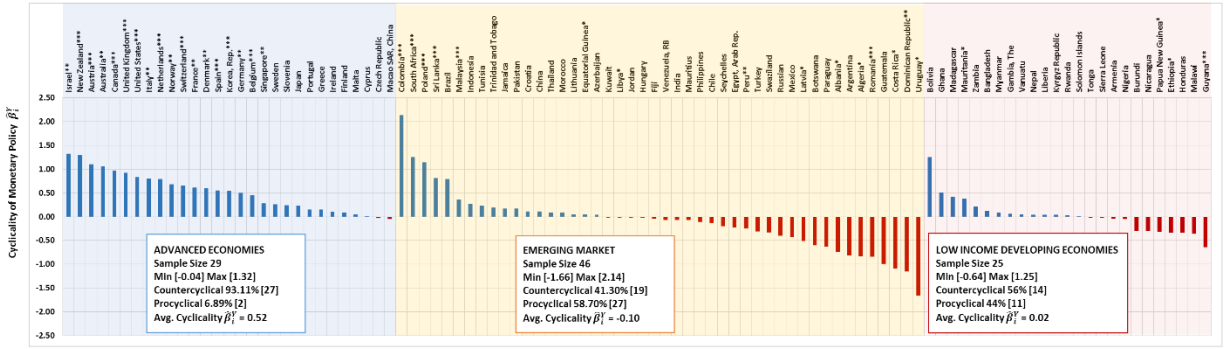
Note: We estimate the cyclicality of monetary policy [$corr\ (i^{Cycle}, Y^{Cycle})$ and $\widehat{\beta}^{Y}$] for individual country on a sample of 100 countries' annual data (29 advanced economies, 46 emerging and 25 low-income developing economies) over 55 years for the time 1960-2014. We take average of monetary policy cyclicality statistics for each country group to present the above summery statistics. A simple correlation statistics is calculated by utilizing the country statistics of $corr\ (i^{Cycle}, Y^{Cycle})$ and $\widehat{\beta}^{Y}$. The country group classification is from Nielsen (2011).

Figure 3.1: Cyclicality of Monetary Policy $corr\ (i^{Cycle}, Y^{Cycle})$ During The Period 1960-2014 for 100 Countries



Degree of Monetary Cyclicality [$corr\ (i^{Cycle}, Y^{Cycle})$ Measurement Scale
Countercyclical Monetary Policy [$corr\ (i^{Cycle}, Y^{Cycle}) > 0$] and Procyclical Monetary Policy [$corr\ (i^{Cycle}, Y^{Cycle}) < 0$]
Note: We measure $corr\ (i^{Cycle}, Y^{Cycle})$ for each country to measure the cyclicality of monetary policy and present the above summery statistics according to their country group.
The country group classification is from Nielsen (2011).

Figure 3.2: Cyclicality of Monetary Policy $\widehat{\beta}_i^{Y}$ During The Period 1960-2014 for 100 Countries



Degree of Monetary Cyclicality $\widehat{\beta}_i^{Y}$ Measurement Scale
Countercyclical Monetary Policy [$\widehat{\beta}_i^{Y} > 0$] and Procyclical Monetary Policy [$\widehat{\beta}_i^{Y} < 0$]
Level of Significance ***1%, **5% and *10%.
Note: We estimate $\hat{\beta}_i^{Y}$ for each country to measure the cyclicality of monetary policy and present the above summery statistics according to their country group.
The country group classification is from Nielsen (2011).

tendency to run procyclical monetary policy is widespread among the emerging and low-income developing countries, as opposed to advanced economies (red vs blue bars). The findings indicate that there is an inverse relation between procyclicality with the countries' development. In Figure 3.1, cyclicality indicators of $corr(i^{cycle}, Y^{cycle})$ reveals that more than 96% of the advanced economies (28 out of 29) show countercyclical monetary policy (blue bars). On the contrary, around 60% of emerging market (28 out of 46) and 52% of developing countries (12 out of 25) show procyclical policy (red bars). Cyclicality indicators of $\hat{\beta}_i^Y$ show similar results (Figure 3.2).

3.4.2 The graduation hypothesis and inflation targeting

In this section, we re-visit the "*graduation hypothesis*", this time for monetary policy procyclicality[69]. McGettigan *et al.,* (2013) propose that inflation targeting (*IT*) in emerging market appear to have been most successful in implementing the countercyclical monetary policy. We investigate this proposition by examining how the cyclicality behaviour of monetary policy has changed over the last decades and its relation to the presence of *IT* regime[70]. To this end, Figure 3.3 presents a scatter plot with pre-1990s' cyclicality on the horizontal axis and post-1999s' cyclicality on the vertical axis similar to our analysis with fiscal policy in Chapter 2[71]. In Figure 3.3, these are four categories of countries[72].

a) *Recent graduates* (top-left): These are the countries that were procyclical during the pre-1999s and became countercyclical over the last decade (post-1999s). Our findings indicate that in total 29 out of 97 sample countries have recently graduated. The majority of them are emerging (17) and developing countries (9). Most of the "*recent graduate*" countries have adopted some version of targeting (*IT*) regimes in the post-1999s period (Panel B, Green Dots). By and large, a greater proportion of inflation targeting countries (5 out of 17 emerging and 1 out of 9 developing countries) moved from procyclical to countercyclical monetary policy compare to non-*IT* countries (Panel B, non-Green Dots).
b) *Established graduates* (top-right): These are countries that have always been countercyclical in both sub-time period. We have observed that 41 out of 97 sample

[69] To propose the "*graduation hypothesis*", Vegh and Vuletin (2012) investigate 68 countries data for the period 1960-2009; McGettigan *et al*., (2013) analyse 84 countries data over the period 1960-2011.
[70] Table A3.3-A3.5 for Inflation Targeting (*IT*) regime adoption date for the sample countries. The adoption date of inflation targeting from Hammond (2012) and Ebeke and Fouejieu (2015).
[71] We calculate the monetary policy cyclicality [$corr(i^{cycle}, Y^{cycle})$] by establishing the correlation between cyclical components of nominal short-term interest rate and real GDP for both sub-period using annual data (1960-99 vs. 2000-09). The two sub-period cyclicality results are presented in Table A3.3-A3.5.
[72] We borrow the expression of the coordinate's name from Frankel *et al.*, (2013).

countries have always been countercyclical or "*established graduate*" over the time 1960-2014. Not surprisingly, the majority of the advanced countries (24) belongs to this category and 10 of them have already adopted some version of *IT* regimes. A small set of emerging (12) and developing countries (6) also fall in this category. Among them, 4 emerging and 1 developing countries have already adopted *IT* regimes (Panel B, Green Dots).

c) *Back to school* (bottom-right): These are the countries that were countercyclical during pre-1999s and turned to procyclical over the last decade (post-1999s). We have observed that a small group of countries (8) fall into these categories. They are emerging (3) and low-income developing countries (5). Remarkably, only one emerging country has adopted *IT* regimes (Panel B, Green Dots).

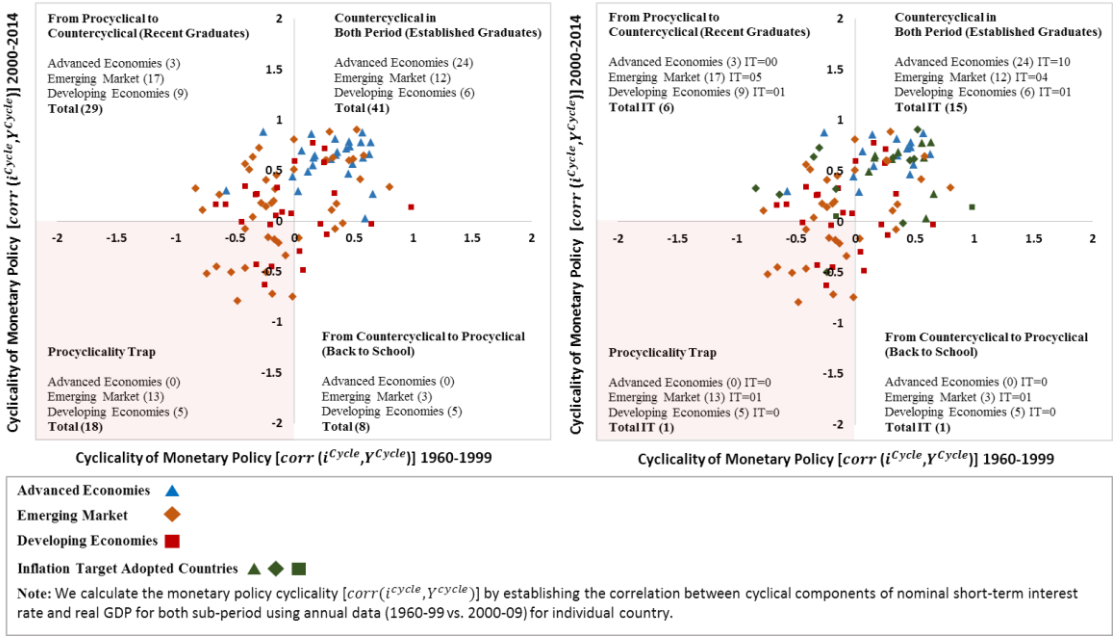
d) *Procyclicality trap* (bottom-left): These are the countries that have continued to exhibit procyclicality over the last decade. As expected, these are all emerging (13) and low-income developing (5) countries. Among these only one emerging country has adopted *IT* regimes (Panel B, Green Dots).

Figure 3.3 scatter plot classify that in total 26 emerging and developing countries are classified as "*procyclicality trap*" and "*back to school*". We find that on average "*procyclicality trap*" and "*back to school*" countries used to be less procyclical during pre-1999s, and became more procyclical during post-1999s (see, Table 3.2).

3.4.3 The prevalence of fear of floating

We represent the calculated FOF indicator $[corr(i^{cycle}, EXE^{cycle})]$ in Figure 3.4, where blue bars indicate no evidence of FOF ($FOF \leq 0$) and red bars indicate the presence of FOF ($FOF > 0$). Specifically a positive correlation indicates $[corr(i^{cycle}, EXE^{cycle}) > 0$ or $FOF > 0]$ that the short term policy rate increases when the currency is depreciating. Figure 3.4 shows that the FOF is prevalent in both emerging and developing country; precisely, more than 82% of emerging market (38 out of 46) and 84% of low-income developing countries (21 out of 25) show the evidence of FOF (red bars). On average, we detect that FOF value is above zero for both emerging ($FOF = 0.27$) and low-income developing countries ($FOF = 0.18$). On the contrary, we have observed a minor evidence of FOF for advanced economies, on average, it is nearly zero ($FOF = 0.07$). We also notice that on average FOF in "*procyclicality trap*" and "*back to school countries*" used to be less prominent during the pre-1999s and it has increased in the post-1999s period (Table 3.3).

Figure 3.3: Cyclicality of Monetary Policy and Inflation Targeting for 97 Countries 1960-2014



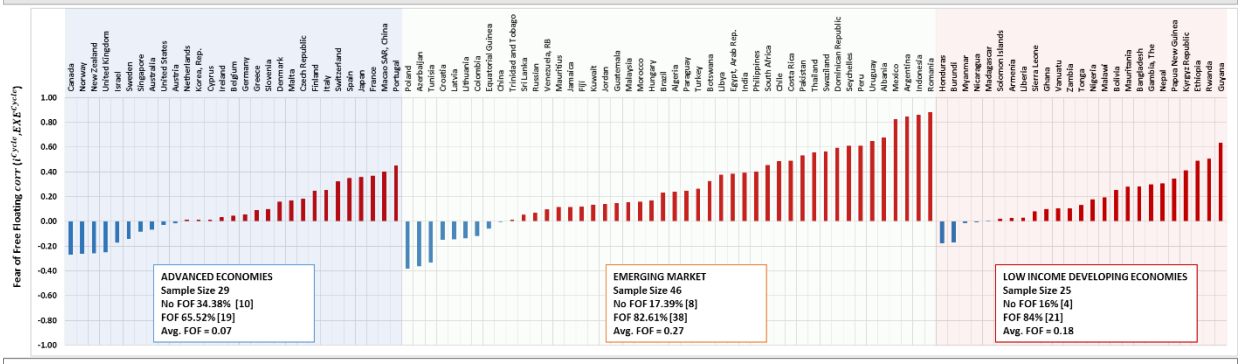
Note: We calculate the monetary policy cyclicality $[corr(i^{cycle}, Y^{cycle})]$ by establishing the correlation between cyclical components of nominal short-term interest rate and real GDP for both sub-period using annual data (1960-99 vs. 2000-09) for individual country.

TABLE 3.2: CHANGE OF MONETARY CYCLICALITY OVER THE TIME 1970-2014 (PRE 1999s vs. POST 1999s)

Country Group	Cyclicality of Monetary Policy $[corr\ (i^{Cycle}, Y^{Cycle})]$			
	Pre-1999s	Post-1999s	$\Delta corr\ (i^{Cycle}, Y^{Cycle})$	Sample
All Country Group	0.03	0.26	**+0.23**↑	96
Advanced Economies	0.30	0.61	**+0.31**↑↑	26
Emerging Market	-0.08	0.16	**+0.24**↑	45
Low Income Developing Country	-0.04	0.09	**+0.13**↑	25
Procyclicality Trap and Back to School	-0.14	-0.32	**-0.18**↓↓	26

Note: We estimate yearly $corr\ (i^{Cycle}, Y^{Cycle})$ for two sub-time period 1960-1999 (pre-1999s, 40 years) and 2000-2014 (post-1999s, 15 years) for each country. We take average of monetary policy cyclicality statistics for each country group to present the above summery statistics. Change Δ calculated from 2000-2014 (post-1999s) average value minus 1960-99 (pre-1999s) average value of $corr\ (i^{Cycle}, Y^{Cycle})$. The +ve (or -ve) value of Δ indicates that country groups are moving from procyclical monetary policy to less (more) procyclical policy. The country group classification is from Nielsen (2011).

Figure 3.4: Fear of Free Floating (FOF) During The Period 1960-2014 for 100 Countries



Degree of Fear of Free Floating [$corr\ (i^{Cycle}, EXE^{Cycle})$ Measurement Scale

No Evidence of Fear of Free Floating [$corr\ (i^{Cycle}, EXE^{Cycle}) \leq 0$ or $FOF \leq 0$] and Evidence of Fear of Free Floating [$corr\ (i^{Cycle}, EXE^{Cycle}) > 0$ or or $FOF > 0$]

Note: We measure the fear of free floating by constructing the correlation between the cyclicality components of exchange rate (EXE^{cycle}) and the short-term nominal interest rate (i^{cycle}) to present the above summery statistics according to their country group. The country group classification is from Nielsen (2011).

TABLE 3.3: CHANGE OF FEAR OF FLOATING (FOF) OVER THE TIME 1960-2014

Country Group	1960-99	2000-14	$\Delta corr\ (i^{Cycle}, EXE^{Cycle})$ or ΔFOF	Sample
All Country Group	0.14	0.11	**-0.04**↓	96
Advanced Economies	0.07	-0.04	**-0.11**↓↓	26
Emerging Market	0.18	0.20	**+0.02**↑	45
Low Income Developing Country	0.16	0.10	**-0.06**↓	25
Procyclicality Trap and From Countercyclical to Procyclical	0.15	0.25	**+0.10**↑↑	26

Note: We measure the FOF indicators [$corr\ (i^{Cycle}, EXE^{Cycle})$] by using annual data for two sub-time period 1960-1999 (40 years) and 2000-2014 (15 years) for each country. We take average of fear of free floating statistics for each country group to present the above summery statistics. Change Δ calculated from 2000-2014 average value minus 1960-99 average value of $corr\ (i^{Cycle}, EXE^{Cycle})$. The -ve (or +ve) value of Δ indicates that country groups are moving from more fear of free floating to less (more) fear free floating.

3.5 Empirical results

3.5.1 Bivariate analysis

Figure 3.5 presents the co-movement between monetary policy cyclicality and FOF over the period 1980-2014. First it is clear that during the period of the Great Moderation starting in 1984, advanced economies' monetary policy steadily moved towards more countercyclical nature (blue lines, Figure 3.5, Panel A). This is likely to demonstrate the importance of more flexible exchange rate regimes in facilitating greater monetary policy independence. However, we have not observed any noticeable improvement for emerging and developing economies during the same period. Rather, these countries shift towards more procyclical monetary policy from the 1990s onward (blue line, Figure 3.5, Panel B). FOF has also increased during the period of emerging market crises 1990-2002 (red line, Figure 3.5, Panel B). The need to defend the domestic currency in the crisis time is best exemplified by the procyclical policy[73]. However, we observed that emerging and developing economies have gradually shifted from procyclical policy to countercyclical during 2000, but they always show the evidence of FOF (red line, Figure 3.5, Panel B).

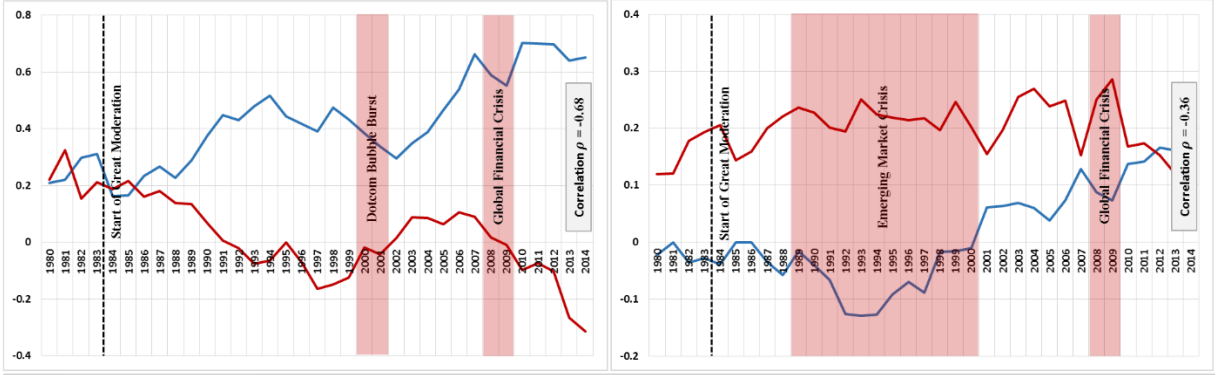
We have also observed that during the global financial crisis (2008-09), monetary policy has become less countercyclical across countries. A key factor in this has been the nominal rates hitting the zero lower bound, resulting in a shift towards less countercyclical policy during the global crisis 2008-09 episode (blue line, Figure 3.5, Panel A). On the contrary, emerging and developing economies have experienced substantial losses in the value of their currencies combined with rapid capital flight. Global commodity and food price shocks played a role given their weight in many emerging and developing economies' CPI baskets, with important implications for exchange rate pass-through. Once the crisis hit in 2008-09, central banks in the emerging and developing countries had less capacity to conduct countercyclical policy but they were required to tighter monetary policy to stop capital flight. We also detected that FOF has increased during the global financial crisis compared to the pre-crisis period for these groups of countries (see, red line, Figure 3.5, Panel B).

[73] For example, the Tequila crisis in Latin America during 1994-1995, as well as the more recent experiences of Russia, Brazil, Turkey and Hong Kong, exhibit important examples of strong defiance domestic currency during the crisis. All the listed countries have experienced massive devaluations of their currencies and central banks force to increase interest rates along with other supporting policy measures. Similar condition were observed, during the 1997 Asian crisis, the reserves of Korea and Thailand fell significantly to defend domestic currency, and the Indonesian currency depreciated sharply. Thus, during that time IMF advice was to regain confidence in the currency (see, for example, Fischer, 1998). To accomplish this, countries have to make it more attractive to hold the domestic currency (i.e., to defend capital flight and to regain foreign investors' confidence), which, in turn, create a pressure on monetary authorities to raise interest rates temporarily.

It is clear that from the start of the Great Moderation till the onset of the global financial crisis, on average advanced economies were always countercyclical (blue lines, Panel A) with a clear swing towards greater countercyclicality (blue lines, Panel A). The co-movement between cyclicality and FOF is negative (-0.68). The emerging and developing countries exhibited FOF (red line, Panel B) throughout the sample period with a noticeable co-movement between between FOF and monetary policy over the sample period (i.e. red vs blue, the correlation is -0.36).

We further check these results by constructing a scatter plot between FOF and monetary policy cyclicality indicators [$corr(i^{cycle}, Y^{cycle})$, $\hat{\beta}_i^Y$] at the individual country levels, as in plotted in Figure 3.6. It can be seen that monetary policy is countercyclical for low levels of FOF, becoming more procyclical as FOF increases. Figure 3.6 also suggests that majority of the advanced economies (blue dots) exhibit a clear evidence of low FOF with countercyclical policy. On the contrary, majority of emerging (orange dots) and developing countries (red dots) are characterized by relatively high degree of FOF with procyclical monetary policy. However, there may be a large variation exists within the sample countries' monetary policy cyclicality and FOF relationship over the sample period.

Figure 3.5: Cyclicality of Monetary Policy and Fear of Free Floating (FOF) Over the Period 1980-2014

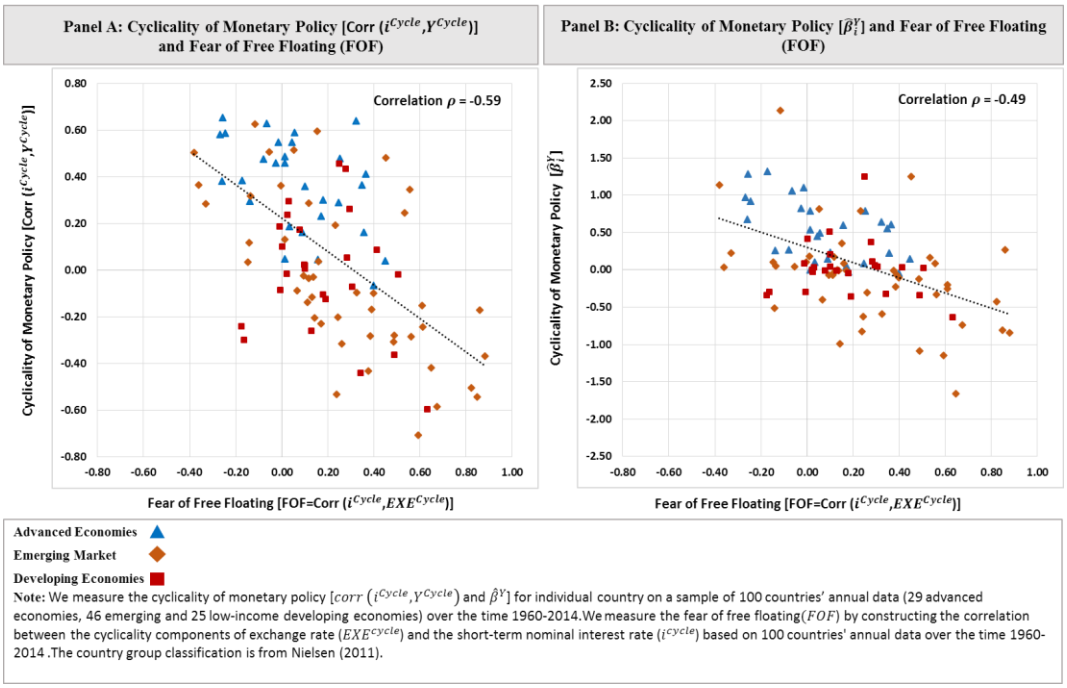


Measurement Scale

No Evidence of Fear of Free Floating [$FOF \leq 0$]; Evidence of Fear of Free Floating [$FOF > 0$]
Countercyclical Monetary Policy [$corr\ (i^{Cycle}, Y^{Cycle}) > 0$]; Procyclical Monetary Policy [$corr\ (i^{Cycle}, Y^{Cycle}) < 0$]

Note: Country Specific measure of monetary policy cyclicality is based on the 10-year rolling backward correlation between the cyclical components of real GDP [y^{Cycle}] and the cyclical component of the short-term interest rate [i^{Cycle}]. Similarly Fear of Free Falling (FOF) is based on the 10-year rolling backward correlation between the cyclical components of depreciation of the exchange rate [EXE^{Cycle}] and the cyclical component of the short-term interest rate [i^{Cycle}]. Therefore, the average presented for 1987, is the country average of the correlation for each country over the previous ten years (1976-

Figure 3.6: Correlation Between Cyclicality of Monetary Policy and Fear of Free Floating (FOF) for 100 Countries 1960-2014



Note: We measure the cyclicality of monetary policy [$corr\left(i^{Cycle},Y^{Cycle}\right)$ and $\hat{\beta}^Y$] for individual country on a sample of 100 countries' annual data (29 advanced economies, 46 emerging and 25 low-income developing economies) over the time 1960-2014.We measure the fear of free floating(FOF) by constructing the correlation between the cyclicality components of exchange rate (EXE^{cycle}) and the short-term nominal interest rate (i^{cycle}) based on 100 countries' annual data over the time 1960-2014 .The country group classification is from Nielsen (2011).

3.5.2 Fear of free floating as a determinants of procyclical monetary policy

In this section, we attempt to address the issue of cross-country variability by utilising panel regressions to establish the relation between FOF and monetary policy cyclicality. We maintain that one can characterise monetary policymaking by an expanded version of Taylor rule and included a multiplicative term of output cycle with fear of floating [$Y_{it}^{cycle} \times FOF_{it}$]. In doing so, we try to capture the interaction between the measure of monetary policy cyclicality and FOF.

Following Corbo (2000); Morón and Winkelried (2005); Calderón *et al.,* (2004a&b); Duncan (2014); and Vegh and Vuletin (2012), we estimate the below specification.

$$i_{it}^{cycle} = \delta_\pi \pi_{it}^{cycle} + \delta_Y Y_{it}^{cycle} + \delta_{FOF} FOF_{it} + \delta_{YF}\left[Y_{it}^{cycle} \times FOF_{it}\right] + \delta_X X_{it} + \delta_{YX}\left[Y_{it}^{cycle} \times X_{it}\right] + \delta_0 + \eta_t + \xi_{it} \quad (3.4)$$

where, i_{it}^{cycle} is the deviation of policy-controlled nominal short-term interest rate from its trend, π_{it}^{cycle} captures the deviations of CPI inflation from its trend and Y_{it}^{cycle} is the logarithm of real output gap, measured as the cyclical components from its trend. The

trend and cyclical components of these variables are measured by using Hodrick-Prescott (HP) filter. X_{it} account for a vector of appropriate control variables, which we will discuss later, and δ_0, η_t, ξ_{it} are the unobserved error terms. Following Vegh and Vuletin (2012), the FOF indicator is constructed by using 10 years rolling correlation between the cyclical components of the short-term nominal interest rate and the rate of the exchange rate. We select each countries time frame based on two restrictions: exchange rate regime and hyperinflation episode, which we have discussed earlier. Table A3.3 to A3.5 provide more details on the country-specific sample period and selection criteria. The data for dependent, explanatory and control variables are collected from different sources; please refer Table A3.1 and A3.2 for their sources and data description.

The interaction term in specification (3.4) between the fear of floating (FOF) with output cycle (Y_{it}^{c}) will determine whether the FOF plays a role on the way monetary authorities respond to business cycle fluctuations. More precisely, under specification (3.4), the degree of monetary policy cyclicality is determined by the following.

$$\frac{\partial i_{it}^{cycle}}{\partial Y_{it}^{cycle}} = \delta_Y + \delta_{YF} FOF_{it} + \delta_{YX} X_{it} \tag{3.5}$$

where $\partial i_{it}^{cycle} / \partial Y_{it}^{cycle}$ measures the cyclicality of monetary policy. Specification (3.5) indicates that at the presence of FOF, we expect the interaction term coefficient δ_{YF} to be negative. This would confirm that monetary policy is more procyclical as FOF increases.

We estimate specification (3.4) by using yearly panel data, pulling all countries together to gain efficiency for the period 1960-2014, including country fixed effects but they are not reported for brevity. We also use cross-sectional weighting matrix assuming the presence of cross-section heteroscedasticity. Please note, we estimate specification (3.4) by utilising least square method, although there is the probability of potential endogeneity problem. The underlying reason is the lack of appropriate time variant instruments for FOF to perform GMM estimation.

Our estimation results are presented in Table 3.4. Col 1 indicates that during good (bad) times interest rates increases (decreases), specifying that monetary policy is countercyclical (procyclical), more precisely interest rate cycle (i_{it}^{cycle}) and output cycle (Y_{it}^{cycle}) are positively correlated. Col 1 also support the notion that interest rate cycle is positively correlated with inflation cycle (π_{it}^{cycle}) and the estimated coefficients are statically significant at 1% level.

As can also be seen, and, in line with our earlier analysis, monetary policy is seen to be overwhelmingly countercyclical in advanced economies and the estimated coefficients of output cycle (Y_{it}^{cycle}) are statistically significant at 1% level with correct positive sign (Table 3.4, Col 4). In contrast, emerging and developing countries' monetary policy is procyclical and the estimated coefficients of the output cycle (Y_{it}^{cycle}) enter with negative sign and they are statistically significant at 1% level (Table 3.4, Col 7). It can be seen that the "*procyclicality trap and back to school*" countries follow procyclical monetary policy and the estimated coefficients are statistically significant at 1% level with correct negative sign (Table 3.4, Col 10).

We now incorporate FOF and the interaction term between the fear of floating (FOF) with output cycle (Y_{it}^{cycle}) in the specification (3.4) to capture the FOF's role on monetary policy is responses to business cycle fluctuations. The estimated coefficients of the interaction term [$Y_{it}^{cycle} \times FOF_{it}$] for all sample countries enter with correct negative sign as expected and they are statistically significant at 1% level (Table 3.4, Col 2). The LS estimate in Table 3.4 Col 2 imply that 1% increase in FOF increase the monetary policy procyclicality by 0.17%.

We also notice that emerging and developing countries' estimated coefficients of the interaction term [$Y_{it}^{cycle} \times FOF_{it}$] are statistically significant and relatively high (in absolute term) compared to those for advanced countries (Table 3.4, Col 5 vs. Col 8). The higher FOF coefficient values imply that monetary policy in emerging and developing countries is relatively more sensitive to FOF compared to the advanced economies.

We also investigate "*procyclicality trap and back to school*" economies separately. The coefficient values of the interaction term [$Y_{it}^{cycle} \times FOF_{it}$] for these countries are statistically significant and enter with correct negative sign. The coefficient values are relatively high compared to other sample countries, supporting the evidence of FOF as a critical determinant for monetary policy cyclicality for this group of countries (Table 3.4, Col 11).

Next, we include exchange rate cycle (Δe_{it}^{cycle}) as a control variable in specification (3.4) as an extension of Taylor rule[74]. It has been argued that the monetary authorities in open economies should react to exchange rate movements in addition to inflation and output

[74] A positive (negative) value of Δe_i^{cycle} denotes currency depreciation (appreciation). Please refer to Table A3.1 for more detailed description of the data.

(Ball, 1999; Corbo, 2000; Benigno and Benigno, 2001; and Morón and Winkelried, 2005). For example, Taylor (2001) argues that monetary policy rule performs worse, if nominal exchange rate fluctuations are excluded. In Table 3.4, all the estimated coefficients of Δe_{it}^{cycle} enter with correct positive sign. However, they are not statistically significant for advanced economies (Table 3.4, Col 6). In sharp contrast, exchange rate cycle (Δe_{it}^{cycle}) appears to be critical determinants for interest rate cycle (i_{it}^{cycle}) for other group of countries, pointing to monetary authorities' deliberate response to exchange rate movements. The estimated coefficients of the interaction term $[Y_{it}^{cycle} \times FOF_{it}]$ continues to appear with correct negative sign and are statistically significance level even when we control for exchange rate cycle (Δe_{it}^{cycle}).

We have also repeated the above exercise with quarterly data, as presented in Table 3.5, confirming results from annual data in Table 3.4. In sum, we find that, when FOF is negligible, monetary policy is countercyclical because the traditional monetary policy reaction dominates, hence policy rate responds to inflation and output movements. This largely exemplifies policy making in advanced economies. In sharp contrast, FOF greatly matters for "*procyclicality trap and back to school*" countries resulting in higher interest rates in downturns and hence procyclical monetary policy.

3.5.3 Other determinants of procyclical monetary policy

While it seems natural to think that FOF affect the way in which monetary policy is conducted, our findings so far could reflect the effect of omitted variables that are related to FOF. To address this issue, we include a set of control variables X_{it}, following Vegh and Vuletin (2012), McGettigan *et al.,* (2013) and Duncan (2014). The estimated results are presented in Table 3.6.

First, we consider the degree of fiscal policy cyclicality ($FISCYC$)[75]. It is well known that less developed countries often face restricted access to international credit markets during downturns, resulting in, government's dependence on central bank's credit, either to finance state-owned entities or to support the budget deficit[76]. This makes it challenging for the central bank to retain control over on monetary policy[77]. Government budget

[75] $FISCYC$ indicator is constructed by using 10 years rolling correlation between the cyclical components of real government consumption and the real GDP. A positive (negative) value of $FISCYC$ specifies that government take procyclical (countercyclical) fiscal policy.
[76] See, for example, Gavin and Perotti (1997); Riascos and Végh (2003); Caballero and Krishnamurthy (2000); Mendoza and Oviedo (2006) and Calderón and Schmidt-Hebbel (2008).
[77] The legal provision of monetary authorities debt financing of the government deficit is inversely related to the level of development. The underlying bases are seen as shallow tax bases and underdeveloped financial systems (see, for example, Alagidede (2016) and Jácome *et al*., (2012).

constraint links budget deficits directly to monetary policy; a change in budget deficit inevitably changes the size of high-power money or interest bearing government bonds required to finance the deficit. Of course, as long as the government has access to the domestic or international credit markets, a budget deficit does not necessarily raise the growth of money. Put differently, access to international credit markets weakens the link between the fiscal deficit and money creation because changes of fiscal deficit can be directly financed through issuing government bonds (see, for example, Taylor, 1995).

In contrast, government borrowing from the central bank tends to generate an upward pressure on inflation and weaken the exchange rate (see, for, example, Laurens, 2005). This in turn, forces monetary authorities to conduct procyclical policies to stabilise the inflation and support budget deficit at the same time. If so, we are expecting countries that pursue procyclical fiscal policy to also follow procyclical monetary policy. Results presented in Table 3.6, Col 1 show that interaction term coefficients of $FISCALCYC$ enter with correct negative sign and they are statistically significant at 1% to 5% level. The LS estimate in Table 3.6 Col 1 imply that 1% increase in $FISCYC$ (i.e. fiscal procyclicality) is associated with an increase in the monetary policy procyclicality of 0.17%.

Next, we incorporate CBI (central bank independence) *de facto* index and monetary freedom (MF) index in specification (3.4). In the absence of central bank independence and monetary freedom, the fiscal authorities have the incentives to indirectly influence central banks to conduct an expansionary monetary policy by increasing the debt accumulation (see, for example, Dimakou, 2006). The delegation of monetary policy to an independent monetary authority in democracies permits central banks to respond in a conservative manner that is reflected directly in the lower rate of money supply growth. That is, monetary authorities can target money supply or exchange rate and manage the interest rates to ensure, most prominently, price stability, regardless of political pressure. If so, CBI and MF in the sphere of the monetary policy as means of preventing high inflation, achieving the price and output stability (see, for example, Alesina, 1988; Cukierman *et al.,* 1992; Berger *et al.,* 2001)[78]. Thus, we can argue that higher CBI and MF may lead to sound monetary policy in response to output fluctuations. The interaction term coefficients of CBI and MF enter with correct positive sign and they are statistically

[78] However, a growing number of literature also argue that there is no systematic relationship available between central bank independence (CBI) and inflation (see, for example, Posen, 1993; Fuhrer, 1997; Campillo and Miron, 1997; and Hayo and Hefeker, 2002). One possible reason why these studies do not find a negative relation between CBI and inflation is the accurate measure of CBI. Brumm (2002) argue that accurate measure of CBI and the discrepancy mainly arise from *de jure* and *de facto* independence, which can lead to anomalous results. He also argue that *de jure* measure of independence may significantly differ from *de facto* independence, particularly in emerging and developing economies, where institutions are weak and the rule of law is relatively low. Keeping these factors into consideration, in this paper, we have used *de facto* independence rather *de jure* independence.

significant for MF at 1% level (Table 3.6, Col 2 and 3). The estimated result in Table 3.6 Col 3 suggest that 1 point increase in MF reduces the monetary policy procyclicality by 0.013%. The positive coefficients of CBI and MF address that central bank independence and monetary freedom acting as a constraints on fiscal policy, which in turn affect the ability of the monetary authority to conduct countercyclical policy.

Next, we incorporate institutional quality in the baseline regression. Countries with strong institutions tended to follow countercyclical monetary policy (see, for example, Duncan, 2014). In the absence of appropriate checks and balance, there may be a danger that monetary authorities are being transformed into multipurpose institutions (see, for example, Taylor, 2016). A delegation of monetary policymaking to a non-elected institution should be accompanied by transparency and accountability. Central bank transparency and accountability are seen as ways of facilitating domestic and international financial markets response to its policy decisions. Policy changes are less likely to cause a sharp movement in asset prices, reducing output fluctuation (see, for example, Dincer and Eichengreen, 2012). To examine this argument, we construct the institutional quality (IQ) index, measured by a composite index, which is proxied by measures of corruption and transparency. The estimated coefficients interaction term enter with correct positive sign and they are statistically significant at 1% (Table 3.6, Col 4). The LS estimates in Table 3.6 Col 4 imply that 0.10 unit increase in IQ reduces monetary procyclicality by 0.47%, suggesting that higher IQ are associated with sound monetary policy responses to output fluctuations.

Next, we control for the role inflation targeting (IT) regimes on price and output stability. The appointment of an independent and sufficiently conservative central bank (i.e., CBI and MF), combined with better institutional quality (i.e., IQ) are seen as one type of anchor to stabilize price and output. Another anchor is commitment to a unilateral exchange rate management (see, for example, Cukierman, 2008). According to "*hollowing-out hypothesis*", the choices are either to follow a flexible exchange rate combined with inflation targeting (IT) regime or a fully dollarized economy (see, for example, Frankel *et al.,* 2000; Masson, 2001; Williamson, 2000 and Velasco, 2000). Over the last twenty five years many advanced and emerging economies have gradually shifted from an exchange rate anchor to effective CBI and MF augmented by implicit or explicit inflation target (IT) regimes[79] (see, for, example, Hammond, 2012).

[79] Other countries like European countries (EU) are raised their commitment to permanently fixed exchange rates by eliminating separate currencies by the creation of European Monetary Union (EMU). In many emerging market, such as, Brazil, Chile, Colombia, Hungary,

The argument of replacing exchange rate anchors with implicit and explicit *IT* regimes is that *IT* regimes allow for monetary tools to be used for domestic stabilization purposes. To the extent that this is true, *IT* regimes may help to conduct the monetary policy in a countercyclical manner. To examine this argument, we construct *IT* dummies with a value of 1 for countries that have adopted *IT* regime and 0 otherwise. The interaction term coefficient of *IT* enter with correct positive sign and they are statistically significant at 1% level in Table 3.6, Col 5. Specifically, Table 3.6 Col 5 LS estimation imply that countries with *IT* regime run 0.28% more countercyclical monetary policy compared to countries with non *IT* regime.

Lastly, we control for the degree of financial depth and integration in specification (3.4). It has been argued that a country's ability to adopt optimal stabilisation policies is hampered by external borrowing constraints (see, for, example, Perotti, 1999; Calvo and Reinhart, 2000) and the interaction between domestic and external financial imperfections (see, for example, Caballero, 2002). Greater financial depth and integration stabilise the exchange rate, which, in turn, improves its effectiveness as an endogenous shock absorber and therefore allow the central bank to conduct countercyclical monetary policy. Thus, countries' access to international capital markets can be closely related to the way its monetary policy is conducted. We proxy financial integration by using the Chinn-Ito financial openness index ($FINOPEN$). Countries with greater values of the index have better access to the international capital markets.

We also incorporate financial depth ($FINDEPTH$) in specification (3.4). We measure $FINDEPTH$ by liquid liabilities over GDP, which may result from free access to international capital markets or greater integration with foreign capital markets. It can be argued that countries with a high level of $FINDEPTH$ have the appropriate financial cushion to conduct countercyclical monetary policy to smooth out the business cycle. Countries with better financial integration ($FINOPEN$) and financial depth ($FINDEPTH$) are better placed to conduct countercyclical policy in an environment where financial markets are deep and better integrated. Table 3.6 (Col 6 and 7) present results; both $FINOPEN$ and $FINDEPTH$ interaction term coefficients enter with correct positive sign and they are statistically significant at 1% level. The LS estimates in Table 3.6, Col 6 and 7 imply that 1 unit increase in $FINOPEN$ and 1% increase in $FINDEPTH$ reduces monetary policy procyclicality by 0.11%, and 0.10%, suggesting that higher financial openness and

Indonesia, Mexico, Peru, Poland, Romania, Russia, South Africa, Thailand and Turkey have recently adopted flexible regimes but with managed floating (see, for example, Hammond, 2012). We have presented the inflation targeting adoption date in Table A3.3-A3.5.

better financial integration are positively associated with countercyclical monetary policy responses to output fluctuations.

Results presented in Table 3.6 (Col 1-8) show that interaction term FOF coefficients remain a strong determinant of monetary policy cyclicality in terms of sign, size and statistical significance, even after accounting for other potential determinants. Additionally, we find larger quantitative effect of FOF compared to $FISCYC$, CBI, MF, $FINOPEN$ and $FINDEPTH$. However, the quantitative effect of FOF is small but statistically significant, while we control for IQ and IT. Our findings clearly point to FOF as key determinant of monetary policy cyclicality.

3.5.4 Sensitivity analysis: cross-country evidence

Estimating the cyclical response of monetary policy in a large panel of heterogeneous countries, as done in the panel estimates. To access the robustness of the results, here we estimate cross-country data to exploit the cross-country variability as oppose to within-country variability. To explore whether there is a statistically significant link between the compiled cyclicality indicators [$corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$] and FOF, we estimate the following cross country regression for the period 1960-2014.

$$\widehat{MonetaryIndct}_{it} = \alpha_0 + \alpha_1 FOF_{it} + \phi X_{it} + \xi_{it} \quad (3.5)$$

Where $\widehat{MonetaryIndct}_{it}$ denotes the relevant estimated monetary policy cyclicality indicators measured by $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$ from the section 3.4.1. Our core variable of interest is the FOF, measured by correlation between the cyclical components of the short-term nominal interest rate cycle (i^{Cycle}) and the rate of exchange rate cycle (EXE^{Cycle}), that we have discussed in section 3.4.3. X_{it} accounts for a set of the appropriate control variable, which we have discussed in the previous panel regression tables. The estimated results are presented in Table 3.7.

Our key indicator FOF show consistent results as hypothesised earlier. The coefficients of (FOF) enter with correct negative signs that are all statistically significant at the 1% level (Table 3.7, Col 1-16). These results are in-line with our panel data analysis, however the quantitative effect becomes much larger with higher values of coefficient values being recorded. We also include a set of control variables X_{it} measured by $FISCYC$, IQ, CBI, MF, IT, $FINOPEN$ and $FINDEPTH$ in the specification (3.5). The coefficients of control variables X_{it} enter with correct signs in line with our earlier panel evidences (Table 3.7). The statistical significance and the size of the coefficients of FOF remain much the same, even

after incorporating X_{it}. The empirical findings form cross-country estimation supports to the arguments laid out in our earlier panel evidences; FOF is an important determinants for procyclical monetary policy.

3.5.5 Addressing the potential endogeneity of fear of floating

In this section, we try to address the potential endogeneity of FOF and the monetary policy stance by using an instrumental variable (IV) approach, by estimating specification (5). We have not found any time-varying instruments for FOF, hence we rely on cross-country estimation method as opposed to panel estimations. We adopt the two-step feasible GMM estimation method results are presented in Table 3.8.

To the extent that procyclical policies harm macroeconomic outcomes, they will also worsen the FOF. Additionally, FOF and monetary policy cyclicality indicators are both measured during the same period 1960-2014, hence it is important to consider the potential endogeneity problem in estimating the link between FOF and monetary policy cyclicality. This is done by estimating specification (3.5).

Our first set of instruments are $NEED$ and IMF, where $NEED$ is the number of episodes a country has gone through of sovereign external default from 1800 to 1960 and IMF is the number of episodes of International Monetary Fund programmes[80]. We collect the data from Reinhart and Rogoff (2011). During 1952-2008, there were in total 85 default episodes and 538 IMF programme (see, for example, Qian *et al.,* (2011). The availability of IMF's loans to support member countries has certainly increased during eve of "*sudden stop*". Countries seeking help from IMF programmes are still forced to undergo through economic adjustments in an effort to regain sound macroeconomic policy and regain access to international capital markets (see, for example, Reinhart and Rogoff, 2011).

How is our constructed FOF is associated with $NEED$ and IMF? We argue that crisis episodes may amplify the FOF particularly in emerging and developing countries, where monetary authorities want to maintain their credibility to avoid debt crisis. The fear of the depreciation of domestic currency (typically characterised by significant capital outflows) would force monetary authorities to raise interest rates to defend the domestic

[80] Qian *et al.*, (2011) propose that the world has experienced the sovereign default episodes during the Napoleonic wars in the early nineteenth century (i.e., 1814 end of Napoleonic era) and the Latin American countries once they became independent. They also argue that the biggest default were largely observed during the era of Great Depression (1929-1939) and World War II (1939-1945), when at the peak more than 40% of the world was in default in external debt. They propose that from 1800 to present, the average external default crisis probability of the advanced economies is less than half of that of developing countries and almost one-fifth of that of Latin American emerging market countries. On average the probability of default crisis in advanced economics is 7%, in emerging and developing countries is 19% and in Latin American countries is 34%.

currency. During crisis periods, this fear becomes severe, when the currency depreciates rapidly and balance sheet effect plunges the economy into recession by encouraging further capital outflows. The IV regression results in Table 3.8 support these arguments. The first-stage regression results show that sovereign external default ($NEED$) and IMF programme (IMF) coefficients are statistically significant at 1% level with a correct positive sign (Table 3.8, Col 1 and 3). The findings indeed suggest, countries that experience sovereign external defaults ($NEED$) and those with IMF programmes (IMF) are more likely to exhibit FOF.

The second set of instruments are combines of currency crisis (CC) and other crisis (OC), where CC is the number of episodes a country have gone through currency crisis[81] and OC is the combined number of episodes a country have gone through inflation crisis[82], stock market crashes, domestic debt crisis, external debt crisis and banking crisis[83] from 1800 to 1960. Similar to the above, we argue that countries that experience currency crises and other crises in the past, may have inflated FOF. The IV regression results in Table 3.8 suggest that countries that previously experienced currency crises (CC) and other crises (OC) exhibit to greater FOF.

After using the above instruments, the first stage regression results in Table 3.8, Col 1-4 suggest that higher FOF leads to a higher tendency to conduct procyclical monetary policy rather than the other way round and the estimated coefficients are statistically significant at 1% level with correct negative sign. The IV results in Table 3.8 are largely consistent with the OLS baseline regression results presented in Table 3.7.

Our instrumental variables satisfy two major requirements of GMM estimations: they must be orthogonal to the error term and correlated with the incorporated endogenous variables. Table 3.8 shows that *F*-test statistics indicate a test of the joint significance of the (excluded) instruments, which are presented in the first-stage regressions. The overidentification test presented in Hansen *J*-test statistics is employed to test whether the instrument is uncorrelated with the error term. The results are consistent with the

[81] Some famous historic example of currency crisis, French franc crisis of 19923-26, the sterling crisis of 1931, the dollar crisis of 1933, and gold bloc crisis 1935-36. With regard to post–World War II period, we can distinguish between those that occurred during the Bretton Woods era and those that occurred after 1973. Some notable crises in the Bretton Woods era were those of the pound sterling in 1947-49 and again in 1967, the French franc in 1968-69, and the U.S. dollar in 1960 (see, for example, Brown, 1940 and Eichengreen and Hsieh, 1996).

[82] There was huge rise in inflation crisis starting after the World War II and it had continued in the 1980s and early 1990s. Indeed, inflation crisis was partially acting as a vehicle for partial other default as many advanced countries experienced in the 1970s and recent hyperinflation era in Latin America during 1980s and in many emerging economies in the 1990s (see, for example, Qian *et al*., 2011).

[83] Some famous historic example of banking crisis, by the time of the Great Depression of the 1930s, banking crisis were the world wide phenomenon. More specifically, there were small number of banking crisis during the years of financial repression that began during World War II and sustained in many countries well into the 1970s. Emerging markets were certainly affected by advanced country banking crises but did not have so many of their own, if only because their financial systems were dominated by foreign banks (see, for, example, Reinhart and Rogoff, 2009).

presence of a general form of heteroscedasticity. The Hansen J-statistics shows that our selected instruments satisfy the orthogonality conditions, indicate they are valid instruments for FOF.

3.5.6 Robustness checks

We check the robustness of our findings by utilising four alternative measures of monetary cyclicality from the previous literature. In this approach, we use our baseline specification (3.5) but the dependent variable of monetary policy cyclicality indicators $\widehat{MonetaryIndct}_{it}$ are replaced by alternative measures of monetary policy cyclicality index as used in the existing literature. One issue with the availability of the monetary policy cyclicality index from previous literature that reduces the number of observations compared to our cyclicality measurement. Nonetheless, the estimation results are conclusive, and they are presented in Table 3.9.

First, we use Vegh and Vuletin (2012) cyclicality index ($VV2012$) which is based on country correlations between the cyclical components of real GDP and nominal short-term interest rate where the cyclical components are estimated by using the Hodrick-Prescott (HP) filter. Results presented Table 3.9, Col 1 confirm our earlier findings. The estimated coefficient of FOF is statistically significant at 1% level with negative sign.

Second, we consider Yakhin (2008) cyclicality index ($YYCorr2008$ and $YYTSLS2008$). To determine the cyclical behaviour of monetary policy, he measures the correlation ($YYCorr2008$) between cyclical movements between real GDP (i.e., measured by GDP deflator) and nominal interest rate (i.e., measured by interbank market rate). In addition, he also estimates Taylor rule by utilising TSLS approach and evaluate the sign of the coefficients on output as a measure of cyclicality stance ($YYTSLS2008$). According to his index, a positive (negative) relation indicates countercyclical (procyclical) monetary policy. The two cyclicality indices confirm our earlier evidences, we find that FOF coefficients are estimated with the expected negative sign and they are statistically significant at 10% level (Table 3.9, Col 2 and 3).

Third, we use McGettigan *et al.,* (2013) index, which is developed for 84 sample countries annual data for 1960 to 2011. Their cyclicality index is different from the others discussed in this section. They emphasise the real interest rate, rather than the nominal interest rate. To determine the cyclical behaviour of monetary policy, they measure the correlation ($McCorr2013$) between cyclical movements between output and real interest rate (i.e., proxied by discount rate or money market rate). In addition, they also estimate Taylor

rule and evaluate the sign of the coefficients on output as a measure of cyclicality stance ($McTR2013$). The two cyclicality indices confirm our earlier results, the estimated coefficients of FOF are statistically significant at 1% to 5% with negative sign (Table 3.9, Col 4 and 5).

Finally, we utilise Duncan (2014) index, which is similar to others discussed in this section ($RD2014$). He measures the cyclicality of monetary policy by utilising a simple correlation between cyclical components of real GDP and central banks' nominal discount rate. According to the index, a positive (negative) correlation indicates countercyclical (procyclical) monetary policy. The estimated coefficient of FOF is not statistically significant, yet it enters with correct negative sign (Table 3.9, Col 6).

Results presented in Table 3.9 (Col 1-6) show that FOF remains a strong determinant of monetary policy cyclicality, even after accounting for the alternative measures of fiscal cyclicality index.

3.6 Conclusions

We document that procyclical monetary policy has been widely observed in emerging and low-income developing countries. This contrasts sharply with advanced economies, where the policies have tended to be countercyclical. We have also shown that, similar to fiscal policies in the previous Chapter, a substantial number of emerging and developing countries have been trapped in a procyclical monetary policy stance, being unable to move to countercyclical monetary policy. Further, we have shown that "*fear of free floating*" is a critical determinant of the way monetary policy is conducted. We found "*fear of free floating*" is strongly and negatively associated with the degrees of monetary policy cyclicality; monetary policy is more procyclical as fear of free floating increases.

Given the role of fear of floating in monetary procyclicality, overcoming the "*fear of floating*" appears as a critical factor to shift from procyclical to countercyclical policies. We document that a lion share of our sample countries are still practising intermediate exchange rate regimes and not letting their currencies to float freely, hence showing "*fear of floating*" (see, Figure 3.4). We also show that a number of countries in our sample have moved away from the "*procyclicality trap*" and recently graduated to countercyclical policy by adopting of inflation targeting regime. Several emerging economies have gradually shifted from an exchange rate anchor to effective inflation targeting regimes, which are seen as key factors in such a move towards countercyclical policy (see, for example, Coulibaly, 2013 and McGettigan *et al.,* 2013).

The cost of procyclical monetary policies can be substantial. McGettigan *et al.,* (2013) demonstrate that procyclical monetary policy is positively associated with output volatility. In Chapter 4, we will also provide empirical evidence that procyclical monetary policy is costly for the macroeconomic outcomes in terms of lower rates of economic growth, higher rates of output volatility and inflation volatility. Our findings point to the importance of shifting from procyclical to countercyclical monetary policy.

Two policy implications can be drawn from our study to overcome the problem of procyclicality. First, emerging and developing countries' countercyclical policy severely hampered by weak exchange rate (i.e. *fear of free floating*). Dollarization is unlikely to be the paramount solution in pursuit of this problem. In general, this policy is only applicable for very small open economies or if the domestic institutional infrastructure is deemed beyond repair (see, Lane, 2003). For the vast majority of the developing and emerging countries, the preferred approach to monetary stability is to maintain some degree of central bank independence (i.e., monetary freedom with less fiscal dominance) and to develop robust, accountable and transparent framework to formulate interest rate decisions. When monetary authorities are accountable and transparent about its economic outlook, monetary policy choices are less likely to act as a surprise, most prominently, price stability, regardless of political pressure. Policy changes are more likely to prevent high inflation, sharp movement in asset prices, achieving the price and output stability. It therefore follows that countries with these characteristics are less likely to face credit constraints in international capital markets and regain investor's confidence, thus better financial integration. Greater financial integration stabilises the exchange rate, which in turn, reduces the exchange rate volatility and therefore calls for a countercyclical monetary policy to step in.

Second, in line with the recent developments of the advanced economies, the most obvious policy is to adopt inflation targeting regime in conducting monetary policy. The argument of replacing exchange rate anchors by implicit and explicit inflation targets is that the regime makes allows monetary tools to be used for domestic stabilisation purposes. The inflation targeting regime provides a policy rule on which domestic sector can anchor its expectations about the future inflation. Within this framework, monetary authorities have the discretion in responding to shocks to stabilise the economy, ensuring greater policy credibility. Of course, credible pursuit of inflation targeting requires a capable, independent monetary authority and better institutional quality that is demonstrably committed to price stability (see, for example, Hammond, 2012 and Lane, 2003). In this

case, inflation targeting regime may be helpful to overcome the problem of procyclicality for better macroeconomic outcomes.

In summary, escaping monetary policy procyclicality does require clear transparent policy making process, better macroeconomic fundamentals, lower exchange rate vulnerabilities, international capital flows and adoption of inflation targeting regimes. It is also notable that many monetary authorities appear to have escaped fiscal dominance, as many emerging countries have recently shifted to countercyclical fiscal policy for better institutional quality (see, for example, Frankel *et al.,* 2013). A key factor has been the financial reforms achieved over the past decades and adoption of inflation targeting, which has enhanced the transparency and flexibility of monetary policy. Although the process of founding a credible inflation targeting may involve a persistent period of high real interest rates, the payoff will be the enhanced monetary climate. Central to developed stabilization performance is an inflation targeting that anchors the price expectations in the medium-term that would allow the monetary authority to stabilise the business cycle fluctuations, without persuading countervailing shifts in long-term interest rates (see, for example, Lane, 2003).

TABLE 3.4: PANEL REGRESSION OF MONETARY POLICY CYCLICALITY WITH FEAR OF FREE FLOATING (FOF), 1960-2014 (ANNUAL DATA)

DEPENDENT VARIABLE: CYCLICAL COMPONENTS OF SHORT-TERM INTEREST RATE [i_i^{cycle}]. ESTIMATION METHOD: LEAST SQUARE[1]

	ALL COUNTRIES			AD SAMPLE			EM & DE SAMPLE			PT & CP SAMPLE		
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**	**Col 7**	**Col 8**	**Col 9**	**Col 10**	**Col 11**	**Col 12**
OUTPUT CYCLE [Y_i^{cycle}]	0.03*** (0.01)	0.09*** (0.01)	0.09*** (0.01)	0.31*** (0.04)	0.31*** (0.04)	0.32*** (0.04)	-0.02*** (0.008)	-0.06*** (0.01)	-0.06*** (0.01)	-0.11*** (0.04)	-0.09 (0.06)	-0.04 (0.05)
INFLATION CYCLE [π_i^{cycle}]	0.13*** (0.008)	0.13*** (0.008)	0.11*** (0.008)	0.19*** (0.02)	0.19*** (0.02)	0.19*** (0.02)	0.10*** (0.009)	0.11*** (0.009)	0.09*** (0.009)	0.10*** (0.01)	0.10*** (0.01)	0.07*** (0.01)
OUTPUT CYCLE [Y_i^{cycle}]× FOF		-0.17*** (0.04)	-0.18*** (0.04)		-0.17* (0.09)	-0.17* (0.09)		-0.23*** (0.04)	-0.25*** (0.04)		-0.27* (0.15)	-0.28* (0.14)
EXCHANGE RATE DEPRECIATION CYCLE [Δe_i^{cycle}]			0.03*** (0.003)			0.001 (0.006)			0.03*** (0.003)			0.03*** (0.005)
STATISTICS												
ADJUSTED R^2	52.64%	52.76%	50.82%	71.93%	70.14%	69.94%	8.64%	9.32%	13.33%	8.25%	9.26%	11.45%
NUMBER OF OBSERVATIONS	2383	2383	2383	798	798	798	1585	1585	1585	581	581	581
NUMBER OF COUNTRIES	**99**	**99**	**99**	**28**	**28**	**28**	**71**	**71**	**71**	**26**	**26**	**26**

Level of significance: ***1%, **5%, *10%. All data regression include intercept term. See data appendix for variable definitions and sources.
AD=Advanced Economies, EM=Emerging Market Economics, DE=Low-Income Developing Countries.
PT=Procyclical trap countries, who conduct procyclical monetary policy in both sub-period 1960-1999 and 2000-2014.
CP=Back to school countries that were countercyclical during 1960-1999 and became procyclical during 2000-2014.
Fear of free floating FOF is constructed using the 10-year rolling window correlation between the cyclical components of the short-term interest rate and the rate of depreciation of the exchange rate.
For brevity constant and FOF terms are not reported.
[1] Least square estimation are performed using cross sectional country fixed effect and cross sectional weighting matrix assuming the presence of cross-section heteroscedasticity.

TABLE 3.5: PANEL REGRESSION OF MONETARY POLICY CYCLICALITY WITH FEAR OF FREE FLOATING (FOF), 1960Q1-2014Q4 (QUARTERLY DATA)

DEPENDENT VARIABLE: CYCLICAL COMPONENTS OF SHORT-TERM INTEREST RATE [i_i^{Qcycle}]. ESTIMATION METHOD: LEAST SQUARE[1]

	ALL COUNTRIES			AD SAMPLE			EM & DE SAMPLE			PT & CP SAMPLE		
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**	**Col 7**	**Col 8**	**Col 9**	**Col 10**	**Col 11**	**Col 12**
OUTPUT CYCLE [Y_i^{Qcycle}]	0.10*** (0.02)	0.12*** (0.02)	0.12*** (0.02)	0.18*** (0.02)	0.20*** (0.02)	0.20*** (0.02)	-0.07** (0.03)	-0.06** (0.03)	-0.07** (0.03)	-0.33*** (0.08)	-0.21*** (0.08)	-0.16** (0.08)
INFLATION CYCLE [π_i^{Qcycle}]	0.33*** (0.01)	0.31*** (0.01)	0.32*** (0.01)	0.37*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.29*** (0.02)	0.27*** (0.02)	0.25*** (0.02)	0.22*** (0.03)	0.22*** (0.03)	0.21*** (0.03)
OUTPUT CYCLE [Y_i^{Qcycle}]× FOF^Q		-0.26*** (0.05)	-0.32*** (0.05)		-0.29*** (0.06)	-0.30*** (0.06)		-0.32*** (0.10)	-0.45*** (0.12)		-1.23*** (0.26)	-1.36*** (0.27)
EXCHANGE RATE DEPRECIATION CYCLE [Δe_i^{Qcycle}]			0.02*** (0.004)			0.004 (0.004)			0.05*** (0.008)			0.05*** (0.02)
STATISTICS												
ADJUSTED R^2	18.98%	18.88%	18.15%	23.37%	24.39%	24.40%	14.29%	13.87%	13.85%	10.59%	13.73%	17.97%
NUMBER OF OBSERVATIONS	5104	5104	5104	3143	3143	3143	1961	1961	1961	540	540	540
NUMBER OF COUNTRIES	**61**	**61**	**61**	**29**	**29**	**29**	**32**	**32**	**32**	**11**	**11**	**11**

Level of significance: ***1%, **5%, *10%. All data regression include intercept term. See data appendix for variable definitions and sources.
AD=Advanced Economies, EM=Emerging Market Economics, DE=Low-Income Developing Countries.
PT=Procyclical trap countries, who conduct procyclical monetary policy in both sub-period 1960-1999 and 2000-2014.
CP= Back to school countries that were countercyclical during 1960-1999 and became procyclical during 2000-2014.
Fear of free floating FOF^Q is constructed using the 20-quater rolling window correlation between the cyclical components of the short-term interest rate and the rate of depreciation of the exchange rate.
For brevity constant and FOF^Q terms are not reported.
[1] Least square estimation are performed using cross sectional country fixed effect and cross sectional weighting matrix assuming the presence of cross-section heteroscedasticity.

TABLE 3.6: PANEL REGRESSION OF MONETARY POLICY CYCLICALITY WITH FEAR OF FREE FLOATING (FOF) AND OTHER DETERMINANTS OF MONETARY POLICY CYCLICALITY, 1960-2014 (ANNUAL DATA)

DEPENDENT VARIABLE: CYCLICAL COMPONENTS OF SHORT-TERM INTEREST RATE [i_i^{cycle}]. ESTIMATION METHOD: PANEL LS[1]								
	ALL COUNTRIES							
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**	**Col 7**	**Col 8**
OUTPUT CYCLE [Y_i^{cycle}]	-0.18*** (0.022)	0.10** (0.05)	-0.80*** (0.13)	-0.12** (0.05)	0.08*** (0.01)	0.04** (0.02)	0.06*** (0.02)	-0.75*** (0.33)
INFLATION CYCLE [π_i^{cycle}]	0.11*** (0.01)	0.12*** (0.01)	0.11*** (0.011)	0.10*** (0.01)	0.11*** (0.01)	0.11*** (0.01)	0.11*** (0.01)	0.13*** (0.01)
OUTPUT CYCLE [Y_i^{cycle}] × FOF	-0.33*** (0.02)	-0.23*** (0.05)	-0.18*** (0.05)	-0.197*** (0.05)	-0.16*** (0.04)	-0.18*** (0.03)	-0.24*** (0.04)	-0.58*** (0.08)
EXCHNAGE RATE DEPRICIATION CYCLE [Δe_i^{cycle}]	0.02*** (0.003)	0.03*** (0.003)	0.04*** (0.004)	0.03*** (0.004)	0.03*** (0.003)	0.03 (0.003)	0.03*** (0.003)	0.04*** (0.005)
OUTPUT CYCLE [Y_i^{cycle}] × $FISCYC$	-0.17*** (0.034)							-0.28** (0.12)
OUTPUT CYCLE [Y_i^{cycle}] × CBI		0.032 (0.09)						0.22 (0.31)
OUTPUT CYCLE [Y_i^{cycle}] × MF			0.013*** (0.002)					0.24 (0.18)
OUTPUT CYCLE [Y_i^{cycle}] × IQ				0.47*** (0.10)				0.010** (0.005)
OUTPUT CYCLE [Y_i^{cycle}] × IT					0.28*** (0.08)			0.25*** (0.09)
OUTPUT CYCLE [Y_i^{cycle}] × $FINOPEN$						0.11*** (0.03)		0.28** (0.13)
OUTPUT CYCLE [Y_i^{cycle}] × $FINDEPTH$							0.10*** (0.02)	0.47*** (0.10)
STATISTICS								
ADJUSTED R^2	53.02%	43.64%	58.17%	62.94%	50.82%	56.98%	54.64%	50.75%
NUMBER OF OBSERVATIONS	2171	2033	1558	1922	2380	2350	2290	1081
NUMBER OF COUNTRIES	**85**	**96**	**97**	**93**	**99**	**98**	**99**	**90**

Level of significance: ***1%, **5%, *10%. All data regression include intercept term.
Fear of free floating FOF is constructed using the 10-year rolling window correlation between the cyclical components of the short-term interest rate and the rate of depreciation of the exchange rate.
[1] Least square estimation are performed using cross sectional country fixed effect and cross sectional weighting matrix assuming the presence of cross-section heteroscedasticity.
For brevity constant, FOF, $FISCYC$, IQ, CBI, MF, IT, $FINOPEN$ and $FINDEPTH$ terms are not reported. See data appendix for variable definitions and sources.

TABLE 3.7: CROSS-COUNTRY REGRESSION OF MONETARY POLICY CYCLICALITY WITH FEAR OF FREE FLOATING (FOF), 1960-2014

(MONETARY POLICY CYCLICALITY MEASURED BY $Corr(i_i^{cycle}, Y_i^{cycle})$ AND $\widehat{\beta}_i^{y}$ BY UTILIZING ANNUAL DATA)

ESTIMATION METHOD: OLS[1]

	Dependent Variable: Monetary policy Cyclicality [$Corr(i_i^{cycle}, Y_i^{cycle})$].								**Dependent Variable: Monetary policy Cyclicality [$\widehat{\beta}_i^{y}$]**							
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**	**Col 7**	**Col 8**	**Col 9**	**Col 10**	**Col 11**	**Col 12**	**Col 13**	**Col 14**	**Col 15**	**Col 16**
FOF	-0.462*** (0.111)	-0.618*** (0.093)	-0.707*** (0.090)	-0.673*** (0.092)	-0.710*** (0.087)	-0.694*** (0.088)	-0.698*** (0.087)	-0.377*** (0.107)	-0.754*** (0.233)	-0.912*** (0.221)	-0.998*** (0.208)	-0.951*** (0.195)	-0.989*** (0.175)	-1.011*** (0.207)	-0.993*** (0.199)	-0.664*** (0.216)
FISCALCYC	-0.249*** (0.049)							-0.172*** (0.061)	-0.276*** (0.094)							-0.241** (0.122)
IQ		0.638*** (0.158)						0.217 (0.279)		0.914*** (0.298)						0.799 (0.597)
CBI			0.256 (0.172)					0.344 (0.207)			0.683** (0.291)					0.597 (0.375)
MF				0.013*** (0.002)				0.010 (0.004)				0.021*** (0.004)				0.010 (0.008)
IT					0.104* (0.055)			0.089* (0.051)					0.397*** (0.132)			0.212 (0.150)
FINOPEN						0.270*** (0.095)		0.189 (0.126)						0.140 (0.189)		0.126 (0.241)
FINDEPTH							0.297*** (0.085)	0.172 (0.142)							0.413*** (0.140)	0.271 (0.230)
STATISTICS																
ADJUSTED R^2	46.63%	43.44%	34.21%	45.40%	34.93%	38.57%	40.62%	53.48%	33.27%	29.08%	24.94%	31.74%	30.68%	22.49%	26.70%	45.16%
OBSERVATIONS	**78**	**94**	**97**	**98**	**100**	**99**	**100**	**72**	**78**	**94**	**97**	**98**	**100**	**99**	**100**	**72**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term
[1]All the estimation is based on white heteroscedasticity-consistent standard errors & covariance.
See data appendix for variable definitions and sources.

TABLE 3.8: IV REGRESSION OF MONETARY POLICY CYCLICALITY WITH FEAR OF FREE FLOATING (FOF), 1960-2014
(CYCLICALITY OF MONETARY POLICY MEASURED BY $Corr(i_i^{cycle}, Y_i^{cycle})$ AND $\widehat{\beta}_i^{Y}$ BY UTILIZING ANNUAL DATA)

PANEL A: GMM ESTIMATION (SECOND STAGE REGRESSION)

EXPLANATORY VARIABLE	**Dependent Variable [$Corr(i_i^{cycle}, Y_i^{cycle}$]**		**Dependent Variable [$\widehat{\beta}_i^{Y}$]**	
	Col 1	**Col 2**	**Col 3**	**Col 4**
FOF	-0.639*** (0.226)	-0.866*** (0.253)	-0.941** (0.404)	-1.599*** (0.513)

PANEL B: FIRST STAGE REGRESSION

EXCLUDED INSTRUMENTS SET 1	**Dependent Variable *FOF*[A]**			
NEED	0.052*** (0.016)		0.052*** (0.016)	
IMF	0.129*** (0.034)		0.129*** (0.034)	
EXCLUDED INSTRUMENTS SET 2				
CC		0.009 (0.007)		0..008 (0.007)
OC		0.005*** (0.001)		0.005*** (0.001)
STATISTICS				
CENTRED R^2	*70.75%*	*55.79%*	*61,38%*	*43.91%*
UNDERIDENTIFICATION TEST[1] ***(LM STATISTIC)***	*20.018* *(P= 0.000)*	*16.428* *(P= 0.000)*	*20.018* *(P= 0.000)*	*16.428* *(P=0.000)*
WEAK IDENTIFICATION F-TEST ON JOINT SIGNIFICANCE OF EXCLUDED INSTRUMENTS[2]	*F= 15.529*	*F= 10.600*	*F= 15.529*	*F= 10.600*
OVERIDENTIFICATION TEST (*J-STATISTICS*)[3] ***Null: The Instruments are Valid Instruments***	*Sargan Statistics = 1.682* *(P= 0.194)* **Accept Null**	*Sargan Statistics = 0.031* *(P= 0.861)* **Accept Null**	*Sargan Statistics = 3.724* *(P= 0.101)* **Accept Null**	*Sargan Statistics = 0.044* *(P= 0.834)* **Accept Null**
OBSERVATIONS	**40**	**42**	**40**	**42**

Level of significance: ***1%, **5%, *10%
All data regression include intercept term. Only the estimated variables of interest are presented in second stage regression. For brevity constant IQ, CBI, MF, IT, FINOPEN and FINDEPTH terms are not reported in second stage regression. See data appendix for variable definitions and sources.

[1] The test is essentially the test of the rank of a matrix: under the null hypothesis that the equation is underidentified. A rejection of the null indicates that the matrix is full column rank, i.e., the model is identified.

[2] Weak identification arises when the excluded instruments are correlated with the endogenous regressors, but only weakly. Estimators can perform poorly when instruments are weak, and different estimators are more robust to weak instruments (e.g., LIML) than others (e.g., IV); see, e.g., Stock and Yogo (2002) for further discussion. Under the null, the excluded instruments are correlated with the endogenous regression, but only strongly. A rejection of null indicates that the excluded instruments are correlated with the endogenous regressors, but only weakly.

[3] The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. A rejection of null indicates that the instruments are not valid instruments.

TABLE 3.9: ROBUSTNESS CHECK: ALTERNATIVE MEASURES OF MONETARY CYCLICALITY FROM Vegh and Vuletin (2012), Yakhin (2008), McGettigan *et al*. (2013) and Duncan (2013)

ESTIMATION METHOD: OLS	**VV2012[1]**	**YYCorr2008[2]**	**YYTSLS2008[3]**	**McCorr2013[4]**	**McTR2013[5]**	**RD2014[6]**
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**
FOF	-0.503*** (0.154)	-0.563* (0.261)	-0.588* (0.299)	-0.370*** (0.108)	-0.540** (0.193)	-0.151 (0.103)
IQ	0.411 (0.259)	1.077 (0.592)	0.085 (0.867)	0.130 (0.306)	0.092 (0.556)	0.717** (0.345)
CBI	0.365 (0.235)	0.424 (0.377)	0.768* (0.382)	0.168 (0.285)	0.399 (0.413)	0.198 (0.220)
MF	0.013*** (0.003)	0.021*** (0.009)	0.040*** (0.009)	0.010** (0.004)	0.016* (0.009)	0.014*** (0.004)
IT	0.224*** (0.074)	0.042 (0.090)	0.144 (0.150)	0.141 (0.083)	0.271** (0.124)	0.014 (0.056)
FINOPEN	0.135 (0.166)	0.051 (0.279)	0.461 (0.284)	0.120 (0.176)	0.333 (0.282)	0.035 (0.152)
FINDEPTH	0.035 (0.126)	0.136 (0.238)	0.480* (0.262)	0.141 (0.300)	0.242 (0.271)	0.257** (0.121)
STATISTICS						
ADJUSTED R^2	30.38%	44.36%	59.04%	24.85%	31.982%	33.89%
OBSERVATIONS	**34**	**23**	**21**	**31**	**31**	**44**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term. All the estimation is based on white heteroscedasticity-consistent standard errors & covariance. See data appendix for variable definitions and sources.

[1] Country correlation between the cyclical component of nominal short-term interest rate and real GDP for the time period 1960-2009 (annual data). The cyclical component have been estimated using the Hodrick-Prescott filter. A positive (negative) correlation indicates countercyclical (procyclical) monetary policy. The index is from Vegh and Vuletin (2012).

[2] Country correlation between the cyclical component of nominal short-term interest rate and real GDP for the time period for the time period 1974-2004 (quarterly data). The cyclical component have been estimated using the Hodrick-Prescott filter. A positive (negative) correlation indicates countercyclical (procyclical) monetary policy. The index is from Yakhin (2008).

[3] Estimated time series relation between nominal short-term interest rate and real GDP using Tylor Rule for the time period 1974-2004 (quarterly data). The interest rule model is estimated using instrument variable approach to avoid potential endogeneity problem. A positive (negative) coefficient value implies that a cyclical upturn is associated with an increase (decrease) output gap, meaning that the behaviour of monetary policy is countercyclical (procyclical). The index is from Yakhin (2008).

[4] Country correlation between the cyclical component of real short-term interest rate and real GDP for the time period for the time period 1960-2011 (annual data). The cyclical component have been estimated using the Hodrick-Prescott filter. A positive (negative) correlation indicates countercyclical (procyclical) monetary policy. The index is from McGettigan *et al.* (2013).

[5] Estimated time series relation between real short-term interest rate and real GDP using Tylor Rule for the time period 1960-2011 (annual data). A positive (negative) coefficient value implies that a cyclical boom is associated with an increase (decrease) output gap, meaning that the behaviour of monetary policy is countercyclical (procyclical). The index is from McGettigan *et al.* (2013).

[6] Country correlation between the cyclical component of nominal short-term interest rate and real GDP for the time period for the time period 1974-2004 (quarterly data). The cyclical component have been estimated using the Hodrick-Prescott filter. A positive (negative) correlation indicates countercyclical (procyclical) monetary policy. The index is from Duncan (2014).

Chapter 4

On the consequences of macroeconomic policy: procyclicality, volatility and growth

4.1 Introduction

Conventional wisdom suggests that macroeconomic policies should be aimed at minimizing business cycle fluctuations. Standard Keynesian theory prescribes increases in public expenditure and reductions in taxes in bad times to increase the aggregate demand. Similarly, monetary policy is expected to follow the Taylor-type rules, whereby short-term interest rates would be reduced in downturns to boost the aggregate demand and investment (see, for example, Clarida *et al.,* 1999). Yet in both Chapter 2 and 3, we found that many emerging and developing countries routinely pursue procyclical fiscal and monetary policies. In particular, fiscal authorities appear to reduce (increase) government expenditures in bad (good) times. Similarly, monetary authorities appear to increase (reduce) interest rates in downturns (upturns). However, lack of such effective stabilisation tools by pursuing procyclical policy may reinforce the cyclical fluctuations, aggravating the busts and exacerbating the booms, or, as Kaminsky *et al.,* (2004) put it, "*turning rainy days into torrential downpours and sunny days into scorching infernos*", with potentially serious implications. The purpose of this Chapter is to examine the macroeconomic consequences of pursuing procyclical fiscal and monetary policy.

It is argued that procyclical fiscal and monetary policy deprived emerging and developing countries of important macroeconomic stabilisation tools and might partially explain the higher volatility of inflation and output in these group of countries (see, for example, Aguiar and Gopinath, 2007). A lack of stabilisation policy is likely to exert detrimental impacts on the economy not only through greater fluctuation in output and price level but also through increased output and price level uncertainty. High volatility of output and inflation over time raises uncertainty that may increase country perceived risk. In a world with nominal contracts, the country perceived risk may induce risk premia for both short and long-term agreements/borrowing from external sources, increases costs for hedging against output and inflation risks and may lead to an unanticipated reallocation of wealth and investments (see, for example, Rother, 2004). Thus, both inflation and output volatility that may arise from procyclical policy may impede economic growth.

A key question of whether the cyclical properties of macroeconomic policies could affect economic growth is also not purely an academic issue, as argued by Aghion and Marinescu (2007)[84]. Before we try to answer the above question, it is worthwhile to ask, how the short-term macroeconomic stabilisation policies can impact on the long-run economic performance. A brief review of the literature on volatility and growth can be useful. Aghion *et al.*, (2005) show that macroeconomic volatility likely to be influenced by the cyclicality of macroeconomic policy, with important implication on the long-run average growth. They argue that at the presence of macroeconomic volatility, the probability of liquidating firm investment increases. As a result, firms are more reluctant to invest in risky technologies in the presence of uncertainties. Credit constrained firms have a borrowing constraint that is typically constrained by their current earnings. In a recession, current earnings are reduced, so are firm's capacity to borrow to maintain the long run growth-enhancing investments (e.g., capital, R&D). Under tight credit constraints, long-term investment turns procyclical, and business cycle amplified thus it amplify volatility. To the extent that higher short-term macroeconomic volatility transforms into deeper recessions, it has an influence on firms' incentives to engage in growth-enhancing investments, resulting in lower average growth. Hence, short-run macroeconomic stabilisation policy that can help to reduce the output volatility can contribute to enhancing long-run growth.

Existing empirical and theoretical work distinguishes the cyclical properties of macroeconomic policies between advanced economies and developing countries. Several accounts have been put forward to explain the cyclical pattern of fiscal and monetary policy. However, it is surprising that, in contrast to the wealth of literature on determinants of procyclical macroeconomic policy, potential costs of pursuing such sub-optimal macroeconomic policies have largely been ignored in the existing literature. A small number of exceptions include, McManus and Ozkan (2015) who document that procyclical fiscal policy is positively associated with output volatility and inflation volatility that are harmful to economic growth[85]. However, to the best of our knowledge, there is no systematic study of procyclical monetary policies and their macroeconomic

[84] Aghion and Marinescu (2007) argue that standard textbooks present macroeconomics in two separate bodies: in the long term economic performance is fundamentally determined by structural features (e.g., education, openness to trade, R&D, financial development and others). However, in the short term, the economy is influenced by macroeconomic-both fiscal and monetary stabilisation policies. These two approaches have been considered as distinct and separate bodies of research, in a sense that no long-term evaluation (i.e., economic performance) is considered to have any impact on the short-term stabilisation policy.

[85] Aghion and Marinescu (2007) and Woo (2009) find a negative relation between fiscal procyclicality and economic growth. However, for both of the studies, this is not the main focus of their analysis. Aghion and Marinescu (2007) analyse 19 industrialized OECD countries, Woo (2009) analysis is based on 104 countries sample average and McManus and Ozkan (2015) investigate 114 countries panel data over the period 1950-2010.

consequences. In this Chapter we examine, how the cyclical stance of fiscal and monetary policy influence macroeconomic stability and long-term growth.

In what follows, using data from a large number of countries, we link cyclical stances of fiscal and monetary policy with macroeconomic stability (i.e., proxied by output volatility and inflation volatility) and economic growth. Our earlier findings from Chapter 2 and 3 suggest that many emerging and low-income developing countries run procyclical policies. The evidence provided in this Chapter suggests that procyclical policies – both fiscal and monetary policies exert a significant role on macroeconomic instability; they increase output volatility and inflation volatility. Our empirical analysis also reveals that procyclical macroeconomic policy is positively associated with lower economic growth. By identifying a specific source of macroeconomic instability (i.e., output and inflation volatility that emerges from procyclical policy), we are able to better isolate the link between procyclical policy and growth. Our results are robust to controlling for the endogeneity and wide range of robustness checks.

The rest of the Chapter is organised as follows. The next section briefly discusses the underlying evidence from the previous literature on the link between macro policy cyclicality, macroeconomic stability and growth. Section 4.3 discusses the methodology. Section 4.4 presents descriptive statistics and bivariate analysis. Section 4.5 and 4.6 relates and discusses the macroeconomic outcomes in the form of output volatility, inflation volatility and growth to the derived cyclicality measurements from Chapter 2 and 3. Robustness checks and extension of the analysis are also presented in Section 4.5 and 4.6. Finally, Section 4.7 provides concluding remarks.

4.2 Consequences of macroeconomic policy cyclicality

Existing empirical studies on the link between macroeconomic policy and its outcomes can be broadly classified into two stands; those on the consequences of volatility and those on the consequences of procyclicality. Regarding the former, Fatás and Mihov (2010) find that countries with excessive fiscal volatility experience a high level of output volatility. In a similar vein, Rother (2004) emphasise adverse consequences of inflation volatility on the GDP growth. The second strand comprises of recent contributions on the impact of procyclical fiscal policies on inflation and output volatility. For example, McManus and Ozkan (2015) find that procyclical fiscal policy is positively associated with output volatility and inflation volatility. Similarly, Lane (2003) shows that developing economies have been fundamentally more exposed to volatile business cycles than the advanced

economies. It is suggested that this was because developing countries have done less well in smoothing the business cycle fluctuations and output volatility due to procyclical fiscal policy.

Yet, there has been little attention on the macroeconomic costs of pursuing procyclical monetary policy. Recent work by McGettigan *et al.,* (2013) estimated Taylor rule for 84 countries over 1960-2011. Their empirical investigation suggests that that countercyclical monetary policy is closely associated with the less volatile output. Aguiar and Gopinath (2007) documents that procyclical monetary policy deprived the developing countries of important macroeconomic stabilisation tools and might partially explain higher output volatility for these group of countries.

How large are the costs of procyclical fiscal and monetary policy? Several studies highlight the relationship between growth and volatility from an empirical viewpoint. For example, Ramey and Ramey (1994) and Martin and Rogers (2000) document evidence of a negative relationship between output volatility and growth. In a similar vein, Judson and Orphanides (1999) and Al-Marhubi (1998) find evidence that inflation volatility has a significant negative relation with economic growth. Similarly, Froyen and Waud (1987), reveals that high inflation encourages uncertainties with adverse impact on growth. The second strand of empirical work explores specific channels of uncertainty and how this has affected growth. For example, Alesina and Tabellini (2005) emphasise political instability as a source of macroeconomic uncertainty and show that this impacts economic growth unfavourably. Fatás (2002) also finds that the association between growth and volatility is negative and significant for low-income developing countries. Most of these studies present evidence in support of the hypothesis that political instability, uncertainty and volatility hurt economic growth.

From a theoretical viewpoint, Angeletos *et al.,* (2005) develop a formal framework to explain why macroeconomic volatility may be negatively related to productivity growth. They argue that domestic firms face credit constraints that are typically conditioned by their current earnings. In a recession, firms' current earnings decrease, so is their ability to borrow, hence investment. Under tight credit constraints, long-term investment turns procyclical, amplifying volatility. As a result, short-term macroeconomic volatility transforms into deeper recessions and thus lower mean growth. This prediction received empirical support from Aghion and Marinescu (2007). These results are later confirmed by looking at the firm level evidence (see, for example, Aghion *et al.,* 2012).

The above two lines of literature indeed suggest that countercyclical macroeconomic policies, with higher government spending and lower nominal interest rates during recessions, may allow credit constrained firms' to preserve their growth-enhancing investments, in turn inducing a long positive effect on economic growth. This argument has received empirical support, where the literature has attempted to relate the cyclical properties of fiscal policy to economic growth. For example, Aghion *et al.*, (2009) utilising industry-level data form OECD countries, find that countries with tight credit constraints would benefit from countercyclical fiscal policy to enhance long-term economic growth. Woo (2009), on the other hand, proposes an alternative channel through which macroeconomic cyclicality may impact output growth. He proposes that greater heterogeneous preferences (or polarisation) of social groups is responsible for fiscal policy to be more procyclical. By utilising a cross-section data of 96 countries, the author shows that social polarisation (i.e., income and education inequality) has a negative impact on growth through procyclical fiscal policy. These results are consistent with McManus and Ozkan (2015), who find that procyclical countries have lower rates of economic growth.

4.3 Methodology on the consequences of procyclical macroeconomic policy

To explore the link between the cyclicality of macroeconomic policy and macroeconomic outcomes (i.e., growth, output volatility and inflation volatility), we estimate the following cross-country dimension of data for the period 1960-2014. Our methodology is comparable to the ones used by Fatás and Mihov (2003), Lane (2003) and Woo (2009). The baseline regression model is as follows:

$$MO_{it} = \varphi + \theta\widehat{FMP}_{it} + \omega X_{it} + \mathcal{E}_{it} \tag{4.1}$$

where MO_{it} denotes a macroeconomic outcomes ($GRGDPC$, $RGDPCHVOL$ and $INFVOL$) for country i during a time interval t; $GRGDPC$ is the GDP growth, measured by the average of growth rate of real GDP per-capita for the period 1960-2014 for each country i; $RGDPCHVOL$ represents real GDP volatility by the standard deviation of annual percentage change of real GDP per-capita for the period 1960-2014 for each country i. Similarly, we calculate inflation volatility ($INFVOL$) by taking the standard deviation of the annual percentage change of GDP deflator for the same time interval for each country i. $\widehat{FMP}_{it}$ denotes the relevant estimated cyclicality macroeconomic policy measured by cyclical properties of fiscal and monetary policy for country i during a time interval t. We estimate the cyclical behaviours of fiscal policy ($\hat{\beta}$ and $\hat{\tilde{\beta}}$) from our sample

of 137 countries of over 45 years 1970-2014, by following specification (2.1) and (2.2) from Chapter 2. To estimate the cyclical properties of monetary policy ($corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$), we use a sample of 100 countries over 55 years 1960-2014 by applying the correlation approach and specification (3.1) from Chapter 3[86]. Each of the policy cyclicality indicators enter the regression specification separately, and their results are tested and presented in isolation.

In specification (4.1), X_{it} accounts for a set of the appropriate control variable, which we will discuss later. The data for dependent, explanatory variables and other control variables are collected from a wide range of sources, as is presented in Table A4.1. According to specification (4.1), the impact of macroeconomic cyclicality will be tested along three dimensions: volatility of output ($RGDPCHVOL$), volatility of inflation ($INFVOL$) and average growth ($GRGDPC$).

4.4 Descriptive statistics and bivariate analysis

Table 4.1 presents average cyclicality measures for fiscal and monetary policy and macroeconomic outcomes ($RGDPCHVOL$, $INFVOL$ and $GRGDPC$) and their pairwise correlations. Results presented in Table 4.1 (Panel A) helps us to make two observations. First and as stated in Chapter 2 and 3, on average procyclical fiscal and monetary policy is widely observed in emerging and developing countries (i.e., fiscal policy cyclicality indicators $\hat{\beta}$ and $\hat{\tilde{\beta}}$ show positive values and monetary policy cyclicality indicators $corr$ (i^{Cycle}, Y^{Cycle}) and $\hat{\beta}^Y$show negative values). On the contrary, on average advanced economies tend to follow slightly procyclical fiscal policy (i.e., the cyclicality indicators of $\hat{\beta}$ and $\hat{\tilde{\beta}}$ are slightly positive). However, advanced economies' monetary policies are profoundly countercyclical (i.e., monetary policy cyclicality indicators $corr$ (i^{Cycle}, Y^{Cycle}) and $\hat{\beta}^Y$show high positive values). Second, on average, advanced countries have lower level of output volatility ($RGDPCHVOL$) and inflation volatility ($INFVOL$) with higher level of growth ($GRGDPC$) compare to emerging and developing economies.

A simple bivariate analysis, as is presented in Table 4.1 (Panel B) depicts a clear positive relation between fiscal policy cyclicality, and output and inflation volatility. Similarly, we find a clear negative relation between monetary policy cyclicality, and output and inflation volatility. These findings imply that output and inflation volatility are higher for

[86] Please note, the sample size reduced to 100 country due to exchange rate classification and hyperinflation episodes, while we estimate the monetary policy cyclicality. On the other hand, we estimate 137 countries' fiscal policy cyclicality at the absence of such restrictions.

countries conducting procyclical fiscal and monetary policy. We also find a clear negative relation between fiscal policy cyclicality and economic growth. In a similar vein, we find that countries with procyclical monetary policy have low level of economic growth. The results in bivariate analysis are statistically significant at 1% level. In sum, the bivariate analysis indicates that procyclical countries have higher rates of output volatility, inflation volatility and lower rates of economic growth.

TABLE 4.1

PANEL A: CYCLICAL PROPERTIES OF FISCAL AND MONETARY POLICY, OUTPUT VOLATILITY, INFLATION VOLATILITY AND GROWTH

Country group	Cyclicality of Fiscal Policy		Cyclicality of Monetary Policy		Volatility of Output	Volatility of Inflation	Growth
	Avg. $\widehat{\beta}$	Avg. $\widehat{\bar{\beta}}$	Avg. $corr\,(i^{Cycle}, Y^{Cycle})$	Avg. $\widehat{\beta}^{Y}$	Avg. $RGDPCHVOL$	Avg. $INFVOL$	Avg. $GRGDPC$
All country group	0.68	0.66	0.08	0.11	5.56%	9.11%	2.33%
Advanced economies	0.17	0.07	0.37	0.52	3.31%	4.52%	3.92%
Emerging market and low income developing economies	0.83	0.82	-0.03	-0.04	6.19%	10.47%	2.19%

PANEL B: CORRELATION MATRIX OF CYCLICALITY, OUTPUT VOLATILITY, INFLATION VOLATILITY AND GROWTH

	$\widehat{\beta}$	$\widehat{\bar{\beta}}$	$corr\,(i^{Cycle}, Y^{Cycle})$	$\widehat{\beta}^{Y}$	$RGDPCHVOL$	$INFVOL$	$GRGDPC$
$\widehat{\beta}$	1				0.018*** (0.002)	0.053*** (0.008)	-0.009*** (0.002)
$\widehat{\bar{\beta}}$	0.813	1			0.015*** (0.003)	0.044*** (0.008)	-0.006*** (0.002)
$corr\,(i^{Cycle}, Y^{Cycle})$			1		-0.039*** (0.006)	-0.086*** (0.014)	0.009** (0.004)
$\widehat{\beta}^{Y}$			0.815	1	-0.019*** (0.004)	-0.039*** (0.009)	0.004** (0.002)

Note:

We estimate $\widehat{\beta}_I$ and $\widehat{\bar{\beta}}_I$ for 45 year annual (1970-2014) for each country to measure the cyclicality of fiscal policy by utilizing the stated methodology in Chapter 2. We use 137 countries' (30 developed, 59 emerging and 48 low-income developing country) data during the estimation process. A positive (negative) values of $\widehat{\beta}_I$ and $\widehat{\bar{\beta}}_I$ imply procyclical (countercyclical) policy. The estimated results are presented in Table A4.2.

We estimate $corr\,(i^{Cycle}, Y^{Cycle})$ and $\widehat{\beta}^{Y}$ for 55 years annual data (1960-2014) to measure the cyclicality of monetary policy by applying the stated methodology in Chapter 3. We utilize 100 countries' (29 advanced economies, 46 emerging and 25 low-income developing economies) data during the estimation process. A negative (positive) values of $corr\,(i^{Cycle}, Y^{Cycle})$ and $\widehat{\beta}^{Y}$ imply procyclical (countercyclical) policy. The estimated results are presented in Table A4.2.

We take average of volatility of output, volatility of inflation, growth and the estimated cyclical properties of fiscal and monetary policy values for each country group to present the above summery statistics. The country group classification is from Nielsen (2011). Please refer to page 20 in his paper for the list of classification.

In Panel B, a simple correlation statistics is calculated for full set of countries by utilizing the cyclicality indicators of $\widehat{\beta}$, $\widehat{\bar{\beta}}$, $corr\,(i^{Cycle}, Y^{Cycle})$ and $\widehat{\beta}^{Y}$. A simple bivariate OLS regression is conducted to establish the relation between cyclicality of macroeconomic policy ($\widehat{\beta}$, $\widehat{\bar{\beta}}$, $corr\,(i^{Cycle}, Y^{Cycle})$ and $\widehat{\beta}^{Y}$) and macroeconomic outcomes ($RGDPCHVOL$, $INFVOL$, $GRGDPC$). We use the standard star convention for statistical significance; ***1%, **5% and *10% significance, where white heteroscedasticity-consistent standard errors & covariance are reported in the parenthesis.

4.5 Role of procyclical macroeconomic policy on output and inflation volatility

4.5.1 Output volatility

In this section, we formally test the relation between the cyclical properties of macroeconomic policy and output volatility. A natural hypothesis is that a higher level of macroeconomic procyclicality would lead to higher levels of output volatility. A countercyclical policy action against the cycle would be expected to act as stabilisation tool and reduce output fluctuation, keeping the growth on a non-fluctuating path over the business cycle. On the contrary, procyclical policy may aggravate the busts and intensify

the booms. Such policy may amplify the oscillation of business cycle movements that may lead to higher level of output volatility. In this section we empirically examine this hypothesis by exploring whether there is a statistically significant link between the cyclicality of macroeconomic policy (i.e., both fiscal and monetary) and output volatility.

Our estimation results from specification (4.1) are presented in Table 4.2, where output volatility ($RGDPCHVOL$) is regressed on the cyclicality of macroeconomic policy and a set of control variables X_{it}. In the baseline regression specification (4.1), we include the initial real GDP per-capita in 1960 ($LNLRGDPCH$) to control for the potential impact of the level of economic development on output volatility. It is also widely known that output volatility is inversely correlated with the level of development (see, for example, Lane, 2003; Kraay and Ventura, 2000). The estimated coefficients of $LNLRGDPCH$ enter with correct negative sign and they are statistically significant at 1% to 5% level (Table 4.2).

It may also be that smaller countries face higher volatility since the scope for regional and sectoral diversification is more limited (see, for example, Lane, 2003). We include country size measured by population (*POP*) in the specification (4.1). The coefficient of *POP* is estimated with a correct negative sign, and is significant at 1% level (Table 4.2). Similarly, more open economies – those with high trade volumes may be more vulnerable to external shocks, such as volatile terms of trade shocks (see, for example, Blanchard and Wolfers, 2000). To capture such an impact, we include trade openness ($TRADE$). The estimated coefficient of $TRADE$ enter with correct positive sign, however they are not statistically significant (Table 4.2). We also consider the government size ($GEXP$) measured by government expenditures as a percentage of GDP. $GEXP$ is introduced to capture the stabilisation impact of government size on output gap (see, for example, Fatás and Mihov, 2003; Gali, 1994). That is, countries with larger governments are more likely to exhibit countercyclical fiscal policy to reduce macroeconomic stability, thus output volatility (see, for example, Gali, 1994 and Debrun *et al.*, 2008). The estimated coefficient of $GEXP$ enter with correct negative sign (Table 4.2).

After incorporating the above-discussed control variables in the specification (4.1), our key indicator macroeconomic policy-both fiscal and monetary cyclicality show expected results as hypothesised earlier. The coefficients of fiscal policy cyclicality ($\hat{\beta}$ and $\hat{\tilde{\beta}}$) enter with correct positive sign that are all statistically significant at 1% level (Table 4.2, Col 1-6). The findings confirm that procyclical fiscal policy is harmful for economic stability, that is to say procyclicality intensify the output volatility. Table 4.2 OLS estimates in Col

1 for $\hat{\beta}$ imply that 0.01% increase in fiscal policy procyclicality increase the output volatility ($RGDPCHVOL$) by 0.017%.

We find similar evidence for monetary policy cyclicality in relation to output volatility. The coefficients of monetary policy cyclicality ($corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$) enter with correct negative sign that are all statistically significant at 1% level (Table 4.2, Col 7-12). The findings confirms that countercyclical monetary policy is required to reduce output volatility. Table 4.2 OLS estimate in Col 7 for $corr(i^{cycle}, Y^{cycle})$ imply that 0.01% increase in countercyclical monetary policy reduce the output volatility ($RGDPCHVOL$) by 0.031%. The results propose a clear note, countercyclical fiscal and monetary policy is required for output stability. It is also noticeable that the coefficient values are changing for different cyclicality of macroeconomic policy indicators [i.e., $\hat{\beta}$, $\hat{\tilde{\beta}}$, $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$], nonetheless, they are all statistically significant with correct sign. These variations of result arise due to a different kind of macroeconomic policy cyclicality measurements method.

We add three additional control variables X_{it} in the specification (4.1): exchange rate volatility ($EXEVOL$), terms of trade volatility ($TOTVOL$) and financial development measured by financial depth ($FINDEPTH$) and results are presented in Table 4.2. We include the above listed variables to check the robustness of the relation between cyclicality of macroeconomic policy and output volatility. In earlier literature, these three variables received a significant attention in relation to output volatility ($RGDPCHVOL$).

First, we consider $EXEVOL$ as a measure of risk, and it is calculated by taking the standard deviation of the annual nominal exchange rates between the sample country and the USA[87]. High $EXEVOL$ indicates the uncertainties for an open economy in international agreements for financial assets and goods. $EXEVOL$ has a negative impact on domestic and foreign investment decisions. It may cause the reallocation of resources among the domestic sectors and countries, between imports and exports and creates an uncertain environment for investment, thus output volatility (see, for example, Ghosh, *et al.* 1997; Bleaney and Fielding, 2002). Additionally, it has been argued that exchange rate volatility leads to a reduction in the level of international trade, as firms are exposed to asymmetric exchange risk. Higher exchange rate risk lowers the risk-adjusted expected revenue from exports, and therefore incentives to trade (see, for example, Broli. 1994; Wolf, 1995). Thus, exchange rate volatility may lead to volatile macroeconomic environment through export

[87] Please note for European countries, we use the nominal effective exchange rate.

and investment channel. The results in Table 4.2 confirm a strong positive relation between $RGDPCHVOL$ and $EXEVOL$, and the estimated coefficients are statistically significant at 1% to 5% level.

Similarly, terms of trade shocks are likely to have a larger impact on macroeconomic volatility in countries more open to international trade, as it will have their most direct impacts on the tradable sector of an economy (see, for example, Beck *et al.,* 2006). However, economies with more flexible exchange rates are more likely to absorb the terms of trade shocks through currency depreciation with favourable impact on economic activity. This is consistent with the notion that, given the adverse shock, a country with flexible exchange rate will adjust through a currency depreciation, which tends to offset the shock's negative effects on output via a boost in external competitiveness. On the contrary, countries with fixed exchange rate regimes or managed exchange rate regime may experience substantial swings in output (see, for example, Mendoza, 1995; Kose, 2002; Broda, 2004; Edwards and Yeyati, 2005). If so, countries that have high trade volumes combined with the rigid exchange rate regime are vulnerable to terms of trade shocks. We measure terms of trade shock ($TOTVOL$) by taking the standard deviation of annual percentage change of terms of trade. The results in Table 4.2 confirm a positive relation between $RGDPCHVOL$ and $EXEVOL$.

We also consider the role of financial development, proxied by financial depth ($FINDEPTH$). Countries with a high level of liquid liability have the appropriate financial cushion to conduct countercyclical fiscal and monetary policy to reduce volatile macroeconomic outcomes. However, we have observed a weak relation between $FINDEPTH$ and $RGDPCHVOL$. The estimated coefficients of $FINDEPTH$ sometimes enter with wrong positive sign and the estimated effects are relatively small (Table 4.2).

After incorporating the three important determinants ($EXEVOL$, $TOTVOL$ and $FINDEPTH$) of macroeconomic volatility ($RGDPCHVOL$), our key results remain intact, in particular, the coefficient of macroeconomic policy cyclicality indicators [i.e., $\hat{\beta}$, $\hat{\tilde{\beta}}$, $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$] remain significant at 1% level with the expected signs (Table 4.2); procyclical macroeconomic policies have a significantly unfavourable effect on output volatility.

OLS estimation results presented in Table 4.2 may be sensitive to outliers – influential observations with unusual values of explanatory variables. We use weighted and

reweighted OLS regression (WLS and RWLS method) to control for outliers[88]. This estimation process is an alternative to OLS regression when data is contaminated with outliers. The robust results for Table 4.2 are presented in RCol. Interestingly the statistical significance and the size of the coefficients of macroeconomic policy cyclicality indicators remain much the same even after controlling for outliers and even if we include all the major control variables, that we have already discussed in this section (All RCol).

4.5.2 Inflation volatility

We now turn to the relation between the cyclical properties of macroeconomic policy and inflation volatility. Given that macroeconomic policy impacts aggregate demand and hence price level and output, greater procyclicality would lead to higher level of inflation volatility. It is straightforward to establish that procyclical policy is likely lead to inflationary pressures in the good times and prolong recession in the bad times.

In Table 4.3, inflation volatility ($INFVOL$) is regressed on the cyclicality of macroeconomic policy and a set of control variables X_{it}. In the baseline regression, we include the initial real GDP per-capita in 1960 ($LNLRGDPCH$) to control for the potential impact of the level of economic development on inflation volatility. According to Balassa–Samuelson effect if poor countries grow and catch up, productivity is likely to increase in the tradable sector, thereby increasing wages and prices of non-traded goods, raising inflation (see, for example, Samuelson, 1994). Additionally, initial real GDP per-capita needs to be included because it is possible that poor countries may have weak institutions and pursue poor macroeconomic policies, leading to greater macroeconomic volatility (see, for example, Acemoglu *et al.*, 2003 and Easterly 2008). The estimated coefficients of $LNLRGDPCH$ enter with correct negative sign, but they are not statistically significant (Table 4.3).

Next, we include trade openness ($TRADE$) in the specification (4.1). It is well known that trade integration is associated with inflation stability (see, for example, Brahmbhatt and Dadush, 1996; Granato *et al.*, 2006). The costs of inflation volatility may be larger in open economies, if the domestic firms fail to maintain a stable price path, they run the risk of losing international competitiveness. In relatively open economies such cost of inflation volatility plays a key role in policy formulation, and this may cause them to conduct more disciplined macroeconomic policies, delivering inflation stability (see, for example, Romer,

[88] Two types of weights are used in the estimation process. In Huber weighting, observations with small residuals get a weight of 1, the larger the residual, the smaller the weight. With biweighting, all cases with a non-zero residual get down-weighted at least a little. The two different kinds of weight are used because Huber weights can have difficulties with severe outliers, and biweights can have difficulties converging or may yield multiple solutions. Using the Huber weights first, helps to minimise problems with the biweights.

1993). More precisely, trade openness matter due to exchange rate pass through and policymakers should adjust the interest rate based on the inflationary pressures that are originated from degree of trade openness (see, for example, Clarida *et al.,* 2001). Table 4.3 presented results support the evidence of an inverse relation between $TRADE$ and $INFVOL$, however without sufficient statistical significance.

We find that the coefficients of fiscal policy cyclicality ($\hat{\beta}$ and $\hat{\tilde{\beta}}$) enter with the expected positive sign and are all statistically significant at 1% to 5% level (Table 4.3, Col 1-6). The findings confirm that procyclical fiscal policy intensify inflation volatility. Table 4.3 Col 1 suggests that 0.01% increase in fiscal policy procyclicality increases inflation volatility ($INFVOL$) by 0.036%. We find similar evidence for the role of monetary policy cyclicality on inflation volatility ($INFVOL$). The coefficients of monetary policy cyclicality ($corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$) enter with correct negative sign that are all statistically significant at 1% to 5% level (Table 4.3, Col 7-12). As is seen in Table 4.3 coefficient values are different for different cyclicality indicators [i.e., $\hat{\beta}$, $\hat{\tilde{\beta}}$, $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$], however they are all statistically significant at required level with correct signs.

To check whether the link between cyclicality and inflation volatility is sensitive to the inclusion of other control variables we incorporate; exchange rate volatility ($EXEVOL$), terms of trade volatility ($TOTVOL$) and central bank independence (proxied by monetary freedom MF), where all these are expected to impact inflation volatility unambiguously.

First, we consider $EXEVOL$ as a measure of risk, in a sense countries that have high level of trade volumes or open to trade may be more vulnerable to exchange rate volatility ($EXEVOL$), resulting in inflation volatility. The volatility mainly arises from monetary authorities' direct intervention in foreign exchange market due to procyclical policy. If this adjustment happens, then one can notice a similar degree of volatility in commodity prices, thus on inflation. On the other hand, if the exchange rate is allowed to move freely to accommodate commodity price shocks in a countercyclical fashion, then the commodity prices in the local currency should be relatively stable in the presence of flexible exchange rate regime (see, for example, Calvo and Reinhart, 2000). Table 4.3 presents evidence of a positive relation between $EXEVOL$ and $INFVOL$, and the estimated coefficients are statistically significant at 1% level.

It is also well known that countries that are more open to trade are more vulnerable to external shocks due to volatile terms of trade. Using a real business cycle model for a small open economy, Mendoza (1995) and Kose (2002) argue that terms of trade shocks

can explain the majority of the variance in output. Changes in terms of trade impact on output variability by altering the volume of imports that can be obtained for a given amount of exports, hence the economy's real domestic income. Terms of trade shocks also impact on inflation, directly through the shock's effect on domestic price and wages, and indirectly through its effects on output (see, for example, Beck *et al.*, 2006). We include terms of trade volatility ($TOTVOL$) as a measure of terms of trade shock in specification (4.1). This is with the correct positive sign, but is not statistically significant (Table 4.3).

We also consider the role of central bank independence on inflation stability. There is mounting evidence on the importance of central bank independence in the sphere of monetary policy as means of avoiding high inflation and achieving price stability (see, for example, Cukierman, 2008; Taylor, 2016). At the absence of central bank independence, there is a tendency to fiscal dominance resulting in greater debt accumulation (see, for example, Dimakou, 2006). Delegation of monetary policy to an independent monetary authority permits the central banks to respond in a conservative manner that is reflected directly in a lower rate of money supply growth, ensuring price stability (see, for example, Berger *et al.*, 2001; Posso and Tawadros, 2013). We therefore include a measure of central bank independence (measured by monetary freedom MF) that may lead to better macroeconomic outcome by stabilizing the inflation volatility ($INFVOL$). The estimated coefficients of MF appear with the expected negative sign and they are statistically significant at 1% to 5% (Table 4.3).

After incorporating the three important determinants ($EXEVOL$, $TOTVOL$ and MF) of macroeconomic volatility ($INFVOL$), the coefficient of the cyclicality indicators [i.e., $\hat{\beta}$, $\hat{\bar{\beta}}$, $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$] remain significant at 1% to 5% level with correct sign (Table 4.3). In Table 4.3 we also present estimation results from WLS and RWLS method controlling for outliers, where size of the coefficients of cyclicality indicators remain much the same (All RCol). Overall, we observe a clear negative link between countercyclical macroeconomic policy and inflation volatility.

4.5.3 Addressing endogeneity in the output and inflation volatility regression

It can be argued that the relation between macroeconomic outcomes (i.e., $RGDPCHVOL$ and $INFVOL$) and macroeconomic cyclicality indicators [i.e., $\hat{\beta}$, $\hat{\bar{\beta}}$, $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$] may reveal the fact that better (poorer) macroeconomic outcomes help to stabilise (weaken) the economy that might improve (deteriorate) the macroeconomic policy

management. For example, external shock facing countries that are more open to trade that may be reflected in their output and inflation volatility through terms of trade volatility (see, for example Beck *et al.,* 2006). That is, an indirect causality may run from output and inflation volatility to macroeconomic cyclicality indicators and not the other way around. Also given that macroeconomic outcomes and cyclicality indicators are both measured during the period 1960-2014, there may a potential endogeneity problem in estimating the relation between cyclicality of macroeconomic policy and the macroeconomic outcomes by using the specification (4.1). We re-estimate our main relationships using the two-step feasible GMM as an IV regression and results are presented in Table 4.4.

We instrumented cyclical properties of macroeconomic indicators by using two different variables. First, cyclical properties of macroeconomic policies [i.e., $\hat{\beta}$, $\hat{\tilde{\beta}}$, $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$] are instrumented by using the initial level institutional quality. We measure the initial institutional quality proxied by executive corruption in 1946 ($INEXCORR$)[89]. We have established in Chapters 2 and 3 a strong correlation between better (weak) institutional qualities and countercyclical (procyclical) fiscal and monetary policy as is also shown by Calderón and Hebbel (2008), Frankel *et al.*, (2013), Calderón *et al.* (2004a&b) and Duncan (2014). The first stage regression in Table 4.4 (Col 1-2 and 5-6) show that $INEXCORR$ and fiscal policy cyclicality ($\hat{\beta}$ and $\hat{\tilde{\beta}}$) coefficients are statistically significant at 1% level with the expected positive sign. Similarly, the first stage regression in Table 4.4 (3-4 and 7-8) show that $INEXCORR$ and monetary policy cyclicality ($corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$) coefficients are estimated with the expected negative sing and are statistically significant at 1%.

Second, cyclical properties of macroeconomic indicators [i.e., $\hat{\beta}$, $\hat{\tilde{\beta}}$, $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$] instrumented by using the initial level of borrowing constraint proxied by institutional investor credit ratings in 1979 ($INICR$) for a country[90]. It has been widely argued that the ability of emerging and developing countries to adopt optimal (countercyclical) stabilization policies is hindered by external borrowing constraints (see, for example, for fiscal policy Gavin and Perotti, 1997; Calderón and Hebbel, 2008, and for monetary policy Calvo and Reinhart, 2000 and Calderón *et al.*, 2004a&b). The literature proposes that

[89] Please note that, we set the year 1946 for executive corruption based on the earliest time data availability for the sample countries. That is to say, executive corruption 1946 is exogenous. The executive corruption $INEXCORR$ is a normalized index and it ranges from 0 (lower executive corruption) to 1 (highest executive corruption).

[90] Please note that, we set the year 1979 for institutional investor credit ratings based on the earliest time data availability for the sample countries. That is to say, institutional investor credit ratings 1979 is exogenous. One issue with this instrument is the restricted availability of data that reduces the number of sample size. The credit rating $INICR$ ranges from 0 (lower credit ratings) to 100 (highest credit ratings).

there is strong a correlation between better (weak) access to international capital markets and countercyclical (procyclical) fiscal and monetary policy. The first stage regression in Table 4.4 (Col 1-2 and 5-6) show that $INICR$ and fiscal policy cyclicality ($\hat{\beta}$ and $\hat{\hat{\beta}}$) coefficients are statistically significant at 1% to 10% level with the expected negative sign. Similarly, the first stage regression in Table 4.4 (Col 3-4 and 7-8) show that $INICR$ and monetary policy cyclicality ($corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$) coefficients are statistically significant at 1% to 10% level with the positive sign.

The IV results presented in Table 4.4 are largely consistent with the OLS baseline regression results presented in Table 4.2 and 4.3. However, higher coefficients values are reported for cyclical properties of macroeconomic policies.

Our instrumental variables ($INEXCORR$ and $INICR$) satisfy two major requirements of GMM estimations: they must be orthogonal to the error term and correlated with the incorporated endogenous variables. Table 4.4 show that *F*-test statistics indicate a test of the joint significance of the (excluded) instruments, which are presented in the first-stage regressions. The overidentification test presented in Hansen *J*-test statistics is employed to test whether the instrument is uncorrelated with the error term. The results are consistent with the presence of a general form of heteroscedasticity. The Hansen *J*-statistics shows that our selected instruments satisfy the orthogonality conditions, indicate $INEXCORR$ and $INICR$ are valid instruments for cyclical properties of macroeconomic indicators [i.e., $\hat{\beta}$, $\hat{\hat{\beta}}$, $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$].

4.6 Role of procyclical macroeconomic policy on economic growth

4.6.1 Economic growth

We now turn to our key outcome, economic growth, which we will relate to the cyclical properties of macroeconomic policies. A natural hypothesis is that greater procyclicality would lead to lower level of economic growth. Several studies investigate the relationship between growth and volatility from an empirical standpoint. The first group of studies propose that output volatility is harmful to growth (see, for example, Ramey and Ramey, 1994; Martin and Rogers, 2000). Other establish that inflation volatility is detrimental to growth (see, for example, Judson and Orphanides, 1999; Al-Marhubi, 1998). While there is broad agreement that high volatility is harmful to growth, little attention has been devoted to disentangling the procyclical policy channels through which such effects take

place. In the earlier sections, we find that procyclical countries have a higher level of output and inflation volatility. As a result, in this section, we empirically investigate whether the effects of procyclical policy has an impact on economic growth. To explore whether there is a statistically significant link between the cyclicality of macroeconomic policy (i.e., both fiscal and monetary) and growth ($GRGDPC$), we estimate specification (4.1) and present the results in Table 4.5.

In our baseline specification, we include a small set of core growth determinants in line with Barro (1996) and Woo (2009) [91]; initial income per-capita ($LNLRGDPCH$) in 1960 to control for convergence hypothesis; initial human capital (educational attainment) as measured by log of average years the the of secondary schooling of the population over age 15 in 1960 ($LSYR$). It is widely known that GDP growth ($GRGDPC$) is inversely correlated with the level of development (see, for example, Woo, 2009 and McManus and Ozkan, 2015). Estimated results presented in Table 4.5 are consistent these hypotheses.

In Table 4.5 our key cyclicality indicators appear with negative (positive) estimated coefficients for fiscal (monetary) policy. The coefficients of fiscal policy cyclicality ($\hat{\beta}$ and $\hat{\hat{\beta}}$) are all statistically significant at the 1% to 5% level (Table 4.5, Col 1-6), indicating that procyclical fiscal policy is harmful for economic growth, while estimated effects of monetary cyclicality are not statistically significantly different from zero. Table 4.5 OLS estimates in Col 1 for $\hat{\beta}$ imply that 0.01% increase in fiscal policy procyclicality reduces the economic growth by 0.007%.

We also incorporate a set of control variables X_{it}; government size ($GEXP$), trade ($TRADE$), demographic factors proxied by level of fertility ($FERT$) and life expectancy at birth ($LIFEEXP$). First, we consider government size ($GEXP$). A large public sector may have negative spillover on the economy due to greater taxes, borrowing printing money. On the other hand, if the government size relatively small or even zero, the growth is very limited due to limited provision of public goods. The empirical literature shows that government spending and growth are negatively associated (see, for example, Dar and Amirkhalkhali, 2002; Guseh and Oritsejafor, 2007). The results in Table 4.5 confirm the negative relation between $GEXP$ and $GRGDPC$, although not at conventional significance levels.

[91] There is growing number of empirical growth literature and they do have some shortcoming of growth regressions (see, for example, Durlauf *et al*., 2005 for a critical survey). One of the major concern about the robustness. Many growth literature have regressed real GDP growth on a vast array of potential determinants. But this selection of determinants have been called into question, largely because the estimated parameters are often sensitive to other control variables. To avoid this problem, we focus on the a core set of explanatory variables that have been shown to consistently related to growth and estimate the importance of other control variables conditional on presence of the core set. The other major problem is the endogeneity problem. This is why, in our baseline specification, we give emphasis on a small set of growth determinants which are in initial condition.

To also examine the role of trade, we include trade ($TRADE$) in specification (4.1). $TRADE$ is measured by taking the average value of trade shares, exports plus imports divided by GDP. Existing empirical work suggests that trade openness has a positive and significant effect on economic growth (see, for example, Harrison, 1996; Frankel and Romer, 1999; and Irwin and Tervio, 2002). To capture the concept, we include trade openness ($TRADE$) in relation to growth ($GRGDPC$) in the baseline regression. The estimated coefficient in Table 4.5 confirm earlier findings on the positive association between openness and economic growth.

Next, we incorporate fertility rate ($FERT$) and life expectancy rate at birth ($LIFEEXP$). Level of fertility ($FERT$) is closely associated with population growth, and hence with economic growth. High population growth through high level of fertility are shown impede to economic growth (see, for example, Weintraub, 1962 and Barro, 2001). The argument is that the choice to have more children per adult (and, hence, in the long run, to have a higher rate of population growth) comes at the expense of per person output growth rate. The results in Table 4.5 confirm this negative relation between $FERT$ and $GRGDPC$. Similarly, life expectancy rate at birth ($LIFEEXP$) may reflect public health condition thus human capital development. Low life expectancy may reflect low health that is harmful for economic growth and development (see, for example, Acemoglu and Johnson, 2007; Lorentzen *et al.*, 2008). The results in Table 4.5 are also consistent with these hypothesis.

After incorporating $GEXP$, $TRADE$, $FERT$, and $LIFEEXP$, the coefficient of fiscal cyclicality indicators (($\hat{\beta}$ and $\hat{\tilde{\beta}}$) remain significant at 1% to 5% level with the expected negative sign and the size of coefficients does not change noticeably (Table 4.5, Col 1-6). Overall, the estimated results clearly point to the important role of countercyclical fiscal policy.

4.6.2 Addressing endogeneity in the growth regression

It can be argued that the possible relation between cyclical properties of macroeconomic policy and growth may reveal the fact that countries with less economic development may have a weak institutional quality. Lack of better institutional quality may prevent countercyclical policy, and hence better economic outcomes. A strong negative association between institutional quality and economic growth is well-established (see, for example, Mauro, 1995 and Knack and Keefer, 1995). Additionally, Calderón and Hebbel (2008) and Frankel *et al.,* (2013) propose that countries with better institutional quality exhibit less procyclical policy stance. Linking the above two arguments suggests that less developed countries with poor institutional quality may exhibit procyclical characteristics and not

the other way round. We attempt to address this potential endogeneity of growth and cyclical properties of macroeconomic policy through the instrumental variable (IV) regression. The estimation results from the two-step feasible GMM estimation are presented in Table 4.6.

We instrumented cyclical properties of macroeconomic policy [i.e., $\hat{\beta}$, $\hat{\tilde{\beta}}$, $corr(i^{cycle}, Y^{cycle})$ and $\hat{\beta}_i^Y$] by using the same set of instrument variables ($INEXCORR$ and $INICR$) that are discussed in section 4.5.3. The first stage regression in Table 4.6 show that countries with initial level of weak institutional quality ($INEXCORR$) and high borrowing constraint ($INICR$) pursue procyclical fiscal and monetary policy. The second stage regression in Table 4.6 reveal that greater procyclicality of fiscal and monetary policy leads to lower growth and these results are statistically significant. Moreover, the estimated effect of the cyclicality of fiscal and monetary policy becomes much larger with higher values of estimated coefficients being recorded compare to the OLS results presented in Table 4.5.

4.7 Conclusions

In this chapter, we have examined the extent to which cyclical pattern of macroeconomic policy can affect the macroeconomic stability and economic growth, focusing on both fiscal and monetary policy. Our empirical analysis can be summarised as follows: first, procyclical fiscal and monetary policies destabilise macroeconomic outcomes, by intensifying output and inflation volatility. Second, procyclical policies are harmful to growth. These findings have been shown to be robust to a set of alternative measures of fiscal and monetary policy cyclicality. The results are further tested using GMM estimating method to handle potential endogeneity and heteroscedasticity issue, and the results remain unaltered and provide a clear narrative: both procyclical fiscal and monetary policies are detrimental to economic growth and intensify output and inflation volatility.

What are the major channels through which these links operate? One possible explanation is that the effect of fiscal and monetary policies are asymmetric over the course of the business cycle. Recent research documents that fiscal and monetary policy are considerably more effective in recessions compared to expansions (see, for example, Auerbach and Gorodnichenko, 2012 and Coulibaly, 2012). Under the proposed hypothesis fiscal and monetary authorities should be conducting countercyclical policy when it has its largest impact on the aggregate economy: when the multiplier is relatively high (in downtime) expansionary impacts are amplified. In this case, the countercyclical policy is

more effective to take the economy out of the recession. Under the procyclical policy, the main impact of expansionary policy will be first reflected in prices as the economy is close to the capacity and also on the output. Intuitively, such policy management may accelerate output and inflation volatility, which supports our empirical findings.

Another interpretation of our results is that countercyclical fiscal and monetary policy management is a good proxy for good general macroeconomic management. Our empirical analysis proposes that procyclical – both fiscal and monetary policies have a detrimental impact on output and inflation volatility. Therefore, fiscal and monetary authorities who conduct countercyclical policy is sending a signal that they are good at policy management, which in effect reduces macroeconomic uncertainty (e.g., output and inflation volatility). By doing so, countercyclical authorities can demonstrate a credible fiscal and monetary management. The fiscal and monetary authority that ensures the reputation of countercyclical policy would in time find that their credible policy execution did the work for them; in a sense, rational agents would anticipate the economy not to fluctuate as much, and the uncertainty would be relatively low. At the presence of less uncertainty, the rational agents have more incentives to invest growth enhancing long-term investments. An economy in such a condition would feasibly have a higher level of growth.

Having empirically linked the macroeconomic outcomes in the form of higher output volatility, inflation volatility and lower level of growth with procyclical fiscal and monetary policy, our findings point to the importance of shifting from procyclical to countercyclical fiscal and monetary policy. Earlier research has proposed that institutional reforms and credible policy responses in the conduct of fiscal and monetary policy can do much to improve the capacity to stabilize the cyclical fluctuations (see, for example, Lane, 2003; Calderón *et al.*, 2004a&b; Frankel *et al.,* 2013; Vegh and Vuletin, 2012; Duncan, 2014). It is also argued that procyclical countries face greater restrictions to accessing to international capital markets and have shallow domestic credit markets (see, for example, Riascos and Vegh, 2003; Lane, 2003; Caballero, 2002; Caballero and Krishnamurthy, 2004). In line with the Chapter 2 and 3 policy recommendation, better institutional/government quality (i.e., strengthening checks and balances, transparency and fiscal rules), credible policy response (i.e., the appropriate exchange rate regime and inflation targeting) and better financial integration with international capital markets appear to facilitate countercyclical policy as a key step in both short-term stability and long-term growth.

TABLE 4.2: OUTPUT VOLATILITY AND CYCLICALITY OF MACROECONOMIC POLICY, 1960-2014

DEPENDENT VARIABLE: OUTPUT VOLATILITY (RGDPCHVOL)

REGRESSORS	**Col 1**	**Col 2**	**RCol 3**	**Col 4**	**Col 5**	**RCol 6**	**Col 7**	**Col 8**	**RCol 9**	**Col 10**	**Col 11**	**RCol 12**
LNLRGDPCH	-0.005** (0.002)	-0.006*** (0.002)	-0.006*** (0.001)	-0.006*** (0.001)	-0.006*** (0.002)	-0.007*** (0.001)	-0.008*** (0.002)	-0.008*** (0.002)	-0.009*** (0.001)	-0.009*** (0.002)	-0.008*** (0.002)	-0.009*** (0.002)
CYCLICALITY OF FISCAL POLICY $\widehat{\beta}_i$	0.017*** (0.003)	0.013*** (0.003)	0.013*** (0.002)									
CYCLICALITY OF FISCAL POLICY $\widehat{\widehat{\beta}_i}$				0.015*** (0.003)	0.011*** (0.003)	0.013*** (0.002)						
CYCLICALITY OF MONETARY POLICY $corr(i_i^{cycle}, Y_i^{cycle})$							-0.031*** (0.006)	-0.022*** (0.006)	-0.020*** (0.006)			
CYCLICALITY OF MONETARY POLICY $\widehat{\beta}_i^Y$										-0.014*** (0.004)	-0.010*** (0.004)	-0.011*** (0.003)
POP	-0.003*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.003** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
TRADE	0.006** (0.003)	0.006 (0.004)	0.003 (0.005)	0.005 (0.003)	0.004 (0.004)	0.002 (0.005)	0.004 (0.017)	0.007** (0.003)	0.007 (0.005)	0.001 (0.004)	0.005 (0.003)	0.004 (0.005)
GEXP	-0.039 (0.036)	-0.026 (0.042)	-0.036 (0.042)	-0.048 (0.037)	-0.028 (0.041)	-0.032 (0.043)	-0.152*** (0.038)	-0.173*** (0.039)	-0.163*** (0.041)	-0.151*** (0.039)	-0.178*** (0.041)	-0.164*** (0.041)
EXEVOL		0.010*** (0.002)	0.010*** (0.002)		0.009*** (0.001)	0.008*** (0.002)		0.048** (0.024)	0.045** (0.019)		0.057** (0.024)	0.044** (0.018)
TOTVOL		0.034 (0.023)	0.035 (0.026)		0.035 (0.027)	0.029 (0.026)		0.085* (0.050)	0.061 (0.043)		0.097* (0.054)	0.075* (0.042)
FINDEPTH		-0.009 (0.006)	-0.010 (0.006)		-0.010 (0.006)	-0.006 (0.007)		0.001 (0.007)	0.005 (0.007)		0.001 (0.007)	0.004 (0.007)
STATISTICS												
ADJUSTED R^2	37.20%	47.61%	46.57%	36.53%	46.88%	47.23%	49.60%	56.37%	54.38%	44.05%	54.85%	54.63%
OBSERVATIONS	**131**	**113**	**113**	**131**	**113**	**113**	**92**	**91**	**91**	**92**	**91**	**91**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Col estimations are performed based on OLS, where white heteroscedasticity-consistent standard errors & covariance are reported in the parenthesis.
RCol estimation are performed based on weighted and reweighted OLS regression to control for outliers.
See data appendix for variable definitions and sources.

TABLE 4.3: INFLATION VOLATILITY AND CYCLICALITY OF MACROECONOMIC POLICY, 1960-2014

DEPENDENT VARIABLE: INFLATION VOLATILITY (INFVOL)

REGRESSORS	**Col 1**	**Col 2**	**RCol 3**	**Col 4**	**Col 5**	**RCol 6**	**Col 7**	**Col 8**	**RCol 9**	**Col 10**	**Col 11**	**RCol 12**
LNLRGDPCH	-0.003 (0.004)	-0.004 (0.004)	-0.003 (0.002)	-0.003 (0.004)	-0.005 (0.004)	-0.003 (0.002)	-0.005 (0.003)	-0.006 (0.004)	-0.005 (0.003)	-0.004 (0.003)	-0.006 (0.004)	-0.005 (0.003)
CYCLICALITY OF FISCAL POLICY $\widehat{\beta}_i$	0.036*** (0.011)	0.030** (0.011)	0.031** (0.012)									
CYCLICALITY OF FISCAL POLICY $\widehat{\widehat{\beta}_i}$				0.032*** (0.011)	0.027** (0.011)	0.032** (0.014)						
CYCLICALITY OF MONETARY POLICY $corr(i_i^{cycle}, Y_i^{cycle})$							-0.063*** (0.016)	-0.030** (0.014)	-0.028** (0.004)			
CYCLICALITY OF MONETARY POLICY $\widehat{\beta}_i^{y}$										-0.030*** (0.009)	-0.013** (0.006)	-0.011** (0.004)
TRADE	-0.007 (0.010)	-0.004 (0.009)	-0.003 (0.004)	-0.009 (0.009)	-0.005 (0.009)	-0.002 (0.004)	-0.019* (0.010)	-0.010 (0.008)	-0.005 (0.005)	-0.023** (0.010)	-0.010 (0.008)	-0.005 (0.005)
EXEVOL	0.101*** (0.018)	0.088*** (0.020)	0.103*** (0.008)	0.091*** (0.021)	0.079*** (0.020)	0.096*** (0.009)	0.176*** (0.056)	0.102*** (0.029)	0.181*** (0.023)	0.206*** (0.055)	0.100*** (0.029)	0.190*** (0.023)
TOTVOL		0.104 (0.064)	0.041 (0.029)		0.105 (0.067)	0.040 (0.029)		0.107 (0.080)	0.102 (0.045)		0.121 (0.081)	0.103 (0.045)
MF		-0.003*** (0.0009)	-0.002** (0.0002)		-0.003*** (0.0008)	-0.002** (0.0002)		-0.003*** (0.001)	-0.002*** (0.0003)		-0.003*** (0.001)	-0.002*** (0.0003)
STATISTICS												
ADJUSTED R^2	27.08%	35.95%	53.71%	27.85%	37.37%	52.91%	39.78%	51.63%	57.61%	35.59%	50.59%	57.61%
OBSERVATIONS	**105**	**105**	**105**	**105**	**105**	**105**	**90**	**88**	**88**	**90**	**88**	**88**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term
Col estimations are performed based on OLS, where white heteroscedasticity-consistent standard errors & covariance are reported in the parenthesis
RCol estimation are performed based on weighted and reweighted OLS regression to control for outliers.
See data appendix for variable definitions and sources.

TABLE 4.4: IV REGRESSION OF OUTPUT VOLATILITY, INFLATION VOLATILITY AND CYCLICALITY OF MACROECONOMIC POLICY

PANEL A: GMM ESTIMATION

	Dependent Variable Output Volatility (RGDPCHVOL)				**Dependent Variable Inflation Volatility (INFVOL)**			
EXPLANATORY VARIABLE (2ND STAGE)	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**	**Col 7**	**Col 8**
LNLRGDPCH	-0.002 (0.002)	-0.001 (0.002)	-0.004** (0.002)	-0.004* (0.002)	-0.011 (0.012)	-0.015 (0.012)	-0.001 (0.008)	-0.001 (0.009)
CYCLICALITY OF FISCAL POLICY $\widehat{\beta}_i$	0.026*** (0.006)				0.112*** (0.031)			
CYCLICALITY OF FISCAL POLICY $\widehat{\widetilde{\beta}_i}$		0.025*** (0.006)				0.104*** (0.028)		
CYCLICALITY OF MONETARY POLICY $corr(i_i^{cycle}, Y_i^{cycle})$			-0.036*** (0.009)				-0.131*** (0.029)	
CYCLICALITY OF MONETARY POLICY $\widehat{\beta}_i^Y$				-0.021*** (0.006)				-0.077*** (0.021)
PANEL B: FIRST STAGE REGRESSION								
EXCLUDED INSTRUMENTS (1ST STAGE)	**Dependent Variable $\widehat{\beta}_i$**	**Dependent Variable $\widehat{\widetilde{\beta}_i}$**	**Dependent Variable $corr(i_i^{cycle}, Y_i^{cycle})$**	**Dependent Variable $\widehat{\beta}_i^Y$**	**Dependent Variable $\widehat{\beta}_i$**	**Dependent Variable $\widehat{\widetilde{\beta}_i}$**	**Dependent Variable $corr(i_i^{cycle}, Y_i^{cycle})$**	**Dependent Variable $\widehat{\beta}_i^Y$**
INEXECORR	0.879*** (0.218)	0.955*** (0.253)	-0.682*** (0.152)	-1.237*** (0.326)	0.961*** (0.221)	1.045*** (0.254)	-0.694*** (0.153)	-1.226*** (0.317)
INICR	-0.006** (0.003)	-0.006** (0.003)	0.005*** (0.002)	0.007** (0.003)	-0.006** (0.003)	-0.007* (0.004)	0.006*** (0.002)	0.008** (0.004)
STATISTICS								
CENTRED R^2	*29.74%*	*17.55%*	*29.51%*	*17.65%*	*33.49%*	*10.41%*	*32.80%*	*28.95%*
UNDERIDENTIFICATION TEST[1] ***(LM STATISTIC)***	*18.835* *(P=0.000)*	*16.901* *(P=0.000)*	*24.220* *(P=0.000)*	*17.666* *(P=0.000)*	*21.093* *(P=0.000)*	*19.199* *(P=0.000)*	*25.911* *(P=0.000)*	*20.049* *(P=0.000)*
WEAK IDENTIFICATION F-TEST ON JOINT SIGNIFICANCE OF EXCLUDED INSTRUMENTS[2]	*F= 13.900*	*F= 11.744*	*F= 20.066*	*F= 12.066*	*F= 16.575*	*F= 14.188*	*F= 23.061*	*F= 14.763*
OVERIDENTIFICATION TEST (*J-STATISTICS*)[3] ***Null: The Instruments are Valid Instruments***	*Sargan Statistics = 0.483* *(P= 0.487)* **Accept Null**	*Sargan Statistics = 0.312* *(P= 0.576)* **Accept Null**	*Sargan Statistics = 0.521* *(P= 0.470)* **Accept Null**	*Sargan Statistics = 0.113* *(P= 0.736)* **Accept Null**	*Sargan Statistics = 0.007* *(P= 0.933)* **Accept Null**	*Sargan Statistics = 0.026* *(P= 0.873)* **Accept Null**	*Sargan Statistics = 1.136* *(P= 0.286)* **Accept Null**	*Sargan Statistics = 1.288* *(P= 0.256)* **Accept Null**
OBSERVATIONS	**50**	**50**	**55**	**55**	**51**	**51**	**54**	**54**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term. See data appendix for variable definitions and sources.

[1] The test is essentially the test of the rank of a matrix: under the null hypothesis that the equation is underidentified. Under the null, the statistic is distributed as chi-squared with degrees of freedom=(L1-K1+1). A rejection of the null indicates that the matrix is full column rank, i.e., the model is identified.
[2] Weak identification arises when the excluded instruments are correlated with the endogenous regressors, but only weakly. Estimators can perform poorly when instruments are weak, and different estimators are more robust to weak instruments (e.g., LIML) than others (e.g., IV); see, e.g., Stock and Yogo (2002) for further discussion. Under the null, the excluded instruments are correlated with the endogenous regression, but only strongly. A rejection of null indicates that the excluded instruments are correlated with the endogenous regressors, but only weakly.
[3] The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. A rejection of null indicates that the instruments are not valid instruments.

TABLE 4.5: GROWTH AND CYCLICALITY OF MACROECONOMIC POLICY, 1960-2014

DEPENDENT VARIABLE: GROWTH RATE OF REAL GDP PER CAPITA (GRGDPC)

REGRESSORS	**Col 1**	**Col 2**	**RCol 3**	**Col 4**	**Col 5**	**RCol 6**	**Col 7**	**Col 8**	**RCol 9**	**Col 10**	**Col 11**	**RCol 12**
LNLRGDPCH	-0.002 (0.002)	-0.006*** (0.002)	-0.007*** (0.001)	-0.002 (0.002)	-0.006*** (0.002)	-0.007*** (0.001)	-0.006*** (0.002)	-0.012*** (0.002)	-0.011*** (0.001)	-0.006*** (0.002)	-0.012*** (0.002)	-0.011*** (0.001)
LSYR	0.009** (0.003)	0.003 (0.003)	0.003 (0.004)	0.010*** (0.003)	0.003 (0.003)	0.003 (0.004)	0.016*** (0.005)	0.004 (0.004)	0002 (0.002)	0.017*** (0.005)	0.004 (0.004)	0002 (0.002)
CYCLICALITY OF FISCAL POLICY $\widehat{\boldsymbol{\beta}}_i$	-0.007*** (0.002)	-0.005** (0.002)	-0.006*** (0.001)									
CYCLICALITY OF FISCAL POLICY $\widehat{\widehat{\boldsymbol{\beta}}_i}$				-0.006*** (0.002)	-0.004*** (0.001)	-0.003*** (0.001)						
CYCLICALITY OF MONETARY POLICY $\boldsymbol{corr}(i_i^{\boldsymbol{cycle}}, \boldsymbol{Y}_i^{\boldsymbol{cycle}})$							0.002 (0.003)	0.002 (0.003)	0.002 (0.002)			
CYCLICALITY OF MONETARY POLICY $\widehat{\boldsymbol{\beta}}_i^{\boldsymbol{Y}}$										0.002 (0.002)	0.001 (0.002)	0.001 (0.001)
GEXP	-0.026 (0.026	-0.011 (0.023)	-0.021 (0.018)	-0.031 (0.026)	-0.016 (0.022)	-0.024 (0.018)	-0.004 (0.036)	-0.021 (0.025)	-0.018 (0.020)	-0.009 (0.037)	-0.021 (0.026)	-0.017 (0.020)
TRADE	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.007** (0.003)	0.007*** (0.001)	0.007*** (0.001)	0.007** (0.003)	0.006*** (0.001)	0.007*** (0.001)
FERT		-0.363** (0.175)	-0.572*** (0.102)		-0.312* (0.167)	-0.519*** (0.107)		-0.612*** (0.160)	-0.617*** (0.115)		-0.602*** (0.158)	-0.607*** (0.110)
LIFEEXP		0.094 (0.032)	0.048* (0.027)		0.109*** (0.033)	0.064** (0.027)		0.092*** (0.032)	0.076** (0.029)		0.093*** (0.032)	0.079*** (0.029)
STATISTICS												
ADJUSTED $\boldsymbol{R^2}$	23.56%	42.34%	57.01%	23.05%	42.94%	56.83%	21.73%	55.72%	62.67%	21.57%	55.72%	62.91%
OBSERVATIONS	**115**	**115**	**115**	**115**	**115**	**115**	**90**	**90**	**90**	**90**	**90**	**90**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term. See data appendix for variable definitions and sources.
Col estimations are performed based on OLS, where white heteroscedasticity-consistent standard errors & covariance are reported in the parenthesis
RCol estimation are performed based on weighted and reweighted OLS regression to control for outliers.

TABLE 4.6: IV REGRESSION OF GROWTH AND CYCLICALITY OF MACROECONOMIC POLICY

PANEL A: GMM ESTIMATION

	Dependent Variable Growth Rate of Real GDP Per Capita (GRGDPC)			
EXPLANATORY VARIABLE (2ND STAGE)	**Col 1**	**Col 2**	**Col 3**	**Col 4**
LNLRGDPCH	-0.009*** (0.002)	-0.010*** (0.002)	-0.009*** (0.001)	-0.009*** (0.002)
LSYR	0.006 (0.004)	0.006 (0.004)	0.003 (0.004)	0.005 (0.005)
CYCLICALITY OF FISCAL POLICY $\widehat{\boldsymbol{\beta}}_i$	-0.019*** (0.004)			
CYCLICALITY OF FISCAL POLICY $\widehat{\widehat{\boldsymbol{\beta}}_t}$		-0.017*** (0.004)		
CYCLICALITY OF MONETARY POLICY $\boldsymbol{corr}(i_i^{cycle}, Y_i^{cycle})$			0.023*** (0.006)	
CYCLICALITY OF MONETARY POLICY $\widehat{\boldsymbol{\beta}}_i^Y$				0.012*** (0.004)
PANEL B: FIRST STAGE REGRESSION				
EXCLUDED INSTRUMENTS (1ST STAGE)	**Dependent Variable** $\widehat{\boldsymbol{\beta}}_i$	**Dependent Variable** $\widehat{\widehat{\boldsymbol{\beta}}_t}$	**Dependent Variable** $\boldsymbol{corr}(i_i^{cycle}, Y_i^{cycle})$	**Dependent Variable** $\widehat{\boldsymbol{\beta}}_i^Y$
INEXECORR	0.934*** (0.235)	1.117*** (0.259)	-0.717*** (0.151)	-1.326*** (0.329)
INICR	-0.007** (0.003)	-0.005 (0.004)	0.005** (0.002)	0.006 (0.004)
STATISTICS				
CENTRED R^2	*14.11%*	*14.74%*	*19.18%*	*17.83%*
UNDERIDENTIFICATION TEST[1] ***(LM STATISTIC)***	*19.153* *(P=0.000)*	*18.666* *(P=0.000)*	*25.219* *(P=0.000)*	*18.811* *(P=0.000)*
WEAK IDENTIFICATION F-TEST ON JOINT SIGNIFICANCE OF EXCLUDED INSTRUMENTS[2]	*F= 13.970*	*F= 13.404*	*F= 21.171*	*F= 12.995*
OVERIDENTIFICATION TEST (*J-STATISTICS*)[3] ***Null: The Instruments are Valid Instruments***	*Sargan Statistics = 0.297* *(P= 0.585)* **Accept Null**	*Sargan Statistics = 1.099* *(P= 0.294)* **Accept Null**	*Sargan Statistics = 1.054* *(P= 0.304)* **Accept Null**	*Sargan Statistics = 1.377* *(P= 0.240)* **Accept Null**
OBSERVATIONS	**50**	**50**	**55**	**55**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term. See data appendix for variable definitions and sources.
[1] The test is essentially the test of the rank of a matrix: under the null hypothesis that the equation is underidentified. A rejection of the null indicates that the matrix is full column rank, i.e., the model is identified.
[2] Weak identification arises when the excluded instruments are correlated with the endogenous regressors, but only weakly. Estimators can perform poorly when instruments are weak, and different estimators are more robust to weak instruments (e.g., LIML) than others (e.g., IV); see, e.g., Stock and Yogo (2002) for further discussion. Under the null, the excluded instruments are correlated with the endogenous regression, but only strongly. A rejection of null indicates that the excluded instruments are correlated with the endogenous regressors, but only weakly.
[3] The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. A rejection of null indicates that the instruments are not valid instruments.

Chapter 5

The role of macroeconomic policy, trade and external debt in the global financial crisis

5.1 Introduction

Financial crisis is not a new phenomenon for either the emerging or the developing countries. Indeed, since the early 1990s, many emerging economies have been hit by either financial, or currency crises, or both. For example, Mexico's 1994 Tequila crisis was characterised by a sharp correction of the exchange rate and the current account, together with a collapse of output and economic activity. Broadly similar outcomes were observed in the 1997 East Asian currency and financial crisis, Russia's currency devaluation and debt default in 1998, Brazil's abandonment of its peg in 1999, Turkey's banking cum currency crisis in 2001, and Argentina's debt crisis in 2002. Although the source of difficulty may have been different in each episode, the profile of the crises and their consequences have been broadly similar. A "*sudden stop*" of capital inflows is almost always followed by a sharp contraction in real economic activity. Moreover, many countries experienced substantial losses in the value of their currencies, which significantly helped them to recover from the crisis. These countries were mostly able to expand their net exports to counter the contractionary effects of foreign currency denominated debt (see, for example, Ozkan and Unsal, 2017).

The 2008-09 global financial crisis has been widely considered to be the worst economic downturn, since the Great Depression of the 1930s. It has originated in the financial system of the United States and quickly spread through multiple channels to the other parts of the world. The standard explanation of the transmission of the global crisis highlights the role played by the global financial linkages and the trade collapse. The financial shock originating in the United States disrupted the financial system of several advanced and other emerging countries. In turn, the turmoil in the global financial system was steadily transferred to the real economy resulting in a contraction in economic activity in late 2008 and early 2009. However, not all emerging countries suffered to the same degree or in the same way. Some were impacted predominantly through rapid financial spillovers effect and other countries through a subsequent collapse in trade.

Based on the previous experiences of emerging countries, the recent global financial crisis has been different in two significant ways (see, for example, Reinhart and Rogoff, 2009). First, during the years 2008-09, the financial markets in the developed world faced a liquidity crisis, which led to a sharp reduction of capital inflows into the emerging countries. Second, the emerging economies also suffered significant falls in their trading partner's export demand, as the financial crisis hit the consumers spending across the globe. Hence these countries were unable to export, due to the sharp downturn in the global economy, although a large number of emerging economies experienced a substantial devaluation of their currency. Figure 5.1 documents the severe decline of net flows of debt finance and merchandise export, from large and positive before the pre-crisis (2007), to large and negative during the crisis (2008-09). Figure 5.1 shows that the net flow of gross external debt and merchandise export fell by -23.15% (Panel A) and -22.53% (Panel B) respectively (year on year weighted average growth rate) during the crisis (2008-09), from the previous period (2007).

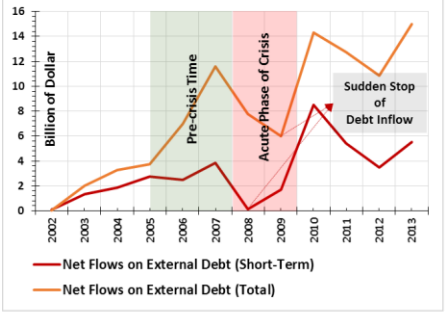
The above discussion suggests that the global synchronisation of trade and finance has been crucial in the transmission mechanism during the global financial crisis, with a clear adverse impact on GDP growth. The advanced and emerging countries' GDP growth moved much more lockstep during the crisis. Figure 5.2 (Panel A) shows that the quarterly GDP growth rate for the two country groups has moved together, from the first quarter of 2008 to the fourth quarter of 2009. In the acute phase of the crisis[92], the GDP growth rate in the advanced world was -4.48% and -3.53% respectively (quarter on quarter weighted average growth rate). Over the same period, GDP growth of the emerging countries was -1.89% and -3.03%. The parallel business cycle performance of the two groups during the crisis (Figure 5.2, Panel A) indicates an active global synchronisation of trade and finance[93] (Figure 5.1, Panel A and B).

Figure 5.2 (Panel B) depicts, the "GDP Gap" during the crisis, for a sample of 40 emerging countries[94]. Here, "GDP Gap" denotes the deviation of GDP growth from its ten years growth trend and it helps us measure the intensity of the crisis impact on the output growth for each country. Higher negative value of "GDP Gap" indicates greater growth losses during the crisis from previous growth trend. Figure 5.2 (Panel B) reveals that a

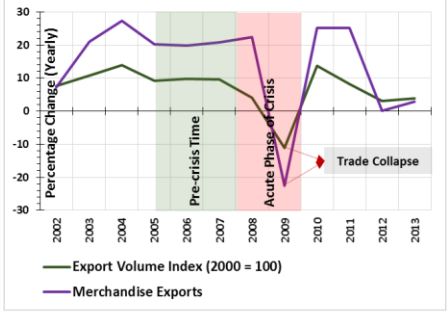
[92] Blanchard *et al.,* (2010) defined fourth quarter of 2008 and first quarter of 2009 as acute phase of the crisis.
[93] However, there could be other substantial heterogeneous macroeconomic factors involved between the two groups with a parallel business cycle performance during the crisis. For instance, a deterioration of country's financial conditions will affect the economy through a negative wealth effect on consumption and investment decisions. The effect on the economy depends not only on the agent's behaviours, but also on the institutional framework they operate in, both of which vary across the countries, and over time (see for example, Ciccarelli *et al.,* 2015).
[94] Following Al-Saffar *et al.,* (2013), we define the term "GDP Gap" as the crisis time average real GDP growth (2008-09) net of the pre-crisis real GDP growth trend (1997-2007).

Figure 5.1: Capital Flows and Trade in Emerging Countries, 2002-2013

Panel A: Net Flows on Total External Debt and Short Term External Debt, 2002-2013



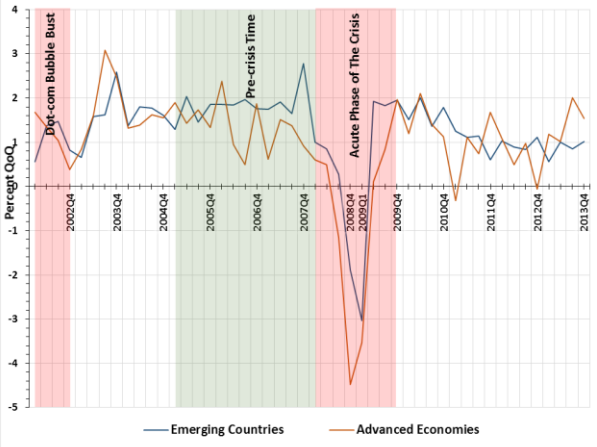
Panel B: Merchandise Export and Export Volume Index from, 2002-2013



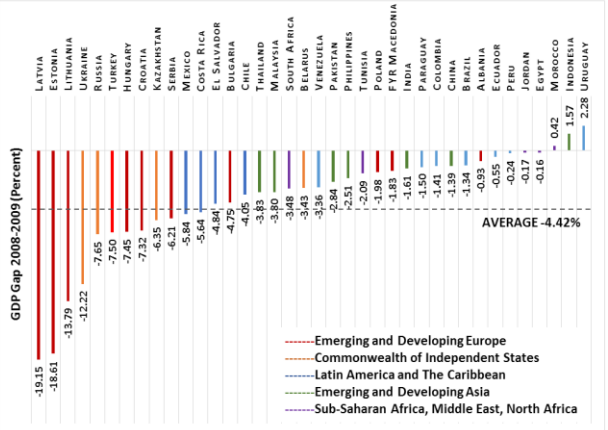
Data Source: International Monetary Fund (2014), International Debt Statistics (2014) and World Development Indicator (2014)
Data Conversation: Yearly data are averages weighted by GDP at purchasing power parity (PPP). The figures are based on data availability and time. Panel A is based on 30 Emerging Countries and Panel B is based on 38 Emerging Countries. Country classification is based on International Monetary Fund, World Economic Outlook (WEO) (2014).
List of Emerging Country: Albania, Argentina, Belarus, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Ecuador, Egypt, El Salvador, Estonia, Hungary, India, Indonesia, Kazakhstan, Latvia, Lithuania, Macedonia, Mexico, Morocco, Pakistan, Paraguay, Peru, Philippines, Poland, Romania, Russian, Serbia, South Africa, Thailand, Tunisia, Turkey, Ukraine, Uruguay, Venezuela

Figure 5.2: GDP Growth in Advanced and Emerging Countries, 2008-2009

Panel A: Quarterly GDP Growth in Advanced and Emerging Countries, 2002-2013



Panel B: Crisis Time 2008-2009 GDP Gap in Emerging Economy



Data Source: Trading Economics (2014), International Monetary Fund (2014) and World Economic Outlook (2014)
Data Conversation: Quarter over quarter (QoQ) GDP Growth (Seasonally Adjusted). Series are averages weighted by GDP at purchasing power parity (PPP). The figure is based on data availability and time for 32 Advanced Countries and 31 Emerging Countries. Country classification is based on International Monetary Fund, World Economic Outlook (2014).
List of Advanced Country: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong SAR, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Slovak Republic,, Slovenia, Spain, Sweden, Switzerland, Taiwan, United Kingdom, United States.
List of Emerging Country: Argentina, Belize, Botswana, Brazil, Bulgaria, Chile, Colombia, Costa Rica, Croatia, Dominica Republic, Ecuador, El Salvador,, Estonia, Hungary, India, Kazakhstan, Latvia, Lithuania, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russia, Serbia, South Africa, Thailand, Tunisia, Turkey, Venezuela.

Data Source: International Monetary Fund (2014) and World Economic Outlook (2014)
Data Conversation: GDP Gap calculated by crisis time average real GDP growth (2008-2009) minus pre-crisis real GDP growth trend (1997-2007). This figure is based on 40 Emerging Countries. Country group classification is based on International Monetary Fund, World Economic Outlook (2014). Gross domestic product is based on purchasing-power-parity (PPP) valuation of country GDP (Current international dollar).

large number of the countries in the sample experienced negative "GDP Gap" during 2008-09, except Morocco, Indonesia, and Uruguay. Figure 5.2 (Panel B) also suggest that Baltic countries (i.e., Latvia, Estonia, Lithuania) faced larger "GDP Gap" compared to other emerging countries, precisely Baltic countries growth was lower than ten years growth trend by more than 12%. On average, the emerging economies faced -4.42% GDP growth losses from their previous ten years growth trend, but there exists a considerable variation across the sample[95].

Figure 5.2 (Panel B) provides a clear motivation for examining the potential factors underlying such diverse patterns in the losses across the emerging countries during the crisis. Motivated by this, our main purpose in this Chapter is to explore the nature and the role of trade and financial channels in the transmission of financial crises. We follow the theoretical framework of Blanchard *et al.,* (2010) to establish our empirical hypothesis. The conceptual framework proposes that emerging countries' growth was primarily affected by trading partners' weak export demand during the crisis and foreign currency dominated external debt before the crisis.

To that end, we empirically investigate whether the incidents and the severity of the 2008-09 global financial crisis (measured by GDP growth 2008-09) are systematically related to the trade collapse and pre-crisis financial variables. Earlier empirical studies investigate cross-sectional data for a group of advanced and emerging countries, and suggest that the pre-crisis current account imbalances, trade openness and gross external debt can explain the severity and intensity of the crisis (see, for example, Blanchard *et al.,* 2010, Lane and Milesi-Ferretti, 2011 and Al-Saffar *et al.,* 2013). Their current findings on trade and financial channels transmission mechanism on growth collapse motivate us to extend the existing analysis to the emerging countries. More specifically, we complement and extend some of the findings of Lane and Milesi-Ferretti (2011) and Berkmen *et al.,* (2009) in the following dimensions. First, we examine 38 emerging countries' external balance sheets (i.e., liability side) based on the maturity structure (i.e., long and short term) during pre-crisis periods. Second, we incorporate the role of gross external debt by sectors (i.e., government, central bank, bank and non-bank private sector). Third, we also investigate the role of external leverage position and foreign rollover risk before the crisis.

[95] For a sample of 40 emerging countries, on average the GDP growth during 1997 to 2007 was 6.91% (pre-crisis time growth trend) and on average GDP growth during 2008 and 2009 was 2.49% (crisis period). GDP Gap on average from pre-crisis time to crisis time was -4.42% (2.49%-6.91%).

Fourth, we develop trading partners' export demand index to account for the trade collapse proposition.

We examine the emerging countries' external balance sheets (liability side) measured by gross external debt to identify the impact of the financial channel. This hypothesis implies that the financially open countries have accumulated large portions of their debt externally during the pre-crisis period. In particular, flexible credit market regulations and a moderate level of country credit ratings encourage domestic financial systems to acquire a significant portion of their debt externally before the crisis (see, for example, Giannone *et al.,* 2011). Pre-crisis foreign currency denominated external debt increases the currency and maturity mismatches, which enhances the probability of strong "*balance sheet effect*" and a scale of "*liquidity crisis*". Balance sheet effect arises when high levels of foreign currency denominated debt force financial sectors to collectively focus on paying down their debt rather than spending on investment, slowing down or reducing economic growth as a result. The financial shock intensifies the impact if financial sector holds a high level of short-term debt before the crisis and currency devaluation takes place during the crisis (see, for example, Reinhart and Rogoff, 2009 and Abiad *et al.,* 2009). This situation can lead to a liquidity crisis, arising from the inability to pay due debt or meet other debt related obligations. As a result, a country's high level of gross external debt is expected to increase its perceived risk (see, for example, Kannan and Köhler-Geib, 2009). Higher perceived risk in turn, imposes a higher risk premium for external borrowing, which reduces the net capital inflow or enhances the probability of "*sudden stop*" on the eve of the crisis, eventually reducing investment and growth collapses.

We argue that the financial sector's (bank and non-bank) pre-crisis gross external debt – specifically short-term debt is also likely to played an important role in its severity. This observation, is based on the notion that the financial sector was the key source of fragility during the crisis. Moreover, emerging countries are characterised by highly leveraged financial sectors with a considerable amount of foreign currency denominated debts (see, for example, Gourinchas and Obstfeld, 2012). This implies severe currency mismatches in the face of the devaluation of the currency. This situation led to rapid capital outflows during the crisis, due to, for example, the need to repay the short-term debt, which further weakened the balance sheets, and reduced the net worth. Additionally, the liquidity crisis in the advanced economies, led to a sharp reduction of capital inflows into the emerging countries.

In relation to this, we argue that external leverage is likely to be a good crisis predictor as a source of financial sectors' vulnerability. Emerging economies were characterised by highly leveraged domestic financial systems, which had experienced more rapid domestic credit growth, before the crisis (see, for example, Haldane and Madouros, 2012). Leveraged financial systems, combined with greater risk-taking, through rapid domestic credit expansion experienced both an increase in asset price inflation and in the real economic activity. Both distant past and more recent crisis episodes typically witnessed a period of significant growth in credit (and external financing), followed by busts in the financial markets, along with sharp corrections in the asset prices, making it difficult to attract short-term financing (see, for example, Claessens and Kose, 2013). Such "*sudden stops*" can lead to a cascade of forced sales and liquidations of assets, and a further decline in the prices, with consequences for the real economy. To investigate the proposition, we develop an external leverage index to account for the financial channel.

Additionally, foreign rollover risk is another source of vulnerability for financial sectors. High gross external interbank debt combined with a set of maturity mismatches, can lead to a foreign rollover risk. This problem arises from the emerging countries' financial system, with typically short-term external debt to finance long-term domestic investments. Again, the lack of systematic information about the balance sheets of financial sectors represents a difficulty in analysing debt maturity mismatches in emerging economies. Foreign rollover risk is associated with the refinancing of debt. Rollover risk is commonly faced by the countries when their debt is about to mature and needs to be rolled over into new debt. This relationship plays a pivotal role in destabilising direct cross-border credit in turbulent times (see, for example, Kashyap *et al.,* 2008). That is, the maturity mismatch and the asymmetric information gives rise to rollover risks, that is closely associated with growth collapses. We construct a foreign rollover index to investigate this propositions.

During the global financial crisis 2008-09, many emerging countries pursued countercyclical policy to cushion against the global financial shock and to boost economic recovery. The fiscal and monetary authorities reacted in different ways during the crisis. Some emerging countries took countercyclical fiscal policy to shorten the length of crisis episode by stimulating short-run aggregate demand (see, for example, Blanchard *et al.,* 2010). Other emerging countries loosened monetary policy (see, for example, Coulibaly, 2012). Some others decumulated foreign reserves to stabilise currency values to limit the adverse effects of trade and financial channels on real activity during the crisis (see, for

example, Bussière *et al.,* 2013). In our analysis, we use exchange rate regime, fiscal space, interest rate gap and reserve to account for fiscal and monetary policy's role to stabilise the economy during the global financial crisis.

Overall, our empirical analysis yields four important findings. We document that trading partner's weak export demand has a positive impact on growth collapse during the crisis (2008-09) and countries which were more open to trade before the crisis (2007) faced more adverse impact. We examine external balance sheets (liability side) and find that pre-crisis gross external debt, specifically short-term gross external debt just before the crisis, were closely associated with the growth collapse. To extend our analysis, we examine the role of initial level of gross external debt by sectors (i.e. government, the central bank, bank and non-bank private sector). We find that the sharp growth declines that are observed in the emerging countries were well explained by the pre-crisis level of the banking sector's gross external debt, specifically those of short-term in nature. Our analysis also suggests that countries with highly leveraged domestic financial systems experienced a larger subsequent contraction in real output. Furthermore, we demonstrate that foreign rollover risk played a key role in the transmission of the financial crisis, creating an impact on the real economic activity. Lastly, we find little evidence for a central role of countercyclical policy to cushion against the global financial shock.

The rest of the chapter is organised as follows: Section 5.2 reviews the empirical work. Section 5.3 presents an empirical framework. Section 5.4 discusses empirical results for trade and financial channel's impact on output. Extensions to the benchmark estimations and robustness checks are also presented in section 5.4. Section 5.5 presents the concluding remarks.

5.2 Review of the existing literature

Financial integration has improved intensely over the past decade, in particular among the advanced economies (including many emerging countries), that were at the hearth of the global imbalances. Capital account openness and the financial market reforms have led to large increase in cross-border interaction. Increasing the interconnectedness of financial institutions led to highly correlated financial risks. For example, Claessens *et al.,* (2010) propose that the increased level of cross-border financial integration and the dependence on wholesale funding during the pre-crisis time were the primary indicators of current account imbalances and can quantify the severity of the crisis.

Imbalances often resulted from badly sequenced regulatory reforms. Poorly designed financial reforms and inadequate supervision often led to currency and maturity mismatches. Berkmen *et al.,* (2009) and Giannone *et al.,* (2010) suggest that the policies in favour of the liberal credit market regulations, before the crisis, stimulated the foreign fund inflows with a high level of external leverage. They also argue that the countries with a high level of external leverage had experienced the worst performance during the crisis. This vulnerability mainly arises from the rapid increases in credit, funded by external sources. For, example, Gourinchas and Obstfeld (2012), and Hahm *et al.,* (2013) proposed that a high level of external leverage indicate that a country was financing a significant part of its assets through foreign debt issuance, which subsequently increased the domestic credit growth. The close association between the net capital inflows, external leverage and the incidence of domestic credit growth is well-documented (see, for example, Ostry *et al.,* 2010 and Furceri *et al.,* 2011). The leverage build up and the greater risk-taking, through rapid domestic credit expansion, together with the increases in asset price inflation and real economic activity, often preceed crises (see, for example, Borio and Lowe, 2002). Periods of significant growth in external financing (i.e., credit) or typically followed by crashes in credit markets, along with sharp corrections in asset prices (see, for example, Claessens and Kose, 2013).

External balance sheets are seen as a key source financial fragility preparing the ground for the crisis. Ahrend and Goujard (2014) argue that a significant amount of foreign capital that came in prior to the crisis brought the link between countries' external balance sheets and financial stability to the forefront of the policy debate. Excessive dependence on short-term liabilities, combined with the currency and maturity mismatches, have been seen as a crucial risk factor. Hence, the external debt maturity structure is often considered to be an important determinant of the scale of financial crises. One reason is that debt with a shorter maturity structure might increase the risks of refinancing. A large share of short-term external debt may also be associated with the financial sectors' (bank and non-bank) vulnerability to the wholesale funding runs (see, for example, Morris and Sing, 2008)

Additionally, foreign currency denominated debt is seen as a major determinant of the capital gains and losses that result from the exchange rate movements (see, for example, Lane and Shambaugh, 2010). As domestic financial sectors (bank and non-bank) are typically not (fully) insured, exchange rate fluctuations have destabilising consequences, with a cumulative impact on real economic activity (see, for example, Eichengreen *et al.,*

2007). Similarly, Blanchard *et al.,* (2010) focus on debt maturity structure for the emerging countries and demonstrate that high levels of pre-crisis short-term external debt are negatively associated with GDP growth losses. They also propose high levels of short-term external debt stock, with maturity and currency mismatches, aggravate a country's perceived risk. Higher perceived risk imposes increased risk premium for external borrowing reducing capital flows and hence investment and growth.

Trade is another channel through which countries get affected by crises elsewhere. GDP growth decline more significantly in more open economies, and this has been the case in particular for the countries that have faced the trading partner's weak export demand. Blanchard *et al.,* (2010) explains the role of trade for the emerging economies during the crisis, and they propose that the trading partner's reduced export demand has a direct impact on the downfall of GDP growth. Additionally, Berg *et al.,* (2011) propose that low-income countries are significantly affected by the crisis, due to the sharp declines in terms of trade. Berg and Ostry (2013) suggest that the high oil prices in the pre-crisis period hit the commodity exporters' revenue hardest, due to the weak export demand and low offered price.

The relationship between trade finance and the export collapse has also been widely examined. Early research by Auboin (2009) confirms that the decline in the world trade, between the second quarter of 2008 and the second quarter of 2009 was mainly caused by the weak demand for exports. He confirms that the world supply of trade credit declined by 15 percent during mid-2008 to mid-2009, which had an adverse impact on small and medium-sized companies across the globe. Amiti and Weinstein (2011) find similar results and confirms that the exports dropped by 28 percent during the crisis (first quarter of 2008 to the first quarter of 2009). They argue that trade finance is closely associated with the health of financial institutions and it is an essential determinant of firm-level exports during the crises. Sauvant *et al.,* (2010) find similar results and they propose that the low commodity prices, the cost of trade finance and the decline in trade credit create an adverse impact on GDP growth.

5.3 Empirical specification

We utilize data from 38 emerging countries to explore the role of the trade collapse in 2008-09 and the pre-crisis (2007) financial variables on the output collapse during 2008-09. The emerging country classification is based on International Monetary Fund (2014)[96].

[96] Table A5.2 presents the full country list.

Our sample base is geographically diverse and covers Emerging Europe, Commonwealth and Independent State (CIS), The Caribbean and Latin America, Emerging Asia, Sub-Saharan Africa, Middle East and North Africa. Following Lane and Milesi-Ferretti (2011), our cross-country regression analysis considers two-time phases, namely the pre-crisis period (2007) and the crisis period (2008-09). The empirical specification for cross-country regression analysis is as follows:

$$GDP_{i0809} = \alpha_i + \beta_{1i}GDP_{i0507} + \beta_{2i}GDP_{itrend} + \beta_{3i}Trade_{i0809} + \beta_{4i}Fin_{i07} + \beta_{5i}Policy_{i0709} + \beta_{6i}X_{i0709} + \varepsilon_i \quad (5.1)$$

where GDP_{i0809} is the average real GDP growth in 2008-09, GDP_{i0507} is the average real GDP growth over 2005-07 and GDP_{itrend} is the real GDP growth trend measured by average growth rate over 1997-2007[97]. The growth trend is included to take account of the persistent differences in growth across the sample countries – particularly important in a diverse sample. The GDP growth rate over 2005-07 is alternatively a control for above – trend growth during the pre-crisis time.

$Trade_{i0809}$ is the trading partners' export demand in 2008-09 to capture the concept of trade collapse and its potential impact on the growth loss. We develop an index for trading partner export demand, which is measured by countries' trading partner's crisis time $GDPGap_{j0809}$ multiplied by countries' weighted merchandise export W_{i07} in 2007[98]. A simplified equation (5.2) has been used for each country (i) to calculate its trading partner's (j) export demand.

$$Trading\ Partner's\ Export\ Demand_{i0809} = \sum_{J=1}^{J} W_{i07}\left[GDPGap_{j0809}\right] \quad (5.2)$$

In equation (5.2) trading partner's $GDPGap_{j0809}$ is measured by $\overline{GDPGrowth}_{j0809} - \overline{GDPGrowth}_{j9707}$, which indicates average real GDP growth (2008-09) minus the pre-crisis real GDP growth trend from 1997 to 2007. Weight W_{i2007} is constructed as follows;

$$W_{i07} = Export_{j07}/Total\ Export\ to\ World_i \quad (5.3)$$

where $Export_{j07}$ denotes country's (i) merchandise export to its trading partner country (j) and $Total\ Export\ to\ World_i$ is defined as each emerging country's (i) total merchandise export to rest of the world.

[97] Here real GDP growth is based on gross domestic product constructed by purchasing-power-parity (PPP) valuation of country GDP (current international dollar). Here "real" GDP is considered to be the PPP GDP in current prices (Definition from World Development Indicator, World Bank, 2014).

[98] We follow Fayad and Perrelli (2014) to develop the index. We collect the trade data from Direction of Trade Statistics (2014) and GDP data from World Economic Outlook (2014).

Emerging countries that are more open to trade is likely to experience an amplified impact, due to the sudden downfall of export demand. Therefore, the estimated coefficients of the trading partner's export demand $\hat{\beta}_{3i}$ should enter with a positive sign. The positive coefficient indicates that the lower the trading partner's export demand the greater the GDP growth collapse during the crisis.

Fin_{i07} broadly measured by gross external debt to GDP during the pre-crisis time (2007). Country's gross external debt is the total debt of a country owed to foreign creditors. Gross external debt is composed of public debt (government and central bank) and private/financial sectors debt (bank and non-bank private institution[99]), which includes both short-term and long-term debt[100]. We also investigate the contribution of different institutions government, central bank, bank and non-bank in the accumulation of the external debt prior to the crisis. We have used Quarterly External Debt Statistics (QEDS) Template to segregate the gross external debt statistics by economic sectors and by their maturity structure (short and long term) [101].

High levels of foreign currency denominated external debt increase the currency and maturity mismatch risk, enhancing the probability of strong "*balance sheet effect*" and scale of "*liquidity crisis*", as well as country's perceived risk. Higher perceived risk, in turn, imposes a higher risk premium for foreign borrowing, reducing capital inflows. This situation increases the probability of a "*sudden stop*" of foreign capital inflow and leads to liquidity constraint, which is closely associated with investment and growth collapses during the crisis. This particular fragility mainly arises from the high share of short-term debt. The pre-crisis (2007) short-term debt is those that mature during the crisis (2008-09). Naturally, countries with a high level of foreign currency denominated pre-crisis short-term debt face stronger balance sheets effects during the crisis, due to maturity and currency mismatch risk. Therefore, the estimated coefficient $\hat{\beta}_{4i}$ should enter with a negative sign, indicating that higher gross external debt, especially those of shorter maturity creates adverse impacts on GDP growth during the crisis.

We measure financial fragility through external leverage index, domestic credit growth and foreign rollover risk. Emerging countries' high pre-crisis gross external debt indicates

[99] Bank is defined as deposit-taking corporations' gross external debt except the central bank, which composed of short-term and long-term external debt. Non-Bank sector defined as non-deposit taking corporations' (e.g. finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange company) external debt.

[100] Long-term debt is debt that has an original or extended maturity of more than one year and short-term external debt is defined as debt that has an original maturity of one year or less (Definition from World Bank, International Debt Statistics, 2014). We collect the accumulated data of the country's gross external debt by their maturity structure for end of the year 2007 from World Bank, International Debt Statistics (2014).

[101] In October 2014, the World Bank launched the new Quarterly External Debt Statistics (QEDS) SDDS database. The template is publicly available at //databank.worldbank.org/data/.../debt/SDDS_QEDS_template_v2.1.xlsx.//

that the financial sectors are levered through borrowing from abroad (see, for example, Claessens and Kose, 2013). Pre-crisis "*external leverage*" is a good crisis predictor for subsequent financial sectors vulnerability through rapid domestic credit expansion. The external leverage index is constructed by the ratio of the country's total assets (domestic and foreign) to its gross equity debt (domestic and foreign)[102]. The high value of external leverage indicates a significant reliance on external debt issuance. Therefore, the estimated coefficient $\hat{\beta}_{4i}$ is expected to enter with a negative sign.

As argued above, another factor underlying the financial fragility is related to the "*foreign rollover risk*" [103]. Following Cerutti *et al.,* (2012), we construct the foreign rollover risk index, by the ratio of external loans to foreign deposits (i.e., external deposit) ratio[104]. The high value of the index indicates insufficient liquidity, likely prepare the ground for "*liquidity crisis*", with clear consequences for real activity. Therefore, the estimated coefficient $\hat{\beta}_{4i}$ is expected to be estimated with negative sign.

In specification (5.1) $Policy_{i0709}$ denoted a set of policy variables. We incorporate the pre-crisis level (2007) of total foreign reserves to measure the role of the foreign reserves' decumulation during crisis episodes[105]. Blanchard *et al.*, (2010) argue that foreign reserve decumulation can come into play to adjust the exchange rate to minimize the balance sheets adverse impact on GDP growth during the crisis. Countries with a higher level of foreign reserves relative to short-term, suffer less from the crisis. We also introduce the exchange rate regime dummy as a control variable. We collect exchange rate regime data from Ilzetzki *et al.,* (2011) and construct a dummy variable for exchange rate; 1=country have fixed exchange rate during crisis time (2008-09) and zero otherwise[106]. Theoretically, for a given shock, the flexible exchange rate regime helps to adjust the exchange rate and minimize the balance sheets adverse impact on GDP growth during the crisis (see, for example, Blanchard *et al.*, 2010). Therefore high level of foreign exchange reserves in 2007 and flexible exchange rate regimes help to counter against the crises, hence estimated coefficient $\hat{\beta}_{5i}$ is expected to enter with a positive sign.

We also include monetary and fiscal policy instruments to account countercyclical policy response in order to support the domestic economy. Coulibaly (2012) argue that central

[102] We measure an external leverage index, based on the proposed definition by Gourinchas and Obstfeld (2012). We collect the data from Lane and Milesi-Ferretti (2007).
[103] Foreign rollover risk is associated with the refinancing of debt. Rollover risk is commonly faced by countries, when their debt is about to mature and needs to be rolled over into new debt.
[104] We collect the data from Bank of International Settlement (BIS) (2014).
[105] Total foreign reserves comprise special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. Gold holdings are excluded. (Definition from World Development Indicator, World Bank, 2014)
[106] Exchange rate regime classification based on 1 to 6 scaling rating, where 1=fixed exchange rate regime, 6=fully flexible exchange rate regime. (Definition from Ilzetzki *et al.*, 2011).

banks in emerging countries were able to loosen the monetary policy considerably to foster economic recovery. To capture the concept we include interest rate gap during 2008-09; defined as the average interest rate (2008-09) net of the interest rate trend from 1997-2007, where a negative value of indicates that country has loose monetary policy. We also incorporate the pre-crisis level of fiscal space; calculated as general government revenue net of total expenditure as a percent of GDP[107]. Countries with a greater pre-crisis fiscal space would have room for countercyclical fiscal policy in the face of the crisis. The estimated coefficients $\hat{\beta}_{5i}$ are expected to enter with positive signs.

In equation (5.1), X_{i0709} denotes as set of control variables. We follow Lane and Milesi-Ferretti (2011) to include the level of GDP per-capita in 2007 in specification (5.1). They argue that overall level of economic development (proxied by GDP per-capita) is correlated with the financial development indicators in 2007 and to the possible extent they want to distinguish between financial factors and factors linked to the general level of development. The estimated coefficient $\hat{\beta}_{6i}$ are expected to enter with negative sign for GDP per-capita. We also include population size in 2008-09 to account for size of a country. It is possible that smaller countries may larger GDP losses during crises, since the scope of regional and sectoral diversification is more limited. In a similar fashion, smaller countries that have large trade volumes may be more vulnerable to external shocks during crises. The estimated coefficient $\hat{\beta}_{6i}$ are expected to enter with positive sign for country size.

We also consider country's credit rating and credit market regulation in 2007 as a control variable. Before the crisis, rapid foreign capital debt inflows followed from a high levels of country credit rating and low levels of credit market regulations. Additionally, liberalised financial systems, measured by low credit market regulations, also helped the emerging countries' financial systems to borrow externally in the pre-crisis period. During the crisis episode, the majority of the emerging economies experienced currency devaluations (Abiad *et al.,* 2009), that enhanced the probability of strong balance sheet effects and liquidity crises. In this regard, country's credit rating[108] and credit market regulations[109] in 2007 are partially seen as responsible for the growth collapse during the crisis. Hence, coefficient $\hat{\beta}_{6i}$ is expected to be estimated with a negative sign.

[107] We collect the data from World Development Indicator (WDI).
[108] Country's credit rating defined as rating index, which varies from 0 to 100. The value 100 indicates highly credit rated country and value 0 indicates very poor credit rated country. We collect the data from Institutional Investor's Country Credit Rating (2014).
[109] Country's credit market regulations defined as rating index which varies from 1 to 10. The value 1 define as less freedom indicates high credit market regulations and 10 value define as more freedom specifies low credit market regulations. We collect the data from Economic Freedom of the World (2014).

The data are collected from a wide range of sources; please refer Table A5.1 for their sources and detailed definitions. We restrict our analysis to emerging countries and exclude low-income developing countries, not on the basis of their economic developments, but because they lack external balance sheet data for our analysis. In the cross-country data analysis, we have used Huber-White sandwich estimator method for specification (5.1). In the empirical findings, we report the estimation result based on white heteroscedasticity consistence covariance matrix. In the empirical findings, we report the estimation result based on white heteroscedasticity consistence covariance matrix. Similar to counter the potential issues arising from outliers (please refer Figure A5.1 bivariate scatter plot). We have used weighted and reweighted OLS regression to control for the outlier.

5.4 Empirical results

5.4.1 The role of export demand and external debt

Table 5.1 presents the cross-country estimation results for the output slowdown in 2008-09. The results indicate that there is a weak relation between growth in 2008-09 with growth trend (1997-2007) and growth during 2005-07. The estimated coefficients of growth trend and growth 2005-07 are not consistently statistically significant and neighter are they estimated with the same sign across different specification (Table 5.1, Col 1-8).

In specification (5.1), our key indicator is trading partner's export demand ($Trade_{i0809}$) that shows results that are consistent with as hypothesises earlier. Figure 5.3 (Panel A) reveals that the emerging countries experienced falls in export demand outlined in 2008-09 by -5.04% (on average). At the same time they also experienced negative GDP gap (on average -4.42%)[110]. The cross-country regression result reveal positive estimated coefficients of export demand and they are statistically significant at 1% to 10% level (Table 5.1, Col 1 to 7). Table 5.1 cross-country estimates in Col 1 imply that a decrease in trading partners' export demand by 1 percentage point is associated with a decrease in domestic GDP growth about 2.06 percentage points during the crisis time. Thus, the

[110] Figure 5.3 (Panel A) suggests that trading partners' export demand plays a dominant role for GDP loss in most countries, in particular, some of the Baltic countries' export demand during the crisis time (2008-09) reduced by more than 8% compared to other emerging countries. During the crisis time, Baltic state countries also faced larger GDP loss from the earlier ten years growth trend. We have presented the trading partners' export demand and GDP Gap data in Table A5.2.

trading partner's low export demand during the crisis is appears as a major channels through which, the emerging countries' growth is negatively affected by the crisis[111].

In empirical specification (5.1), our second set of key indicator (Fin_{i07}) are measured by gross external debt to GDP. Figure 5.3 (Panel B) indicates that in 2007 the majority of the emerging economies that were financially open were in the net debtors, a clear source of vulnerability, especially if debt is foreign currency denominated[112]. Thus a high level of external debt can increase the country's perceived risk and can enhance the probability of a "*sudden stop*" of foreign capital inflow. Large balance sheets effects combined with a reduction in foreign capital inflow can intensify the impact of the crisis on investment and growth collapse (see, for example, Bénétrix *et al.,* 2015). In the regression analysis gross external debt coefficients are estimated with the expected negative sign and they are statistically significant (Table 5.1, Col 1 and 2). Table 5.1 cross-country regression analysis in Col 1 implies that an increase of 10 percentage points in the ratio of gross external debt to GDP during 2007 reduces GDP growth by 0.71 percentage points during 2008-09 crisis.

Next, we look at the gross external debt by their maturity structure. Based on our sample, on average emerging countries have 10.16% and 33.99% of gross external short and long-term debt to GDP in 2007 respectively (Figure 5.4, Panel A and B). Countries with a high level of foreign currency denominated short-term debt just before the crisis face stronger balance sheets effects for every level of currency devaluation (Abiad *et al.,* 2009). Overall, the currency and maturity mismatch enhance the liquidity constraints. This situation is closely associated with the investment and growth collapse. The coefficients are estimated with the correct negative signs for both long and short term external debt, and are statistically significant (Table 5.1). Table 5.1 regression analysis in Col 3 and Col 5 implies that an increase of 10 percentage points in the ratio of long and short-term debt to GDP during 2007 reduces GDP growth by 0.87 and 2.5 percentage points during the crisis time. It is important to note, Col 3 and Col 5 findings suggest that the quantitative effects of short-term debt to GDP are higher as compared to that of the long-term debt to GDP during 2007[113]. These findings support our arguments that debt maturity structure

[111] Our findings are consistent with the previous literature (see, for example, Berg *et al.,* 2013 and Blanchard *et al.,* 2010). Berg *et al.,* 2013 suggest that low and middle income countries' crisis time growth collapse is positively associated with their trading partner's low export demand. Blanchard *et al.,* 2010 find similar results for the emerging countries.

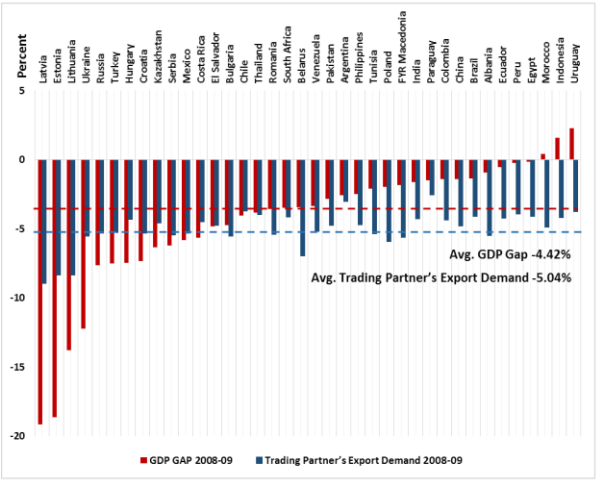
[112] Figure 5.3 (Panel B) reveals that Baltic States (i.e., Latvia and Estonia) and other emerging countries (i.e., Croatia, Bulgaria and Hungary) were financially open by more than 145% to GDP in 2007. At the same time, these group of countries were in net debtor condition (i.e., net foreign asset to GDP is more than -38%) compared to other emerging countries.

[113] We also find larger quantitative effect of short-term debt compared to long-term debt on GDP loss, while we control for both short and long-term debt together in the regression analysis (See, Table 5.1, Col 8 and 9).

matters for output loss during the crisis and countries suffered most were those with a high level of short-term debt[114].

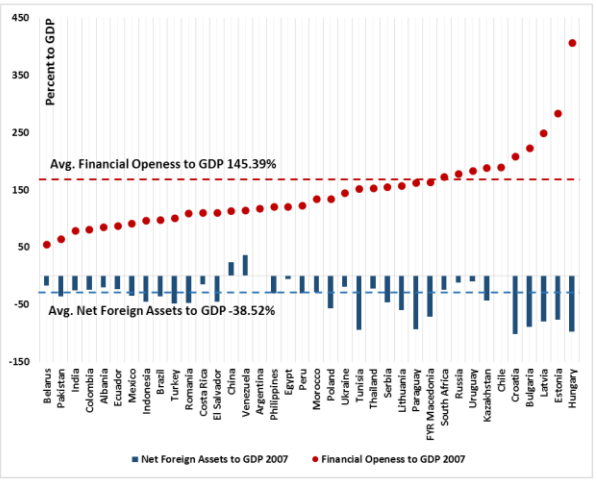
Figure 5.3: GDP Gap, Trading Partner's Export Demand, Financial Openness and Net Foreign Asset Position

Panel A: Crisis Time GDP Gap and Trading Partner's Export Demand



Data Source: World Economic Outlook (2014), Direction Trade Statistics (2014). The figure is based on 38 Emerging Countries. Country classification is based on International Monetary Fund, World Economic Outlook (2014).
Data Conversion: GDP Gap measured by crisis time average real GDP growth (2008-2009) minus the pre-crisis real GDP growth trend (1997-2007). Trading partner's export demand is measured by Trade weighted trading partner's average real GDP growth (2008-09) minus the pre-crisis real GDP growth trend (1997-07). Trade weight is measured by the trading partner's export share divided by the world export end of the year 2007.

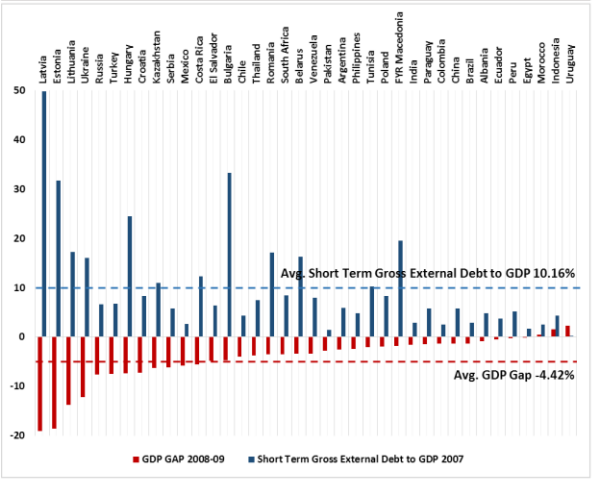
Panel B: Pre-Crisis Time Financial Openness and Net Foreign Asset Position



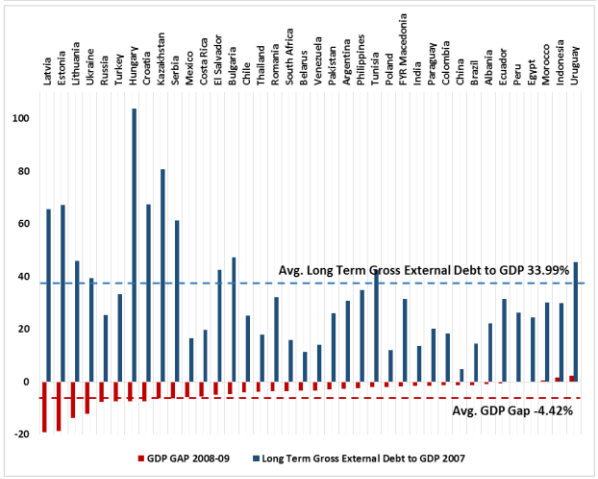
Data Source: World Economic Outlook (2014), Lane and Milesi-Ferreti (2010), Quarterly External Debt Statistics (2014). The figure is based on 38 Emerging Countries. Country classification is based on International Monetary Fund, World Economic Outlook (2014).
Data Conversion: Financial openness measured as sum of total foreign assets and foreign liabilities as a percentage of GDP (current U.S. dollar). Net foreign assets measured as total foreign assets net of total foreign liabilities as a percentage of GDP (current U.S. dollar). . Negative net foreign asset position, where total foreign liability is higher than foreign asset.

Figure 5.4: Crisis Time GDP Gap and Pre-Crisis Time Gross External Debt (Short and Long Term)

Panel A: Crisis Time GDP Gap and Pre-Crisis Time Short Term Gross External Debt



Panel B: Crisis Time GDP Gap and Pre-Crisis Time Long Term Gross External Debt



Data Source: World Economic Outlook (2014), Lane and Milesi-Ferreti (2010), Quarterly External Debt Statistics (2014). The figures are based on 38 Emerging Countries. Country classification is based on International Monetary Fund, World Economic Outlook (2014).
Data Definition: Long-term gross external debt is the debt that has an original or extended maturity of more than one year and short-term external gross external debt is defined as the debt that has an original maturity of one year or less. This short-term and long-term debt are consist of country's public (central government and central bank) and private/financial (bank, non-bank and other private institution) sector's combined external debt (Definition from International Debt Statistics, World Bank, 2014). GDP Gap measured by crisis time average real GDP growth (2008-2009) minus the pre-crisis real GDP growth trend (1997-2007).

We also include short-term debt to foreign reserves in 2007 in the regression. The argument is that foreign reserve decumulation can come into play to adjust the exchange

[114] Our findings are consistent with the existing literature. For example, Blanchard *et al.*, (2010) proposes that the emerging countries accumulated a large portion of their short-term debt externally during the pre-crisis time, which makes a country more valuable during the crisis, and intensifies the crisis shocks on the GDP growth.

rate that minimizes the balance sheets adverse impact on GDP growth during the crisis. Countries with a higher level of foreign reserves relative to short-term debt during pre-crisis, suffered less from the crisis (see, for example, Blanchard *et al.*, 2010). However, the estimated coefficients of short-term debt to reserve enter with correct negative sign with statistically significant result (Table 5.1, Col 7). This findings imply that foreign reserve decumulation played a limited role to minimize the balance sheet impact on growth loss.

In summary, our findings suggest that trade collapse in 2008-09 and gross external debt, particularly the short-term gross external debt in 2007 played key role in the intensity of the crisis.

We now turn to the potential role of fiscal and monetary policy variables ($Policy_{i0709}$). The positive coefficients of exchange rate regime (peg=1) indicates that countries with flexible exchange rate regime performed better to absorb the financial shock. However, the coefficients are not statistically significant. Existing evidence on this link is also mixed. For example, Ghosh *et al.,* (2010) propose that the growth performance of the peg regimes were not different from that of the floating regimes during the crisis. On the contrary, Blanchard *et al.,* (2010) show that countries with currency pegs suffered considerably, due to the strong balance sheets effects that arose from a high level of short-term external debt.

We also include foreign reserves to GDP in our estimation of specification 5.1. It has been widely accepted that the emerging countries accumulated a large portion of foreign reserves before the crisis, due to the trade and financial openness (see, for example, Blanchard *et al.,* 2010; Dominguez, 2012 and Bussière *et al.,* 2013). The literature argues that the countries with a higher level of foreign reserves compared to short-term debt suffered less from the crisis. The estimated coefficients enter with a positive sign but they are not statistically significant (Table 5.1).

We also address the role of countercyclical policy in response to the crisis. Regarding the monetary policy, we find that on average interest gap is around -5.51% that indicates monetary authorities' willingness to loosen the monetary policy to cushion against the global financial crisis. The estimated coefficients of interest rate gap enter with the expected negative sign but they are statistically insignificant (Table 5.1). We also use the fiscal space in 2007 to capture ability to conduct countercyclical fiscal policy during the crisis. The coefficients of fiscal space are estimated with the expected positive sign; fiscal

space acted as a safeguard during the crisis time, albeit with lack of statistically significance (Table 5.1).

We include a set of other control variables X_{i0709} in equation 5.1. We incorporate GDP per-capita in 2007, the estimated coefficients of which enter with a negative sign (Table 5.1). That is, growth declines were larger in more developed countries, as also documented by Lane and Milesi-Ferretti (2011). However, we have not found a statistically significant relation between pre-crisis GDP per-capita and growth downfalls in 2008-09. We also include country size measured by natural log of population, which is estimated with a negative sign, though not statistically significant (Table 5.1).

Next, we include two more control variables (X_{i0709}) that are related to rapid capital inflows before the crisis; country credit rating and credit market regulations. Country's credit ratings are seen as screening tools, which influence the composition of foreign investor's investment portfolios, as well as their investment decisions. Country credit rating defined as rating index which varies from 0 (poor credit rating) to 100 (high credit rating). On average, emerging countries' credit rating was 55 in 2007, based on our 38 sample country. This value indicates that they were not poorly rated before the crisis. Favourable credit ratings help borrowing externally, raising short-term debt that is closely associated with growth collapse during the crisis. Surprisingly, the coefficients of credit rating are estimated with wrong positive signs and they are not statistically significant (Table 5.1).

Low credit market regulations are also associated with significant external debts. Giannone *et al.,* (2011) and Rose and Spiegel (2011) found that the countries with market-friendly regulations experienced rapid credit (debt) inflow, and a considerably worse recession during the global crisis. Credit market regulation measure as 1 (high regulation/less freedom) to 10 (low regulation/more freedom). Based on 38 country sample, on average emerging economies' credit market regulation was 8.62 in 2007. The value may indicates that high level of credit market freedom helped to accumulate a significant portion of their debt externally. Findings from our estimation support this argument. We find that flexible credit market regulations indirectly influenced the financial markets to absorb a high level of external debt in 2007 with consequences for the output collapse (Table 5.1).

Results presented in Table 5.1 (Col 1 to 8) show that export demand and short-term external debt remain a strong determinants of the growth collapse during the crisis. To

explore further, we utilize alternative specification for (5.1). In this approach, we use the same explanatory variables that are discussed above, however dependent variable GDP_{i0809} (i.e., the average real GDP growth in 2008-09) is replaced by $GDPGAP_{i0809}$ (i.e., real GDP growth 2008-2009 minus real GDP growth trend 1997-2007). $GDPGAP_{i0809}$ allows us to measure the financial crisis impact on the deviation of growth (2008-09) from its previous ten year trend (1997-07). Higher negative values of $GDPGAP_{i0809}$ indicate that greater output collapse during 2008-09. Table 5.1 (Col 10) show that low export demand and high short-term debt are important determinants in explaining the output losses during the crisis from its trend. Results are statistically significant at 1% level with the expected signs.

To explore further, Table 5.1 (All RCol) investigate the robustness of the results related to outliers by using weighted and reweighted OLS regression (WLS and RWLS method). Interestingly, however, the statistical significance, the sign and the size of the coefficients of export demand and short-term external debt remain much the same after controlling for outliers and all other control variables.

5.4.2 The role of external debt by economic sector

The above findings indicate that the emerging economies have accumulated a significant portion of their debt externally before the crisis, which can explain its severity during the crisis. In this section, we closely investigate the institutional composition (i.e. government, central bank, bank and non-bank private sectors) of the external debt in 2007. We use the specification (5.1) and results are presented in Table 5.2.

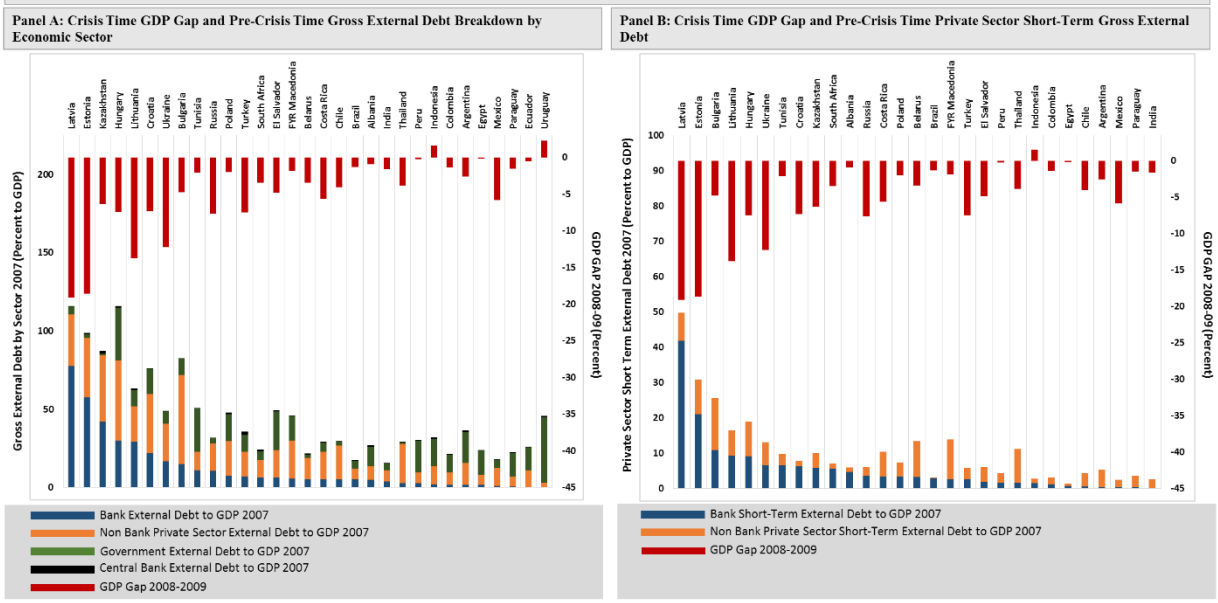
Figure 5.5 (Panel A) shows that the majority of the emerging countries had high levels of financial sector' external debt (bank[115] and non-bank sector[116]), when compared to the public sectors' debt (government and central bank) in 2007. Based on a sample of 30 countries, on average emerging economies' banking and non-bank sectors had an external debt of 52% and 56% of GDP respectively[117]. On the other hand, the government and central bank had external debt 49.23% and 2.37% of GDP respectively. These figures highlight the role of the financial institutions in the accumulation of most of the external

[115] Deposit-taking corporations, except the central bank.
[116] Other sector defined as non-deposit taking corporation (i.e. finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange company) except bank and central bank.
[117] Figure 5.5 (Panel A) suggests that Baltic countries (i.e., Latvia, Estonia, Lithuania) and other emerging countries (i.e., Ukraine, Kazakhstan, Hungary, Croatia, Ukraine and Bulgaria) experienced larger share of gross external debt to GDP in 2007, precisely banking and non-banking sectors' debt to GDP have a dominant role for GDP loss during the global financial crisis.

debt in 2007. Now we turn to the role of this composition on the output collapse in 2008-09.

The estimated coefficient of banking sectors' gross external debt enter with the expected negative sign and they are statistically significant (Table 5.2, Col 1 and 5). The non-bank sectors' gross external debt coefficients are estimated with the expected negative sign, but they are not statistically significant. Table 5.2 estimated result in Col 1 indicates that an increase of 10 percentage points in the ratio of banking sectors' gross external debt to GDP reduces the GDP growth by 0.44 percentage points during the 2008-09 crisis. We can conclude that banking sectors' gross external debt is one of the major financial channels through which an adverse impact on GDP growth is mediated. The previous economic literature found similar results, for example, Joyce (2011) investigates the systematic banking crisis for the emerging markets and suggest that the initial level of foreign capital accumulation by the banking sectors penalised the emerging countries during the crisis. Al-Saffar *et al.,* (2013) have looked at the pre-crisis time external balance sheet positions, and found similar results for the developed and emerging countries. In our sample, we do not find any significant negative relationship between external government and central bank's debt in 2007 and GDP growth in 2008-09 (not reported).

Figure 5.5: Crisis Time GDP Gap, Pre-Crisis Time Gross External Debt by Sector



Data Source: World Economic Outlook (2014) and Quarterly External Debt Statistics (2014).
Date Definition: Gross external debt is composed of four sector debt; Central Government Debt, Central Bank Debt, Deposit-Taking Corporations (Bank) Debt and Non-Bank Sector (e.g. finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange company) Debt. Gross external debt is composed of both short and long term debt. Data is based on accumulated debt end of the year 2007.
Panel A is based on 31 Emerging Countries' QEDS data availability. Panel B is based on 29 Emerging Countries' QEDS data availability. Country classification is based on International Monetary Fund, World Economic Outlook (2014). GDP Gap measured by crisis time average real GDP growth (2008-2009) minus the pre-crisis real GDP growth trend (1997-2007).

We also separate financial sectors' gross external debt in 2007 by their maturity structure (short and long-term) and explore their link with GDP growth in 2008-09. The argument is that short-term debt is contractual and the debtor country's financial sectors need to

repay their debt regardless of their economic condition. Based on our sample of 30 countries, on average emerging economies' banking and non-bank sectors had a short-term external debt of 22% and 19% of GDP respectively. In this regard, the high level of short-term debt during the pre-crisis time, combined with the currency mismatch during the crisis puts a country in a more vulnerable position. Reduced net-capital inflow has an adverse impact on the country's real economic performance. Figure 5.5 (Panel B) reveals that the countries with the high level of financial sectors' (bank and non-bank) short-term external debt had experienced a larger negative GDP Gap during the crisis[118].

We find that banking and non-bank sectors' short-term external debt have an adverse impact on GDP growth in 2008-09. However, only the bank's external short-term debt are estimated with coefficients that are statistically significant with correct negative sign (Table 5.2, Col 3 and 7). On the other hand non-bank external short-term debt enter with a correct negative sign, but they are not statistically significant. It is also noticeable that the banking sectors' short-term external debt are estimated with higher coefficient values when compared to the non-bank sectors. Table 5.2 estimated result in Col 3 implies that an increase of 10 percentage points in the ratio of banking sectors short-term debt to GDP reduces GDP growth by 0.76 percentage points during the crisis. These findings indicate that the banking sector's external short-term debt is one of the major channels, through which the emerging countries are affected in 2008-09.

To explore further, Table 5.2 investigates the robustness of the results (presented in RCol) related to the problem of outliers by using weighted and reweighted OLS regression (WLS and RWLS method). We also use alternative specification, where dependent variable GDP_{i0809} is replaced by $GDPGAP_{i0809}$. Interestingly, however, the statistical significance, the sign and the size of the coefficients of bank gross external debt and short-term external debt remain much the same after control for outliers and even if we include all the major control variables.

5.4.3 Further extensions: the role of external leverage, domestic credit and foreign rollover risk

We have seen in the previous section that the majority of the emerging countries exhibited high levels of gross external debt in 2007, where the financial sectors (i.e., bank and non-bank sector) were, especially levered through borrowing from abroad. Pre-crisis high level

[118] Figure 5.5 (Panel B) implies that Baltic countries (i.e., Latvia, Estonia, Lithuania) and other emerging countries (i.e., Bulgaria, Hungary, Ukraine, Croatia and Tunisia) experienced larger share of banking sector's short-term external debt to GDP in 2007 that have significant role for GDP loss during the financial crisis.

of country credit rating and credit market deregulations can trigger a credit boom and lead to an excessive increase in the financial leverage by facilitating greater risk-taking. Rapid growth in domestic credit is another thread running through the narratives of events before the crises. Leverage build-ups and greater risk-taking combined with rapid domestic credit expansion increase the asset prices. This situation can lead to the crises. In the distant past, as well as during the recent crises episodes, a period of significant growth in credit (and external financing) was noted, followed by busts in the credit markets, along with sharp corrections in the asset prices (see, for example, Claessens and Kose, 2013). Notably, a drop in the prices triggered the financial institutions to experience a decline in the asset value struggle to attract short-term financing from external sources. Such "*sudden stops*" can lead to a cascade of forced sales and liquidations of assets, and further declines in asset prices. This situation brings conclusive consequences for the real economy. In this regard, external leverage is a good crisis predictor for a subsequent financial vulnerability in the financial sectors (see, for example, Haldane and Madouros, 2012). To investigate the proposition, we use the specification (5.1) and present the results in Table 5.3.

Financial sectors are the main channels, through which the emerging countries accumulate a significant portion of their debt externally. We construct an external leverage index, based on the proposed definition by Gourinchas and Obstfeld (2012). Higher values of this index indicates that country is financing a large portion of its asset through external debt issuance. Based on our sample we find that on average emerging economies' external leverage ratio was 1.15. This value indicates that country is financing 13% of the domestic investment to GDP through external debt issuance before the crisis[119]. External leverage's coefficients enter with the expected negative sign and they are strongly statistically significant (Table 5.3, Col 1 and 4)[120]. Table 5.3 estimated result in Col 1 implies that an increase of 10 percentage points in external leverage ratio to GDP in 2007 reduces GDP growth by 1.69 percentage points during the crisis.

The above findings and arguments motivate us to investigate whether the external leverage stimulates the domestic credit growth during the pre-crisis time. A large number of studies find that the pre-crisis level of domestic credit growth is a good crisis indicator (see, for example, Lane and Milesi-Ferretti, 2011, Hahm *et al.,* 2013 and Rose and Spiegel, 2011). The estimated coefficients of domestic credit to private sector enter with a correct

[119] On average External Leverage Ratio $= \frac{\text{Total Asset to GDP}}{\text{Equity Debt to GDP}} = 1.15$. External debt issuance $(1 - \frac{1}{1.15}) = 0.13$.

[120] Schularick and Tylor (2012) and Gourinchas and Obstfeld (2012) also find that the external leverage before crisis time plays a major role to predict the consequence of the crises.

negative sign, but they are not statistically significant (Table 5.3, Col 2 and 4). Negative coefficient indicate that one of the transmission channels, from the enormous external debt to the crisis was the large amount of capital inflow from the foreign countries, which fuelled the domestic credit booms, unsustainable asset price rise and economic activity. Indebtedness also increases perceived risk, exposing a country to the risk of sudden stops during crises. Financial sectors were the channels, through which financial fragility in the form of excessive borrowing was translated into output declines.

The above findings show that the emerging market increases their leverage (i.e., assets relative to equity) during the pre-crisis period. In this case, financial sectors (bank and non-bank) must rely on cross-border lending and wholesale funding to achieve the increased leverage, especially in the countries with limited local lending and depositor base. Cross-border banking can potentially have some benefits, especially by diversifying the available sources of lending and borrowing and by increasing the banking competition. However, such flows can also give rise to financial stability risks, through increasing the vulnerabilities of the domestic financial sectors to external shocks. According to Hills and Hoggarth (2013), cross-border lending was in a much more volatile form from 2007 to 2009. Consequently, the banking and non-bank sectors experienced a rapid balance sheet (i.e., liability side) growth before the crisis. During this period, a high level of cross-border lending, with maturity and currency mismatch appears to have played a major role in contributing to the vulnerabilities associated with foreign rollover risk[121].

We construct a foreign rollover risk index by taking a ratio of the foreign loan (external loan) to foreign deposit (external deposit). A high ratio indicates that the financial sector (i.e., affiliated foreign bank and non-bank sectors) might not have adequate liquidity to cover any unforeseen fund requirements, and the low ratio may indicate that they may not be earning enough profit to cover any unforeseen financial needs. Based on our sample of 38 countries, on an average, the ratio is 1.36 in 2007, which indicates that the emerging economies' financial sectors did not have sufficient liquidity during the crisis, facing a serious risk of liquidity crisis[122]. The estimated coefficients of foreign rollover risk enter

[121]A large number of existing studies explored the relation between foreign rollover risk and reduced capital inflow. For example, Kashyap *et al.,* (2008), and Morris and Shin (2008) claim that the exposure of banks to rollover risk, due to their extensive reliance on short-term financing is a major source of instability for the entire financial system. Specifically, they argue that the banks do not fully internalize the cost, which this liquidity risk imposes on the economy during the crisis. Additionally, Claessens and Van Horen (2012) find that the foreign banks which source the fund domestically, are less likely to reduce lending, due to the roll-over risk. Again, Cetorelli and Goldberg (2011) argue that the parent banks with funding shocks might withdraw money from their subsidiaries, which are more active in deposit-taking. On the other hand, Benmelech and Dvir (2013) propose that short-term debt leads to financial fragility and roll-over risk, which can enhance the probability of a "*sudden stop*" and funding crisis.

[122] Cerutti *et al.,* (2012) define the term foreign rollover risk by foreign deposit to loan ratio. According to them, the lower the deposit to loan ratio, the higher is the share of local claims financed by parent banks resources and/or wholesale financing. According to the definition and based on 38 countries data, on average the ratio is around 0.73 in 2007. This lower value indicates that foreign affiliated parent banks financing large portion of their debt from external sources. The value also indicates that 0.27 of debt not financed by local consumer deposits , which

with a correct negative sign and they are statistically significant at 5% level (Table 5.3, Col 3 and 4). Table 5.3 estimated result in Col 3 implies that an increase of 10 percentage points in foreign rollover risk in 2007 reduces the GDP growth by 0.10 percentage points during the crisis. Our findings indicate that the pre-crisis time foreign rollover risks is one of the major sources of financial sectors' vulnerability through which the emerging markets get affected during the crisis.

5.4.4 Robustness checks

We test the robustness of our findings by utilising an alternative measure of GDP growth 2008-09. In this approach, we use our baseline specification (5.1) but the dependent variable of GDP growth (2008-09) is replaced by industrial production growth (2008-09). In relation to GDP growth 2008-09, the credit crisis may badly affect the industrial production in those emerging countries that were mostly dependent on credit expansion prior the crisis. More specifically, it is possible that those countries in which domestic credit was increasing rapidly and which were undergoing net capital flows during the per-crisis period may have experienced the greatest adjustment difficulties once the financial crisis hit globally. These economies would have faced a greater readjustment challenge in dealing with the reduction in the supply of credit, and hence on investment and industrial production. Keeping the above arguments in mind, in this section we have considered alternative definitions of crisis intensity measured by industrial production growth in 2008-09. On average the industrial production fell by -3% during 2008-09. In spite of the availability of the industrial production data that reduces the number of observations, the estimation results are conclusive, and they are presented in Table 5.4.

The coefficients of trading partners' export demand enter with a correct positive sign. However, they are not consistently statistically significant (Table 5.4). One possible explanation of the positive relation between reduced export demand and industrial production fall is that collapse in demand for durable goods, driven by uncertainty and credit constraints. The industrial goods are more cyclical and their products are more likely to suffer most (see, for example, Lane and Milesi-Ferretti, 2011). Another possible channel is the collapse in demand for industrial goods (oil prices plummeted) that reduces the revenues of manufacturing exporters.

specifies during the pre-crisis time emerging countries' banking sectors acquire large portion of their debt from external sources by using foreign affiliated financial sectors.

The proportion of loans not financed by local consumer deposit $(1 - Foreign\ Deposits/Foreign\ Loan) = (1 - 0.73) = 0.27$

We also find that gross external debt played a major role the severity of the crisis as measured by the fall in industrial production (Table 5.4, Col 1). We do not find any systematic evidence for long-term external debt, but short-term debt's estimated coefficients are statistically significant with the negative sign (Table 5.4, Col 3 and 4). Banking sectors' gross external debt and short-debt coefficients are statistically significant with the expected negative sign (Table 5.4, Col 5 and 7). Their coefficient values are much higher compared to gross external debt, which point to short-term debt as a better crisis predictor. These findings are merely the reflection of our earlier results from Table 5.1 and 5.2. The estimated coefficients of foreign rollover risk are statistically significant with a correct negative sign (Table 5.4, Col 11). Given the above major variables significant adverse effect on crisis time industrial production growth, we conclude that our results are broadly robust to earlier results presented in Table 5.1 to 5.3.

5.5 Conclusions

Our empirical results reveal that both the financial and trade channels played significant roles in output losses during the 2008-09 crisis. The divergent effects of the global financial crisis across emerging countries, arising from different financial and trade exposures and the growth performances of the trading partners explain much of the heterogonous growth performance of emerging economies during the crisis. We find that the trading partner's reduced export demands can explain an important part of the output losses during the crisis. Our results also suggest that pre-crisis private/financial sector's (bank and non-bank) gross external debt, particularly, short-term debt is important in understanding the intensity of the crisis. In this regard, the emerging countries with more leveraged domestic financial systems tended to suffer more during the crisis. When it comes to policy, we find little evidence for a central role of countercyclical fiscal and monetary policy to cushion against the global financial shock. We also did not find convincing econometric evidence that foreign reserves was essential buffers in the global crisis. Similarly, we find little evidence for flexible exchange rate regimes in absorbing external shocks during the crisis.

The monetary and fiscal policy responses are considered to be complex during the crisis (see, for example, Blanchard *et al.,* 2010). It is important to know which policy actions reduced the impact of the crisis shocks. Now, if a country has a significant amount of short-term debt just before the crisis that matures during the crisis, then the country may

experience high level of capital outflow on the eve of the crisis, requiring a raise in domestic interest rate (i.e., procyclical policy), but higher interest rates reduces domestic demand, which has an adverse impact on output. In this case, foreign reserve decumulation would be an effective policy to offset the capital outflow, and it also avoids large currency devaluation. Hence, a combination of foreign reserve decumulation and expansionary fiscal policy might be a better policy option provided there is fiscal space and foreign reserves. Fiscal space stimulates economic activity, and foreign reserve decumulation minimises the adverse effect on the balance sheets and hence on output.

We did not find that the pre-crisis level of foreign reserves affected the output. Rather, it acted as a buffer for smaller currency depreciation (see, for example, Trivedi and Ahmed, 2010). In this regard, the exchange rate regime played a crucial role during the crisis. However, exchange rate regime performance during the crisis was broadly determined by the intensity of the crisis shocks, size of the pre-crisis external debt and the prevailing macroeconomic conditions (see, for example, Blanchard *et al.,* 2010). Although emerging countries utilised the fiscal space to counter against the crisis, fiscal space has contracted since the global recession and has not recovered to the pre-crisis level (see, for example, Aizenman and Jinjarak, 2010). In this regard, the policy prescription for emerging countries would be to redevelop the buffer fiscal space, for example, through a well-designed fiscal rule, short and medium term expenditure policy and the stabilisation of funds.

The majority of the emerging countries also pursued countercyclical monetary policy during the global financial crisis in contrast to the previous crisis episodes. Emerging economies in the past few decades showed improved macroeconomic fundamentals, such as strengthened international capital flows, trade openness, inflation targeting, and financial reforms (see, for example, Coulibaly, 2012). In this regard, as long as the emerging markets maintain robust economic fundamentals, by maintaining a credible monetary policy, with inflation targeting and financial sector reform, the conduct of countercyclical monetary policy will remain sustainable in future.

Clearly, the room for manoeuvre regading fiscal and monetary tools is crucial during downturns. This chapter proposes that "*prevention is better than cure*". Preventive measures, such as banking regulations can help countries to absorb risky assets and liabilities. Tucker (2012) suggests that all policy makers should pay attention to the national balance sheets and its components. Not only the national balance sheets but also the country's external bank (domestic and foreign) balance sheets appear to contain

relevant information regarding its financial vulnerability. The bank's consolidated balance sheets need to be monitored and supervised, although national supervisors have limited power to monitor the foreign bank activities. That is why, Basel III's overhaul of banking regulation proposes to monitor cross-border banking activities. The regulation also calls for better supervision and monitoring of the risk characteristic in the national balance sheets. The Committee on International Economic Policy and Reform advise that the policy makers should reduce incentives for short-term lending and also asked to reduce the biases in favour of debt over equity financing (G30).

TABLE 5.1: CROSS COUNTRY REGRESSIONS OF PRE-CRISIS TIME GROSS EXTERNAL DEBT BY THEIR MATURITY STRUCTURE AND CRISIS-TIME TRADING PARTNER'S EXPORT DEMAND

ESTIMATION METHOD: OLS

	Dependent Variable: Avg. GDP Growth 2008-09[1]									**Dependent Variable: GDP Gap 2008-09[2]**	
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**	**Col 7**	**Col 8**	**RCol 9**	**Col 10**	**RCol 11**
AVG. GDP GROWTH 2005-07	-0.312	-0.142	-0.430	-0.234	0.242	0.265	0.209	0.201	0.213		
	(0.245)	(0.239)	(0.265)	(0.269)	(0.243)	(0.235)	(0.240)	(0.265)	(0.384)		
GDP GROWTH TREND 1997-07	1.214***	0.844**	1.412***	0.986**	0.594	0.361	0.574	0.693	0.733		
	(0.414)	(0.392)	(0.425)	(0.433)	(0.487)	(0.379)	(0.379)	(0.430)	(0.565)		
EXPORT DEMAND 2008-09	2.059***	1.816***	2.509***	2.105***	1.223*	1.081*	1.219**	1.449**	1.637**	1.711***	2.033***
	(0.385)	(0.503)	(0.319)	(0.549)	(0.602)	(0.583)	(0.590)	(0.660)	(0.681)	(0.542)	(0.478)
GROSS EXTERNAL DEBT TO GDP 2007	-0.071***	-0.050**									
	(0.014)	(0.021)									
LONG TERM EXTERNAL DEBT TO GDP 2007			-0.087***	-0.062*				-0.042	-0.032	-0.046	-0.036
			(0.018)	(0.030)				(0.031)	(0.031)	(0.028)	(0.024)
SHORT TERM EXTERNAL DEBT TO GDP 2007					-0.257***	-0.200**		-0.140**	-0.134*	-0.137**	-0.146**
					(0.063)	(0.075)		(0.070)	(0.069)	(0.060)	(0.073)
SHORT TERM EXTERNAL DEBT TO FOREIGN RESERVE 2007							-0.034**				
							(0.014)				
EXCHANGE RATE REGIME 2008-09	0.015*	0.014	0.019**	0.017	0.005	0.006	0.008	0.011	0.010	0.012	0.005
	(0.008)	(0.010)	(0.008)	(0.011)	(0.010)	(0.010)	(0.009)	(0.009)	(0.012)	(0.009)	(0.010)
FOREIGN RESERVE TO GDP 2007	0.043	0.036	0.035	0.030	0.063	0.052	-0.022	0.045	0.061	0.038	0.056
	(0.046)	(0.048)	(0.044)	(0.047)	(0.055)	(0.051)	(0.052)	(0.048)	(0.055)	(0.043)	(0.048)
INTEREST RATE GAP 2008-09	-0.098	-0.057	-0.110	-0.064	-0.063	-0.027	-0.031	-0.040	-0.067	-0.066	-0.089
	(0.080)	(0.072)	(0.081)	(0.069)	(0.088)	(0.079)	(0.080)	(0.071)	(0.077)	(0.066)	(0.061)
FISCAL SPACE TO GDP 2007	0.013	0.019	0.010	0.018	0.012	0.015	0.030	0.023	0.010	0.015	0.011
	(0.108)	(0.090)	(0.114)	(0.092)	(0.102)	(0.090)	(0.091)	(0.092)	(0.122)	(0.092)	(0.109)
GDP PER-CAPITA 2007		-0.017		-0.018		-0.019*	-0.016	-0.017	-0.023*	-0.018**	-0.026**
		(0.011)		(0.010)		(0.010)	(0.011)	(0.011)	(0.012)	(0.010)	(0.010)
AVG. POPULATION 2008-09		-0.003		-0.003		-0.003	-0.002	-0.004	-0.003	-0.005	-0.005
		(0.005)		(0.005)		(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.003)
COUNTRY CREDIT RATING 2007		0.002		0.002		0.002	-0.006	0.004	-0.011	0.006	-0.013
		(0.025)		(0.024)		(0.026)	(0.026)	(0.025)	(0.023)	(0.024)	(0.021)
CREDIT MARKET FREEDOM 2007		-0.079*		-0.081*		-0.082*	-0.090*	-0.075*	-0.060	-0.062	-0.049
		(0.041)		(0.043)		(0.041)	(0.044)	(0.040)	(0.051)	(0.041)	(0.043)
STATISTICS											
ADJUSTED R^2	54.32%	56.88%	54.83%	58.42%	53.44%	59.31%	71.69%	60.48%	64.36%	70.55%	77.58%
OBSERVATIONS	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Col estimation is based on white heteroscedasticity-consistent standard errors & covariance.
RCol estimation is based on weighted and reweighted OLS regression to control for outliers.
See data appendix for variable definitions and sources.
[1] Avg. GDP growth 2008-09 is calculated by taking average of real GDP growth in 2008 and 2009.
[2] GDP gap is measured by average real GDP growth 2008-09 minus real GDP growth trend 1997-2007.

TABLE 5.2: CROSS COUNTRY REGRESSIONS OF PRE-CRISIS TIME GROSS EXTERNAL DEBT OF BANK AND NON-BANK SECTOR AND BY THEIR MATURITY STRUCTURE AND CRISIS-TIME TRADING PARTNER'S EXPORT DEMAND

ESTIMATION METHOD: OLS

	Dependent Variable: Avg. GDP Growth 2008-09[1]								**Dependent Variable: GDP Gap 2008-09[2]**			
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**RCol 6**	**Col 7**	**RCol 8**	**Col 9**	**RCol 10**	**Col 11**	**RCol 12**
AVG. GDP GROWTH 2005-07	-0.099	-0.259	0.179	-0.089	-0.158	-0.248	0.178	-0.036				
	(0.402)	(0.394)	(0.463)	(0.393)	(0.401)	(0.555)	(0.480)	(0.623)				
GDP GROWTH TREND 1997-07	1.191	0.790	0.378	0.488	1.238	1.289	0.380	0.666				
	(0.716)	(0.614)	(0.708)	(0.606)	(0.736)	(0.874)	(0.736)	(0.896)				
EXPORT DEMAND 2008-09	1.182*	1.412**	0.556	1.608***	0.973	1.016	0.550	0.633	0.919	1.005	0.859	0.889
	(0.601)	(0.580)	(0.842)	(0.536)	(0.767)	(0.733)	(0.878)	(0.897)	(0.674)	(0.639)	(0.793)	(0.743)
BANK GROSS EXTERNAL DEBT TO GDP 2007	-0.044**				-0.038**	-0.034*			-0.038**	-0.035**		
	(0.016)				(0.014)	(0.017)			(0.013)	(0.015)		
NON-BANK GROSS EXTERNAL DEB TO GDP 2007		-0.065			-0.026	-0.010			-0.024	-0.015		
		(0.049)			(0.046)	(0.042)			(0.043)	(0.039)		
BANK SHORT-TERM EXTERNAL DEBT TO GDP 2007			-0.076**				-0.077**	-0.075*			-0.078**	-0.065*
			(0.032)				(0.034)	(0.038)			(0.032)	(0.034)
NON-BANK SHORT-TERM EXTERNAL DEBT TO GDP 2007				-0.041			0.006	0.011			0.007	0.011
				(0.039)			(0.049)	(0.067)			(0.046)	(0.062)
EXCHANGE RATE REGIME 2008-09	0.002	0.014	-0.010	0.018	0.003	0.001	-0.011	-0.012	0.003	0.001	-0.014	-0.015
	(0.015)	(0.017)	(0.020)	(0.016)	(0.016)	(0.019)	(0.021)	(0.025)	(0.015)	(0.017)	(0.020)	(0.023)
FOREIGN RESERVE TO GDP 2007	-0.031	0.122	0.010	0.043	0.019	0.022	0.002	0.023	0.014	0.011	0.005	0.036
	(0.075)	(0.094)	(0.088)	(0.076)	(0.103)	(0.115)	(0.092)	(0.103)	(0.093)	(0.106)	(0.089)	(0.095)
INTEREST RATE GAP 2008-09	0.065	-0.071	0.010	-0.056	0.046	0.032	0.010	0.010	0.047	0.030	-0.005	-0.025
	(0.079)	(0.089)	(0.119)	(0.097)	(0.081)	(0.127)	(0.120)	(0.138)	(0.078)	(0.119)	(0.118)	(0.124)
FISCAL SPACE TO GDP 2007	0.084	-0.163	0.046	-0.040	0.012	0.007	0.052	0.014	0.009	0.009	0.048	-0.009
	(0.123)	(0.142)	(0.126)	(0.124)	(0.148)	(0.205)	(0.133)	(0.184)	(0.143)	(0.192)	(0.134)	(0.168)
GDP PER-CAPITA 2007	-0.020	-0.005	-0.032**	-0.018	-0.013	-0.020	-0.032	-0.035	-0.014	-0.023	-0.033	-0.038
	(0.013)	(0.023)	(0.012)	(0.015)	(0.021)	(0.020)	(0.013)	(0.021)	(0.020)	(0.019)	(0.012)	(0.019)
AVG. POPULATION 2008-09	-0.002	0.002	-0.005	-0.001	-0.001	-0.001	-0.005	-0.002	-0.002	-0.001	-0.004	-0.002
	(0.007)	(0.005)	(0.008)	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)	(0.006)	(0.006)	(0.006)	(0.007)
COUNTRY CREDIT RATING 2007	0.004	-0.033	0.011	-0.019	-0.006	-0.017	0.013	-0.009	-0.004	-0.012	0.008	-0.016
	(0.038)	(0.036)	(0.050)	(0.035)	(0.038)	(0.044)	(0.053)	(0.052)	(0.034)	(0.041)	(0.043)	(0.046)
CREDIT MARKET FREEDOM 2007	-0.037	-0.011	-0.067	-0.085	-0.008	-0.011	-0.068	-0.037	-0.018	-0.023	-0.038	-0.009
	(0.060)	(0.079)	(0.072)	(0.066)	(0.072)	(0.094)	(0.076)	(0.087)	(0.065)	(0.080)	(0.070)	(0.073)
STATISTICS												
ADJUSTED R^2	58.61%	48.56%	49.24%	41.90%	57.20%	53.21%	45.89%	49.17%	71.76%	68.79%	62.92%	67.90%
OBSERVATIONS	**30**	**31**	**29**	**31**	**30**	**30**	**29**	**29**	**30**	**30**	**29**	**29**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Col estimation is based on white heteroscedasticity-consistent standard errors & covariance.
RCol estimation is based on weighted and reweighted OLS regression to control for outliers.
See data appendix for variable definitions and sources.
[1] Avg. GDP growth 2008-09 is calculated by taking average of real GDP growth in 2008 and 2009.
[2] GDP gap is measured by average real GDP growth 2008-09 minus real GDP growth trend 1997-2007.

TABLE 5.3: CROSS COUNTRY REGRESSIONS OF PRE-CRISIS TIME FINANCIAL SECTORS' VULNERABILITY AND CRISIS TIME TRADING PARTNER'S EXPORT DEMAND

ESTIMATION METHOD: OLS

	Dependent Variable: Avg. GDP Growth 2008-09[1]					Dependent Variable: GDP Gap 2008-09[2]	
REGRESSORS	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**RCol 5**	**Col 6**	**RCol 7**
AVG. GDP GROWTH 2005-07	0.073	-0.010	0.010	0.030	0.075		
	(0.216)	(0.303)	(0.227)	(0.236)	(0.266)		
GDP GROWTH TREND 1997-07	0.535	0.662	0.522	0.688*	0.739***		
	(0.336)	(0.435)	(0.347)	(0.354)	(0.425)		
EXPORT DEMAND 2008-09	1.641***	1.906***	1.391**	1.569**	1.720***	1.814***	1.866***
	(0.450)	(0.517)	(0.547)	(0.583)	(0.468)	(0.479)	(0.348)
EXTERNAL LEVERAGE 2007	-0.169***			-0.159**	-0.170***	-0.165***	-0.169***
	(0.033)			(0.058)	(0.056)	(0.056)	(0.051)
DOMESTIC CREDIT TO PRIVATE SECTOR TO GDP 2007		-0.010		-0.018	-0.010	-0.023	-0.011
		(0.017)		(0.015)	(0.014)	(0.014)	(0.012)
FOREIGN ROLLOVER RISK 2007			-0.010**	-0.010**	-0.012***	-0.011***	-0.009*
			(0.004)	(0.005)	(0.004)	(0.004)	(0.005)
EXCHANGE RATE REGIME 2008-09	0.001	0.012	0.016	0.001	-0.001	-0.001	-0.002
	(0.008)	(0.012)	(0.010)	(0.009)	(0.011)	(0.009)	(0.009)
FOREIGN RESERVE TO GDP 2007	0.040	0.034	0.016	0.041	0.056	0.036	0.055
	(0.047)	(0.048)	(0.045)	(0.043)	(0.045)	(0.039)	(0.040)
INTEREST RATE GAP 2008-09	-0.045	-0.063	-0.073	-0.060	-0.078	-0.085	-0.103*
	(0.063)	(0.084)	(0.076)	(0.076)	(0.062)	(0.071)	(0.051)
FISCAL SPACE TO GDP 2007	0.051	-0.002	-0.024	0.036	0.031	0.030	0.019
	(0.078)	(0.095)	(0.089)	(0.093)	(0.102)	(0.100)	(0.092)
GDP PER-CAPITA 2007	-0.029***	-0.022*	-0.021**	-0.030***	-0.033***	-0.032***	-0.034***
	(0.008)	(0.011)	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)
AVG. POPULATION 2008-09	-0.006	0.001	0.001	-0.007	-0.008*	-0.008	-0.008**
	(0.005)	(0.004)	(0.004)	(0.006)	(0.004)	(0.005)	(0.003)
COUNTRY CREDIT RATING 2007	-0.003	-0.001	0.011	0.010	-0.006	0.013	-0.005
	(0.021)	(0.028)	(0.023)	(0.026)	(0.022)	(0.025)	(0.020)
CREDIT MARKET FREEDOM 2007	-0.064*	-0.091*	-0.104**	-0.054	-0.049	-0.038	-0.037
	(0.036)	(0.049)	(0.043)	(0.037)	(0.044)	(0.040)	(0.037)
STATISTICS							
ADJUSTED R^2	64.41%	51.29%	57.59%	63.37%	75.00%	72.76%	83.23%
OBSERVATIONS	**38**	**38**	**38**	**38**	**38**	**38**	**38**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Col estimation is based on white heteroscedasticity-consistent standard errors & covariance.
RCol estimation is based on weighted and reweighted OLS regression to control for outliers.
See data appendix for variable definitions and sources.
[1] Avg. GDP growth 2008-09 is calculated by taking average of real GDP growth in 2008 and 2009.
[2] GDP gap is measured by average real GDP growth 2008-09 minus real GDP growth trend 1997-2007.

TABLE 5.4: ROBUSTNESS CHECK (DEPENDENT VARIABLE: AVG. INDUSTRIAL PRODUCTION GROWTH 2008-2009)

ESTIMATION METHOD: OLS

REGRESSORS	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11
AVG. GDP GROWTH 2005-07	0.405	0.371	0.944*	1.003*	0.740	0.744	0.874	1.195**	0.670	0.689	0.713
	(0.549)	(0.586)	(0.526)	(0.499)	(0.655)	(0.672)	(0.942)	(0.540)	(0.553)	(0.524)	(0.547)
GDP GROWTH TREND 1997-07	0.846	0.932	0.025	0.222	0.359	-0.483	-0.337	-1.391	0.356	0.392	0.157
	(1.087)	(1.177)	(0.939)	(0.935)	(1.481)	(1.387)	(1.705)	(1.232)	(1.081)	(0.893)	(0.973)
EXPORT DEMAND 2008-09	2.834***	3.2***	1.635*	1.733**	1.352	1.697	0.513	1.451	2.585**	2.993***	2.661**
	(0.858)	(0.917)	(0.819)	(0 .726)	(1.189)	(1.223)	(1.044)	(0.993)	(1.010)	(0.743)	(0.982)
GROSS EXTERNAL DEBT TO GDP 2007	-0.062*										
	(0.035)										
LONG TERM EXTERNAL DEBT TO GDP 2007		-0.069									
		(0.050)									
SHORT TERM EXTERNAL DEBT TO GDP 2007			-0.280**								
			(0.120)								
SHORT TERM EXTERNAL DEBT TO FOREIGN RESERVE 2007				-0.058**							
				(0.021)							
BANK GROSS EXTERNAL DEBT TO GDP 2007					-0.040*						
					(0.021)						
NON-BANK GROSS EXTERNAL DEB TO GDP 2007						-0.076					
						(0.086)					
BANK SHORT-TERM EXTERNAL DEBT TO GDP 2007							-0.092**				
							(0.038)				
NON-BANK SHORT-TERM EXTERNAL DEBT TO GDP 2007								-0.187**			
								(0.072)			
EXTERNAL LEVERAGE 2007									-0.100		
									(0.170)		
DOMESTIC CREDIT TO PRIVATE SECTOR TO GDP 2007										-0.038	
										(0.026)	
FOREIGN ROLLOVER RISK 2007											-0.012**
											(0.006)
EXCHANGE RATE REGIME 2008-09	0.019	0.021	0.014	0.013	0.010	0.015	-0.008	0.042	0.016	0.019	0.023
	(0.020)	(0.021)	(0.022)	(0.022)	(0.031)	(0.031)	(0.026)	(0.026)	(0.024)	(0.020)	(0.021)
FOREIGN RESERVE TO GDP 2007	0.006	-0.010	0.055	-0.079	-0.106	0.073	-0.091	0.116	-0.001	0.013	-0.003
	(0.123)	(0.130)	(0.114)	(0.116)	(0.124)	(0.183)	(0.099)	(0.136)	(0.131)	(0.130)	(0.133)
INTEREST RATE GAP 2008-09	0.022	0.016	0.071	0.081	0.254	0.078	0.286*	0.114	0.024	0.021	0.027
	(0.095)	(0.099)	(0.095)	(0.094)	(0.149)	(0.105)	(0.140)	(0.100)	(0.101)	(0.092)	(0.101)
FISCAL SPACE TO GDP 2007	0.162	0.173	0.129	0.167	0.172	-0.073	0.162	-0.062	0.148	0.133	0.133
	(0.206)	(0.206)	(0.187)	(0.174)	(0.226)	(0.293)	(0.199)	(0.234)	(0.194)	(0.166)	(0.189)
GDP PER-CAPITA 2007	-0.014	-0.015	-0.017	-0.013	-0.016	-0.013	-0.027	-0.019	-0.021	-0.026	-0.021
	(0.022)	(0.021)	(0.021)	(0.021)	(0.022)	(0.027)	(0.020)	(0 .022)	(0.021)	(0.022)	(0.021)
AVG. POPULATION 2008-09	-0.012	-0.012	-0.011	-0.012*	-0.004	-0.004	-0.004	-0.004	-0.009	-0.007	-0.005
	(0.008)	(0.008)	(0.006)	(0.006)	(0.009)	(0.008)	(0.012)	(0.007)	(0.010)	(0.007)	(0.007)
COUNTRY CREDIT RATING 2007	0.052	0.053	0.067	0.070	0.035	0.019	0.016	0.041	0.058	0.098	0.069
	(0.086)	(0.087)	(0.080)	(0.077)	(0.098)	(0.085)	(0.143)	(0.078)	(0.090)	(0.088)	(0.088)
CREDIT MARKET FREEDOM 2007	-0.148*	-0.157*	-0.137*	-0.141**	-0.057	-0.028	-0.045	-0.062	-0.158*	-0.123	-0.165*
	(0.082)	(0.085)	(0.069)	(0.066)	(0.099)	(0.162)	(0.120)	(0.096)	(0.083)	(0.079)	(0.082)
STATISTICS											
ADJUSTED R^2	37.18%	36.16%	44.42%	67.22%	28.87%	26.56%	34.05%	36.83%	31.82%	35.88%	31.29%
OBSERVATIONS	32	32	32	32	26	27	25	27	32	32	32

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Col estimation is based on white heteroscedasticity-consistent standard errors & covariance.
See data appendix for variable definitions and sources.

Chapter 6

Conclusions

Our findings of the cyclical behaviour of fiscal policy in this thesis suggest that fiscal procyclicality has become the norm rather than the exception in emerging and low-income developing countries compared to advanced world. More specifically, in Chapter 2, we find that over the last 45 years, a substantial number of emerging and low-income developing countries are trapped within the procyclical policy, in the sense of not being able to move from procyclical to countercyclical stance. The empirical findings confirm that political and institutional factors plays an important role for procyclical fiscal policy along with financial constraints variables. Most of the variables on the government quality and financial constraints variables are statistically significant. Our findings point to the importance of government quality and financial constraints, as a key determinant of a country's inability to escape from "*procyclicality trap*".

Can the fiscal policy in emerging and developing countries be improved by improving institution/government quality? One of the major obstacles to stabilisation policy in these countries is rent extraction behaviour of the benevolent government (see, for example, Alesina and Tabellini, 2005). In a country with poor governance and high level of corruption combined with less transparency, the priorities would be to establish the strengthen the institutional framework, rule of law, more transparency and its accountability (see, for example, Jeff and Anwar, 2000). A potential solution may be an appropriate anti-corruption programme (i.e., anti-corruption agencies/bureau) that may ensure transparency in tax collection and public resource redistribution process among the social groups. As a part of better institutional quality, appropriate checks and balances may also constrain fiscal policy decision-making process, particularly, for the countries with high level of rent extraction. Strong institutions and transparency would also help reduce the "*voracity effect*", relating output volatility to power dispersion, which in turn, would facilitate the accumulation of foreign capital and build up confidence among investors to raise funds during economic recessions (see, for example, Erbil, 2011).

A number of recommendations from earlier studies point to the importance of establishing self-governing Fiscal Policy Councils (FPC) that would regulate deficit limits to maintain a sustainable debt level (see, for example, Eichengreen *et al.,* 1999; Wyplosz, 2002; Perry,

2002; De Gregorio, 2002). According to the literature, there may be scope for tight fiscal discipline or fiscal rules. Fiscal rules may improve the policymaking process by avoiding the discretion for procyclical fiscal policy during upturns in the business cycle. Explicit budgetary rules such as spending limits or balanced budget requirements may include constraints on procyclical policy. Under this proposal, politicians would have to formulate policy within the budgetary limits. Fiscal Policy Council may be particularly effective in countries that are characterised by polarisation and high fragmentation, since these factors are important determinants of procyclical fiscal policy.

In Chapter 3, we found that many countries, especially emerging and low-income developing countries also face challenges in implementing countercyclical monetary policies. We document that over the last 55 years, a substantial number of emerging and developing countries consistently followed procyclical monetary policy or have recently turned procyclical. We provide evidence that procyclical stop-and-go policies are intensified in the presence of "*fear of free floating*", forcing central banks to raise interest rates to avoid large swings in the exchange rates. The fear mainly arises from reliance on debt financing from external sources that are denominated in the foreign currency. A sudden stop and abrupt reversal of capital inflows may lead country to insolvency, leading to costly insolvency and large unpredicted movements in relative prices. In this case cyclicality of monetary policy is predominantly determined by the exchange rate regime. This is particularly the case for developing countries with a large amount of foreign currency denominated obligations which render the exchange rate regime even more important.

An obvious policy prescription is to follow a monetary framework is to follow a monetary framework with inflation targeting regime to pursue countercyclical policy (see, for example, Lane, 2003 and Coulibaly, 2012). The argument of replacing exchange rate anchors with implicit and explicit inflation targeting is based on the notion that inflation targets enable monetary tools to be used for domestic stabilisation purposes. Clearly, a successful and credible policy response requires a capable (i.e., better institutional quality) and independent central banks (i.e., an autonomous institution without government intervention), ensuring that inflation target anchors the price expectations in the medium-term that would allow the monetary authority to stabilise the business cycle fluctuations.

Our findings also highlight the importance of financial development as an important factor in improving cyclical properties of macroeconomic policy. Financial development,

such as development in financial market and its integration with international capital markets enable emerging countries to borrow in local domestic currency (see, for example, Coulibaly, 2012). The larger share of domestic currency denominated debt reduces the risk of rapid capital outflow, the risk of maturity and currency mismatch, facilitating the pursuit of countercyclical policies. However, it is also essential to strengthen the institutional quality to gain foreign investors' confidence. Improvement of institutional quality is also important as a barometer of foreign investor's risk perception that determines the capital inflows. Consequently, countries with weak institutions combined with poor credit ratings may be exposed to the whims of international borrowing. As long as developing countries maintain strong economic fundamentals, better institutional quality and integration with international capital markets, the conduct of countercyclical macroeconomic policies as a macroeconomic stabiliser will be more likely to be sustainable.

In Chapter 4, we investigated the potential macroeconomic cost of pursuing procyclical fiscal and monetary policy. Our empirical findings reveal that procyclical countries have high level of output volatility and inflation volatility. Our analysis also shows that procyclical macroeconomic policies are positively associated with lower economic growth, pointing to the importance of shifting from procyclical fiscal and monetary policy to countercyclical one. What is the prerequisite condition to shift from procyclical stance to countercyclical policy? In line with the earlier recommendation, better institutional/government quality, credible policy (i.e., the appropriate exchange rate regime and inflation targeting) and better financial integration with international capital markets appear as prerequisites in the conduct of countercyclical policy.

In Chapter 2 and 3, we also show that over the last decades a good number of emerging economies have been able to escape the procyclicality trap and become countercyclical. During the global financial crisis 2008-09, these countries pursued countercyclical macroeconomic policy to counter the sharp drop in economic activity. However, in Chapter 5, using cross-country data from 38 countries, we find little evidence for a central role of countercyclical policy to cushion against the global financial shock. Our findings suggest that trading partner's weak export demand had a positive impact on growth collapse during the crisis (2008-09). Sharp growth declines are widely observed in the emerging countries, with a high level of short-term external debt, especially in the banking sector. Additionally, we found that external leverage and foreign rollover risk played key roles in the intensity of the crisis.

During the global financial crisis 2008-09, many emerging countries pursued countercyclical policy to cushion against the global financial shock. Our cross-country analysis finds little evidence of a central role of countercyclical policy to cushion against the crisis intensity. Nevertheless, countercyclical policy response is a remarkable departure from the earlier crisis episodes during which emerging countries had to cut government spending due to less creditworthiness and to raise interest rates to defend the value of the domestic currency to maintain capital inflows. The recent shift of cyclical properties of policy heralds a new era for emerging countries. However, they require better preventive measure combined with better institutional quality on financial sectors to reduce the future financial crisis impact.

Our findings also point to the importance of the link between the structure of gross capital inflows as well as cyclical pattern of net capital inflow (see, for example, Al-Saffar et al., 2013; Tucker, 2012 and Fiscal Policy Committee BOE, 2014). For example, large external gross debt may increase currency and maturity mismatch risk, increasing the risk profile of the financial sectors. This particularly applies to the banking sector that borrows from external sources in short-term agreements to finance long-term domestic investments. More attention needs to be devoted on the sources of the finances that are used for the domestic credit expansion (see, for example, Tucker, 2012). Indeed, Basel III (international banking regulation) includes net stable funding ratio (NFSR) requirements regarding external liabilities, as well as requirements towards monitoring cross-border banking activities.

Several possibilities for future research emerge from our findings in this thesis. First, it would be informative to extend the Chapter 2's empirical analysis by evaluating the short and long-term movement of fiscal balances and revenues with the business cycle. In addition, it would also be interesting to deepen the empirical investigation by utilising higher frequency data. Second, we construct the government quality index by considering three separate measures based corruption, transparency and democratic equality. Naturally, there remains an important question regarding the most efficient ways to compose and measure the government quality and its link with procyclical outcomes. Third, our findings in Chapter 3 links "*fear of free floating*" with cyclical properties of monetary policy, highlighting the importance of understanding the relationship between the two in more formal set-ups. Fourth, it would be interesting to consider a formal framework to examine the relation between procyclical policies with macroeconomic cost (e.g., inflation and output volatility and low growth). For example, in line with the

empirical findings in Chapter 4, one could develop a formal framework establishing, how the short-term structural components of macroeconomic stabilisation policies is likely to impact on the long-run economic performance (i.e., growth). This would be an interesting avenue for future research.

Appendix: Chapter 2

Figure A2.1: Country Credit Rating and Government Quality (GQ) Over The Period of Time 1970-2014

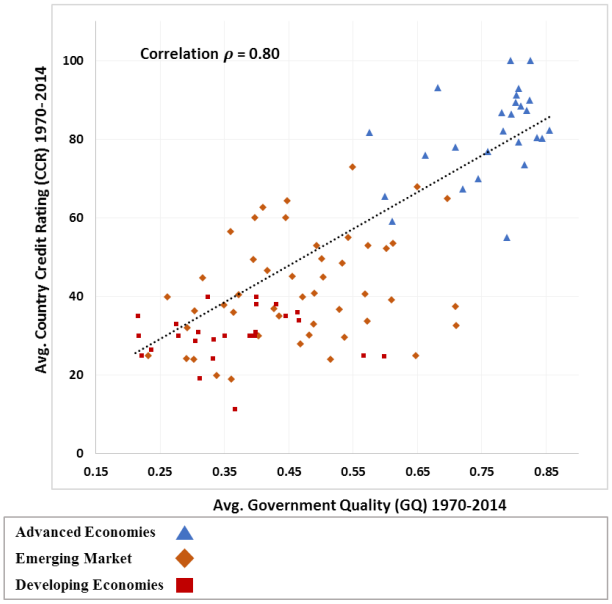


TABLE A2.1: DATA USED TO ESTIMATE THE CYCLICAL PROPERTIES OF FISCAL POLICY

VARIABLES	DESCRIPTION AND SOURCE
Growth rate of real government expenditure ($\Delta logG$) and **Cyclical components of real government expenditure ($\Delta logG^{CYC}$)**	$\Delta logG$ is annual growth rate of real general government final consumption expenditure and $\Delta logG^{CYC}$ is cyclical component of real general government final consumption expenditure derived from logarithm deviation of its Hodrick-Prescott trend. Data are covered over the time horizon 1970-2014. Real annual consumption converted from its nominal values, where possible, using GDP deflator and otherwise by using CPI. Data are in current local currency. Data are obtained from World Development Indicator (2015) and IMF International Financial Statistics (IFS) (2015). Access through UK data services.
Cyclical component of real output (OUT_GAP)	Cyclical component of real GDP derived from logarithm deviation of its Hodrick-Prescott trend. Real annual GDP converted from its nominal values, where possible, using GDP deflation and otherwise by using CPI. Data are in current local currency. Data are covered over the time horizon 1970-2014. Data are obtained from World Development Indicator (2015) and IMF International Financial Statistics (IFS) (2015). Access through UK data services.
Trading partners' export demand ($EXPDEMAND$)	Real external export demand measured by weighted average of GDP growth in country's export partners, weighted by share of partner in total export. Data-set are covered over the time horizon 1985-2014. Data are obtained from Direction of Trade Statistics (DOTS) (2015), Berg *et al.*, (2011) and IMF International Financial Statistics (IFS) (2015). IFS data access through UK data services.
GDP deflator ($GDPDEFLATOR$)	The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. The base year varies by country. Annual data for time period 1970-2004 are obtained from World Development Indicator (2015) and IMF International Financial Statistics (IFS) (2015). Access through UK data services.
Consumer price index (CPI)	Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Annual data for the time period 1970-2014 are obtained from World Development Indicator (2015) and IMF International Financial Statistics (IFS) (2015). Access through UK data services.

TABLE A2.2: DATA USED IN THE CROSS COUNTRY AND PANEL REGRESSION

VARIABLES	DESCRIPTION AND SOURCE
Government Quality (*GQ*)	Government quality is a composite index of political corruption (*POLCORR*), release of information by government (*RELINF*), egalitarian democracy index (*EGLDEMO*), where these three variables' annual data are equally weighted by taking averaged for each country for each year over the time horizon 1970-2014. The Government quality is a normalized index, ranges between 0 (lowest government quality) and 1 (highest government quality). Government quality index are averaged over 1970-2014 for cross-country estimation and annual data are used for panel-data estimation. ***POLCORR***: Political corruption index by taking the average of (a) public sector corruption; (b) executive corruption; (c) legislative corruption; and (d) judicial corruption. In other words, these four different government spheres are weighted equally by taking average for each country for each year over the time horizon 1970-2014 to construct the index. The index ranges from 0 (greater political corruption) to 1 (lowest political corruption). Data are obtained from Coppedge *et al.* (2015). ***RELINF***: Release of information by government as a measure of government transparency more specifically economic (both monetary and fiscal policy) and social data released by governments. It is a normalized annual data index ranges from 0 (lowest release of information) to 1 (highest release of information). Data are obtained from Williams (2015). ***EGLDEMO***: An assessment of ideal egalitarian democracy. Egalitarian democracy is achieved when rights and freedoms of individuals are protected equally across all social groups; and resources are distributed equally across all social groups. The distribution of resources must be sufficient to ensure that citizens' basic needs are met in a way that enables their meaningful participation. Additionally, an equal distribution of resources ensures the potential for greater equality in the distribution of power. It is a normalized annual data index ranges from 0 (lowest egalitarian democracy) to 1 (highest egalitarian democracy). Data are obtained from Coppedge *et al.* (2015).
Initial real GDP per-capita 1970 (*LRGDPCH*)	Initial real GDP per-capita measured by Log of real GDP per-capita in 1970. Data are obtained from Penn World Table (PWT Version 6.3).
Government expenditure to GDP (*GEXP*)	General government final consumption expenditure (% of GDP). Data are averaged over 1970-2014 for cross country estimation and annual data are used for panel-data estimation. Data are obtained from World Development Indicator (2015) and IMF International Financial Statistics (IFS) (2015). Access through UK data services.
Trade openness to GDP (*TRADE*)	Measures trade openness of a country. Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product. Data are averaged over 1970-2014 for cross-country estimation and annual data are used for panel-data estimation. Data are obtained from World Development Indicator (2015).
Political instability (*PINSTAB*)	Measure political instability of the country. Only one variable cannot explain the political instability of the country. We use five indicator political motivated assassination (ASSASSIN), government crisis (GOVCRIS), revolution (REVOLS), military coups (COUPS), and constitutional changes (CONSTCHG) used to calculate the political instability. We give weight for each of the variable proposed by Woo (2009). $PINSTAB_{it}$ weight is estimated by using statistical techniques for each sample country for each year. More precisely the annual weight for each country is defined as *PINSTAB=0.04*GOVTCRIS+0.24*REVOLS+0.44*COUPS+0.33*CONSTCHG+0.07*ASSASSIN.* Data are averaged over 1970-2009 for cross-country estimation and annual data are used for panel-data estimation. Data are obtained from The Cross-National Time-Series Data Archive (2009).
Political constrain (*POLCON*)	Measure the political constrain, to implement the policy executives face political constrain which is depend on the number of institutionally embedded vote players among various branches of government. High value reflect high political constrain and low value indicate low political constrain. Data are averaged over 1970-2014 for cross-country estimation and annual data are used for panel-data estimation. Data are obtained from Henisz (2012). Access through Management Department, University of Pennsylvania.
Cabinet size (*CABSIZE*)	Cabinet size refers to ministers' number in "cabinet rank", excluding parliamentary secretaries, undersecretaries, ministerial alternates and others. Includes the vice-president and president under the presidential system, but not under a parliamentary system. In many cases, counts are approximate, since sources often differ (particularly in regard to "ministers of state") as to what constitutes cabinet status. Generally, the number of ministries, not of individuals holding multiple offices. Data are averaged over 1970-2009 for cross-country estimation and annual data are used for panel-data estimation. Data are obtained from The Cross-National Time-Series Data Archive (2009).

TABLE A2.2 (CONTINUED): DATA USED IN THE CROSS COUNTRY AND PANEL REGRESSION

VARIABLES	DESCRIPTION AND SOURCE
Country credit ratings (CCR)	The Trading Economics credit rating (TE Rating) scores the credit worthiness of a country between 100 (riskless) and 0 (likely to default). Unlike the ratings provided by the major credit agencies, the index is numerical because it is easier to understand and more insightful when comparing multiple countries. Data are obtained from Trading Economics Credit rating (TE Rating 2014) and Reinhart and Rogoff (2009).
Checks and balances ($CHEKBALC$)	Measures political institutions constrains by appropriate checks and balanced; face by politicians to monitor their activity. Stronger check and balances restrain politicians in their policy making process and they held become more accountable to public. An 18-category scale, from 1 to 18, with a higher score indicating more political checks and balances. Data are averaged over 1975-2012 for cross-country estimation and annual data are used for panel-data estimation. Data are obtained from Beck *et al.,* (2001). We use updated data which covers from 1975-2012. Data access through Econ.worldbank.org.
Financial openness ($FINOPEN$)	Measured with the Chinn-Ito financial openness index. The index measures a country's degree of capital account openness. The index ranges from 0 (lowest financial openness) to 1 (highest financial openness). Data are obtained from Chinn and Ito (2006). We use updated data which covers from 1970-2014. Data are averaged over 1970-2014 for cross-country estimation and annual data are used for panel-data estimation. Access through Web.pdx.edu.
Financial depth ($FINDEPTH$)	Measures country's liquid liabilities over the GDP. Data are averaged over 1970-2014 for cross-country estimation and annual data are used for panel-data estimation. Data are obtained from International Financial Statistics (IFS) (2015), International Monetary Fund (IMF) (2015). Access through UK data services.
European settlements ($EUSETMENT$)	European settlements is percent of population that was European or of European descent in 1900 across their Colony. Europeans experienced high level of mortality rates (recorded among bishops, soldiers, and sailors stationed in the Colonies), they failed to settle and they were more likely to set-up worse government institutions. Data are obtained from Acemoglu *et al.,* (2012).
English law ($BRITLAW$)	We divide our sample based on national commercial legal traditions into English law, French civil law, German civil law, Scandinavian law and Socialist law. The variable $ENGLAW$ measures English common law and it is a dummy variable (1 if country follow English common law, and 0 otherwise). Data are obtained from La Porta *et al.,* (1999).
Colonial dummy ($BRITCOL$)	Colonial dummies: Dummy indicating whether country was a British, French, German, Spanish, Italian, Belgian, Dutch. or Portuguese Colony. We give emphasis on British Colony, so that the variable is 1 if the country is Colonized by British and 0 otherwise. Data are obtained from La Porta *et al.,* (1999).
Cyclicality index of Frankel *et al.,* (2013) ($FVV2013$)	Fiscal cyclicality index obtained from Frankel *et al*., (2013). They calculate the index based on country's yearly data correlations between the cyclicality components of real GDP and real central government expenditures sample of 94 countries for the time 1960-2009.
Cyclicality index of Talvi and Vegh ($TV2005$)	Fiscal cyclicality index obtained from Talvi and Végh (2005). They calculate the index based on country's yearly data correlation between the cyclical component of real GDP and general government expenditure sample of 56 countries for the time 1970-1994.
Cyclicality index of Kaminsky *et al.,* (2004) ($KRV2004CGEXP$)	Fiscal cyclicality index obtained from Kaminsky *et al.,* (2004). They calculate the index based on country's yearly data correlation between cyclical components of real GDP with cyclical components central government spending for 104 sample countries for 1960 to 2003.
Cyclicality index of Kaminsky *et al.,* (2004) ($KRV2004INFTAX$)	Fiscal cyclicality index obtained from Kaminsky *et al*., (2004). They calculate the index based on country's yearly data correlation between cyclical components of real GDP with cyclical components of inflation tax as a proxy for tax rate for 104 sample countries for 1960 to 2003.

TABLE A2.2 (CONTINUED): DATA USED IN THE CROSS COUNTRY AND PANEL REGRESSION

VARIABLES	DESCRIPTION AND SOURCE
Cyclicality index of Kaminsky *et al.*, (2004) (*KRV2004INDEX*)	A composite index of fiscal cyclicality based on the yearly data correlation of cyclical components of real GDP and real government expenditures, correlation between the cyclical components of real GDP and inflation tax, and the amplitude of the real government expenditure cycle. The index is developed for 104 sample countries for 1960 to 2003. Index from Kaminsky *et al.,* (2004).
Cyclicality index of Alesina and Tabellini (2005) (*AT2005SURPLUS*)	Fiscal cyclicality index obtained from Alesina and Tabellini (2005). They estimate the index by using regression-based fiscal cyclicality indicator, a statistics of county's budget surplus is regressed on cyclical component of output (using Hodrick-Prescott filter) and the estimated coefficient from time-series regression is considered as the behaviour of fiscal cyclicality for each country. The index is developed for 87 countries with a time variability across countries.
Cyclicality index of Alesina and Tabellini (2005) (*AT2005REVENUE*)	Fiscal cyclicality index obtained from Alesina and Tabellini (2005). They estimate the index by using regression-based fiscal cyclicality indicator, a statistics of county's tax revenue is regressed on cyclical component of output (using Hodrick-Prescott filter) and the estimated coefficient from time-series regression is considered as the behaviour of fiscal cyclicality for each country. The index is developed for 87 countries with a time variability across countries.

TABLE A2.3: CYCLICAL PROPERTIES OF FISCAL POLICY AND GOVERNMENT QUALITY INDEX (ADVANCED ECONOMIES)

COUNTRY GROUP (ADVANCED ECONOMIES)	Time Coverage	Govt. Quality (GQ_i) over the time period 1970-2014	Country's fiscal cyclicality indicators over the time 1970-2014, where $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$ are estimated by using time-series regression model (2.1), (2.4) and (2.7) respectively. Please Note: level of significance: ***1%, **5%, *10% for the estimated coefficient $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$			Fiscal cyclicality stance over the time 1970-2014. We estimate $\hat{\beta}_i$ and $\hat{\bar{\beta}}_i$ for two sub-time period 1970-1999 (pre-1999s, 30 years) and 2000-2014 (post-1999s, 15 years) for each country. Due to lack of data availability for the instrument $EXPDEMAND_{it}$, we estimate $\hat{\beta}_i^{IV}$ for two sub-time period 1985-1999 (pre-1999s, 15 years) and 2000-2014 (post-1999s, 15 years) for each country. We estimate the cyclicality statistics $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$ by using time-series model (2.1), (2.4) and (2.7) respectively. Please Note: PT=Procyclicality Trap means conducting procyclical fiscal policy in both sub-time period; PC=From Procyclical to Countercyclical; CP=From Countercyclical to Procyclical; C=Countercyclical in both sub-time period.		
		GQ_i	$\hat{\beta}_i$	$\hat{\bar{\beta}}_i$	$\hat{\bar{\beta}}_i^{IV}$	$\hat{\beta}_i$	$\hat{\bar{\beta}}_i$	$\hat{\bar{\beta}}_i^{IV}$
Australia	1970-2014	0.81	-0.21	-0.13	-0.65	CP	C	C
Austria	1970-2014	0.78	0.47**	-0.01	-0.34	PT	PC	C
Belgium	1970-2014	0.78	-0.41**	-0.04	-0.47*	PT	PC	C
Canada	1970-2014	0.82	-0.34**	-0.52***	-0.87*	C	C	C
Cyprus	1970-2014	0.61	-0.14*	0.50*	-0.34	CP	PT	C
Denmark	1970-2014	0.84	-0.11	-0.32**	-0.56**	C	C	PC
Finland	1970-2014	0.84	0.40*	0.11	0.15	PT	PT	PT
France	1970-2014	0.81	-0.16	-0.21**	-0.25	C	C	C
Germany	1971-2014	0.68	0.29**	0.07	-0.34	PC	PC	PC
Greece	1970-2014	0.61	0.41	0.36	1.52	CP	CP	PT
Hong Kong	1970-2014	**NA**	-0.14	-0.14	-0.26	C	C	C
Iceland	1970-2014	0.79	0.72***	0.85	0.65***	PT	PT	PT
Ireland	1970-2014	0.74	0.92***	0.39	0.05	PT	PT	PT
Israel	1970-2014	0.66	1.08**	1.20***	0.81**	PT	PC	PT
Italy	1970-2014	0.71	0.26	0.16	0.28	PC	PT	PT
Japan	1970-2014	0.80	0.17	0.17	0.23**	PC	PC	PT
Korea, Rep.	1970-2014	0.60	-0.09	-0.20	0.14	CP	CP	PT
Luxembourg	1970-2014	0.79	-0.23	-0.26	-0.26	C	C	PC
Macao	1980-2014	NA	-0.04	-0.21	NA	C	C	NA
Netherlands	1970-2014	0.82	0.55***	-0.04	-0.09	PT	PT	PT
New Zealand	1971-2014	0.82	0.37**	0.18	0.09	PT	PT	PT
Norway	1970-2014	0.80	-0.14	-0.08	-0.16	PC	PC	PC
Portugal	1970-2014	0.72	0.48**	0.70***	1.78***	PT	PT	PT
Puerto Rico	1970-2014	**NA**	0.34	0.59**	NA	PT	PT	NA
Singapore	1970-2014	0.58	-0.11	-0.07	-0.38	C	C	PC
Spain	1970-2014	0.76	0.67***	0.48*	0.63	PT	PT	PT
Sweden	1970-2014	0.86	-0.17	-0.06	0.00	CP	CP	CP
Switzerland	1980-2014	0.83	0.47**	0.11	-0.10	PC	PC	PC
United Kingdom	1970-2014	0.80	-0.08	-0.29	-0.39	CP	C	C
United States	1970-2014	0.81	-0.10	-0.14	-0.31	PT	PC	C

TABLE A2.4: CYCLICAL PROPERTIES OF FISCAL POLICY AND GOVERNMENT QUALITY INDEX (EMERGING ECONOMIES)

COUNTRY GROUP (EMERGING ECONOMIES)	Time Coverage	Govt. Quality (GQ_i) over the time period 1970-2014	Country's fiscal cyclicality indicators over the time 1970-2014, where $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$ are estimated by using time-series regression model (2.1), (2.4) and (2.7) respectively. Please Note: level of significance: ***1%, **5%, *10% for the estimated coefficient $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$			Fiscal cyclicality stance over the time 1970-2014. We estimate $\hat{\beta}_I$ and $\hat{\bar{\beta}}_I$ for two sub-time period 1970-1999 (pre-1999s, 30 years) and 2000-2014 (post-1999s, 15 years) for each country. Due to lack of data availability for the instrument $EXPDEMAND_{it}$, we estimate $\hat{\beta}_I^{IV}$ for two sub-time period 1985-1999 (pre-1999s, 15 years) and 2000-2014 (post-1999s, 15 years) for each country. We estimate the cyclicality statistics $\hat{\beta}_i$, $\hat{\bar{\beta}}_i$ and $\hat{\bar{\beta}}_i^{IV}$ by using time-series model (2.1), (2.4) and (2.7) respectively. Please Note: PT=Procyclicality Trap means conducting procyclical fiscal policy in both sub-time period; PC=From Procyclical to Countercyclical; CP=From Countercyclical to Procyclical; C=Countercyclical in both sub-time period.		
		GQ_i	$\hat{\beta}_i$	$\hat{\bar{\beta}}_i$	$\hat{\bar{\beta}}_i^{IV}$	$\hat{\beta}_i$	$\hat{\bar{\beta}}_i$	$\hat{\bar{\beta}}_i^{IV}$
Albania	1980-2014	0.43	0.67**	0.02	0.18	PT	CP	PT
Algeria	1970-2014	0.37	2.22	2.38	0.44	PC	PC	PT
Antigua And Barbuda	1977-2014	0.52	0.49**	0.41**	0.92	PT	PT	PT
Argentina	1970-2014	0.57	1.93**	1.75**	3.86**	PT	PT	PT
Bahamas	1973-2014	0.70	0.21	0.25	0.26	PC	PC	PC
Bahrain	1975-2014	0.40	0.12	0.18	0.93	PC	PC	PC
Barbados	1972-2014	0.57	0.67*	0.86***	0.58	CP	PT	PT
Belize	1973-2014	0.65	0.15	-0.05	0.91	PT	PC	CP
Botswana	1970-2014	0.55	0.62**	0.19	NA	PT	PT	NA
Brazil	1970-2014	0.47	0.69*	0.92**	1.48	PT	PT	PC
Bulgaria	1980-2014	0.49	0.40	0.26	0.46	PT	PT	PT
Chile	1970-2014	0.60	0.79**	0.73***	1.11	PC	PC	PC
China	1970-2014	0.41	0.30	0.33	0.82	PT	PT	PT
Colombia	1970-2014	0.46	1.46**	1.23**	2.98	PC	PT	PC
Costa Rica	1970-2014	0.71	0.93***	0.96***	-0.77	PC	PC	PC
Cuba	1971-2014	0.34	0.88***	0.89***	NA	PT	PT	NA
Dominican Republic	1970-2014	0.36	1.97**	2.08**	4.78***	PT	PT	PT
Ecuador	1970-2014	0.47	2.13***	2.39***	-0.21	PC	PC	PC
Egypt, Arab Rep.	1970-2014	0.30	0.53*	0.56	-0.87	PC	PC	PC
El Salvador	1970-2014	0.30	0.52***	0.35**	0.20	PC	PC	PC
Equatorial Guinea	1980-2014	0.41	0.46	0.55	0.78**	PC	PC	PC
Fiji	1970-2014	0.49	1.01*	1.19*	4.88	PT	PT	PT
Gabon	1970-2014	0.26	0.61**	0.52**	1.14	PT	PT	PT
Guatemala	1970-2014	0.29	0.90*	0.73	3.51	PC	PC	PC
Hungary	1971-2014	0.61	0.62**	0.78***	0.15	PT	PT	PT
India	1970-2014	0.53	1.01***	0.80**	0.21	PT	PT	PT
Indonesia	1970-2014	0.32	0.46	1.39***	0.48	PC	PC	PC
Iran, Islamic Rep.	1970-2014	0.38	0.33	0.71***	0.19	PT	PT	PT
Iraq	1971-2014	0.23	1.06***	0.81***	4.74	PT	PT	PT
Jamaica	1970-2014	0.52	0.29	0.84**	-0.60	PT	PT	CP
Jordan	1970-2014	0.50	0.35*	1.00***	1.65*	PT	PT	PT
Kuwait	1970-2014	0.39	-0.23	-0.04	NA	C	PC	NA
Malaysia	1970-2014	0.45	0.17	0.38	0.05	PC	PC	PC
Mauritius	1970-2014	0.57	0.78***	0.61*	1.73	PC	PC	PC
Mexico	1970-2014	0.40	0.86**	1.07***	0.05	PT	PC	C
Morocco	1970-2014	0.35	0.68	0.77	0.07	PT	PT	PT
Namibia	1980-2014	0.54	1.64**	1.01	NA	PT	PT	NA
Oman	1970-2014	0.35	1.03***	0.36	1.60	PT	PT	PT
Pakistan	1970-2014	0.36	1.48**	1.09*	3.42**	PT	PT	PT
Panama	1970-2014	0.45	0.64***	0.65***	0.64	PT	PT	PT
Paraguay	1970-2014	0.29	1.01***	1.00***	2.35*	PC	PT	PC
Peru	1970-2014	0.48	0.82***	1.28***	1.15	PC	PC	PC
Philippines	1970-2014	0.43	1.13**	1.43***	1.48	PT	PT	PT
Poland	1980-2014	0.61	0.46	0.45	-0.81	PT	PT	CP
Quater	1980-2014	0.31	0.45	0.95**	1.53**	PT	PT	PT
Romania	1981-2014	0.43	0.53*	0.23	0.66	PT	PT	PT
Saudi Arabia	1970-2014	0.37	0.18	-0.07	-0.59	C	C	PC
Seychelles	1976-2014	0.40	0.81**	0.94*	2.51	PT	PT	PT
South Africa	1970-2014	0.50	0.89***	0.68*	0.49	PT	PC	PC
Sri Lanka	1970-2014	0.54	0.60	0.55	2.33	PT	PT	PT
St. Kitts And Nevis	1977-2014	0.57	0.13	0.32	0.87	CP	CP	PT
Swaziland	1970-2014	0.34	0.33	0.50	NA	PC	PC	NA
Thailand	1970-2014	0.36	0.56	0.40	0.24	PT	PC	PC
Trinidad And Tobago	1970-2014	0.65	1.09***	0.69*	0.52	PT	PT	PT
Tunisia	1970-2014	0.42	-0.04	-0.04	0.21	PC	PC	PC
Turkey	1970-2014	0.53	0.72**	0.61**	-0.01	PT	PT	PT
Uruguay	1970-2014	0.71	0.76***	0.89***	1.01*	PT	PT	CP
Venezuela	1970-2014	0.49	1.11***	1.26	0.91	PT	PT	PT
Zimbabwe	1970-2014	0.36	0.96	2.06**	3.05	CP	CP	PT

TABLE A2.5: CYCLICAL PROPERTIES OF FISCAL POLICY AND GOVERNMENT QUALITY INDEX (LOW-INCOME DEVELOPING COUNTRIES)

COUNTRY GROUP (LOW-INCOME DEVELOPING COUNTRIES)	Time Coverage	Govt. Quality (GQ_i) over the time period 1970-2014	Country's fiscal cyclicality indicators over the time 1970-2014, where $\hat{\beta}_i$, $\hat{\tilde{\beta}}_i$ and $\hat{\tilde{\beta}}_i^{IV}$ are estimated by using time-series regression model (2.1), (2.4) and (2.7) respectively. Please Note: level of significance: ***1%, **5%, *10% for the estimated coefficient $\hat{\beta}_i$, $\hat{\tilde{\beta}}_i$ and $\hat{\tilde{\beta}}_i^{IV}$			Fiscal cyclicality stance over the time 1970-2014. We estimate $\hat{\beta}_i$ and $\hat{\tilde{\beta}}_i$ for two sub-time period 1970-1999 (pre-1999s, 30 years) and 2000-2014 (post-1999s, 15 years) for each country. Due to lack of data availability for the instrument $EXPDEMAND_{it}$, we estimate $\hat{\tilde{\beta}}_i^{IV}$ for two sub-time period 1985-1999 (pre-1999s, 15 years) and 2000-2014 (post-1999s, 15 years) for each country. We estimate the cyclicality statistics $\hat{\beta}_i$, $\hat{\tilde{\beta}}_i$ and $\hat{\tilde{\beta}}_i^{IV}$ by using time-series model (2.1), (2.4) and (2.7) respectively. Please Note: PT=Procyclicality Trap means conducting procyclical fiscal policy in both sub-time period; PC=From Procyclical to Countercyclical; CP=From Countercyclical to Procyclical; C=Countercyclical in both sub-time period.		
		GQ_i	$\hat{\beta}_i$	$\hat{\tilde{\beta}}_i$	$\hat{\tilde{\beta}}_i^{IV}$	$\hat{\beta}_i$	$\hat{\tilde{\beta}}_i$	$\hat{\tilde{\beta}}_i^{IV}$
Bangladesh	1973-2014	0.32	2.89**	3.22***	2.05	PT	PT	PT
Benin	1970-2014	0.39	1.14*	1.18***	4.88	PC	PC	PT
Bhutan	1980-2014	0.44	-0.11	-0.17	NA	CP	CP	NA
Bolivia	1970-2014	0.40	2.20***	1.99*	0.87	PT	PC	PC
Burkina Faso	1970-2014	0.40	0.71	1.26*	0.89	PT	PT	CP
Burundi	1970-2014	0.38	2.10***	0.96	2.57	PT	PT	PT
Cameroon	1970-2014	0.28	1.00*	0.85***	1.94	PT	PT	PT
Central African Rep.	1970-2014	0.23	0.65**	0.44	0.02	PT	PT	PT
Chad	1970-2014	0.21	1.10**	1.31***	1.16	PT	PT	PT
Comoros	1981-2014	0.27	0.42	0.22	4.67	C	C	C
Congo, Dem. Rep.	1970-2014	0.22	2.80***	2.20	3.31	PC	PC	PC
Congo, Rep.	1970-2014	0.22	0.52	0.02	3.69	PC	PC	PC
Cote d'Ivoire	1970-2014	0.33	1.37***	1.48***	3.45	PT	PT	PT
Dominica	1975-2014	0.60	-0.53	-0.81***	-0.71	C	C	PT
Ethiopia	1970-2014	0.31	1.17***	1.05***	3.24	PT	PT	PT
Gambia, The	1976-2014	0.41	2.67	0.65***	1.14**	PT	PT	PT
Georgia	1980-2014	0.43	0.46	1.30***	1.18**	PT	PT	PT
Ghana	1970-2014	0.40	1.66**	2.64***	4.50	PT	PT	PT
Grenada	1973-2014	0.58	0.68***	0.81***	-0.32	PT	PT	PT
Guinea	1985-2014	0.22	0.29	0.22	1.21	PC	PC	PC
Guinea-Bissau	1971-2014	0.23	0.23	0.54	3.19	PT	PT	PT
Guyana	1970-2014	0.38	1.73***	1.48**	2.82	PT	PC	PC
Honduras	1970-2014	0.31	-0.08	0.05	1.20	CP	CP	PT
Kenya	1970-2014	0.30	0.70**	1.19***	1.19	PC	PC	PC
Lesotho	1970-2014	0.40	-0.08	-0.31	NA	CP	CP	NA
Madagascar	1970-2014	0.27	1.14*	1.53***	3.02	PT	PT	PT
Malawi	1970-2014	0.42	-0.33	-0.94**	3.08	CP	CP	CP
Mali	1970-2014	0.36	0.76	0.96***	2.99	PT	PT	PT
Mauritania	1970-2014	0.25	0.44	0.65	-0.12	PT	PT	PT
Mongolia	1981-2014	0.46	1.29*	1.35***	1.61	PT	PT	PT
Mozambique	1980-2014	0.39	1.19**	0.29	-0.41	PT	PT	CP
Nepal	1975-2014	0.28	0.79	0.78	1.35	PT	PT	PT
Nicaragua	1970-2014	0.37	0.57	0.10	2.60	PT	PT	PT
Niger	1970-2014	0.37	0.73**	0.98***	0.34	PC	PC	PC
Nigeria	1970-2014	0.24	1.17**	0.33	2.36	PT	PT	PT
Rwanda	1970-2014	0.35	1.09***	1.17***	2.46	PC	PC	PT
Senegal	1970-2014	0.44	0.58	0.29	1.48	PC	PC	PT
Sierra Leone	1970-2014	0.24	0.76***	0.75***	1.11	PT	PT	PT
St. Lucia	1975-2014	0.60	0.23	0.37**	0.43	PC	PC	PT
St. Vincent Grenadines	1975-2014	0.57	0.74***	0.53***	1.14	PT	PT	PT
Sudan	1970-2014	0.28	0.12	0.64	0.20	PT	PT	PT
Tajikistan	1985-2014	0.24	0.61	0.26	0.59	CP	CP	PT
Togo	1970-2014	0.32	0.41	0.64**	0.68	PT	PT	PT
Tonga	1975-2014	0.52	0.81***	0.98***	-0.05	PC	CP	PC
Uganda	1982-2014	0.28	1.27	0.88	2.30	PT	PT	PT
Vanuatu	1980-2014	0.48	1.53***	1.74***	2.12**	PT	PT	PT
Vietnam	1985-2014	0.33	0.69	2.39***	2.01	PC	PC	PC
Zambia	1970-2014	0.47	1.20	1.25**	2.00	PT	PT	PT

TABLE A2.6: CROSS-COUNTRY REGRESSION OF FISCAL CYCLICALITY WITH THE COMPONENTS OF GOVERNMENT QUALITY (GQ), 1970-2014
(DEPENDENT VARIABLE: CYCLICALITY OF FISCAL POLICY)

	ESTIMATION METHOD: OLS														
	Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\beta}_t$					Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\widehat{\beta}}_t$					Dependent Variable: Cyclicality of Fiscal Policy $\widehat{\widehat{\beta}}_t^{IV}$				
	All Countries			Procyclicality Trap Sample		All Countries			Procyclicality Trap Sample		All Countries			Procyclicality Trap Sample	
REGRESSORS	**Col 1**	**Col 2**	**RCol 3**	**Col 4**	**RCol 5**	**Col 6**	**Col 7**	**RCol 8**	**Col 9**	**RCol 10**	**Col 11**	**Col 12**	**RCol 13**	**Col 14**	**RCol 15**
LRGDPCH	-0.159 (0.144)	-0.083 (0.140)	-0.088 (0.140)	-0.107 (0.164)	-0.072 (0.181)	-0.089 (0.153)	-0.031 (0.159)	-0.054 (0.158)	0.079 (0.144)	0.135 (0.169)	-0.483 (0.341)	-0.341 (0.357)	-0.322 (0.352)	-0.431 (0.494)	-0.535 (0.449)
GEXP	-0.016 (0.013)	-0.009 (0.013)	-0.004 (0.012)	-0.004 (0.018)	0.011 (0.016)	-0.025 (0.015)	-0.021 (0.016)	-0.014 (0.013)	-0.025 (0.018)	-0.011 (0.016)	0.003 (0.027)	0.009 (0.025)	0.020 (0.028)	0.013 (0.043)	0.057 (0.046)
POLCORR	-0.413 (0.301)	-0.242 (0.312)	-0.179 (0.312)	-0.264 (0.463)	-0.313 (0.423)	-0.518 (0.325)	-0.449 (0.338)	-0.333 (0.352)	-0.190 (0.370)	-0.100 (0.412)	-0.961 (0.691)	-0.527 (0.694)	-0.699 (0.758)	-0.415 (1.277)	-0.526 (1.162)
RELINF	-0.208 (0.462)	-0.275 (0.482)	-0.205 (0.488)	-0.267 (0.702)	-0.216 (0.642)	-0.321 (0.487)	-0.172 (0.518)	-0.175 (0.549)	-0.698 (0.568)	-0.629 (0.672)	-1.620 (1.001)	-2.505** (1.064)	-2.112 (1.045)	-1.951 (1.641)	-0.924 (1.567)
EGLDEMO	-0.396* (0.212)	-0.249 (0.234)	-0.200 (0.256)	-0.128 (0.299)	-0.142 (0.360)	-0.520** (0.229)	-0.499* (0.276)	-0.481* (0.288)	-0.253 (0.286)	-0.217 (0.359)	-0.735** (0.375)	-0.669** (0.304)	-0.618** (0.230)	-1.334 (0.841)	-1.175 (0.819)
TRADE		-0.002** (0.001)	-0.002** (0.001)	0.001 (0.002)	0.001 (0.002)		-0.002** (0.001)	-0.002** (0.001)	-0.001 (0.002)	-0.001 (0.002)		-0.002** (0.001)	-0.002 (0.002)	-0.005 (0.005)	-0.006 (0.006)
PINSTAB		1.296** (0.638)	1.229** (0.596)	1.571* (0.895)	1.790** (0.756)		0.221 (0.657)	0.153 (0.670)	0.492 (0.662)	0.808 (0.712)		1.772 (1.229)	1.797 (1.110)	0.442 (1.678)	0.389 (1.555)
STATISTICS															
ADJUSTED R^2	14.72%	18.61%	15.53%	5.55%	6.12%	18.53%	18.68%	14.88%	5.46%	6.86%	23.14%	23.76%	23.22%	7.93%	11.23%
OBSERVATIONS	**134**	**126**	**126**	**71**	**71**	**134**	**126**	**126**	**65**	**65**	**127**	**119**	**119**	**67**	**67**

Level of significance: ***1%, **5%, *10%.
All data regression include intercept term.
Col estimation is based on white heteroscedasticity-consistent standard errors & covariance.
RCol estimation is based on weighted and reweighted OLS regression to control for outliers.
Procyclicality trap are the sample countries conducting procyclical fiscal policy in both sub-period 1970-1999 and 2000-2014.
See data appendix for variable definitions and sources.

Correlation Matrix of Government Quality Components – Political Corruption (POLCORR) Transparency (RELINF) and Egalitarian Democracy (EGLDEMO)

	POLCORR	RELINF	EGLDEMO	Observations
POLCORR	1			134
RELINF	0.43	1		134
EGLDEMO	0.63	0.38	1	134

TABLE A2.7: DESCRIPTIVE STATISTICS

VARIABLES	Number of Observation	Mean	Standard Deviation	Minimum	Maximum
$\widehat{\beta}_i$	137	0.68	0.64	-0.53	2.89
$\widehat{\beta}_i$	137	0.66	0.70	-0.94	3.22
$\widehat{\beta}_i^{IV}$	128	1.11	1.42	-0.87	4.88
$FVV2013$	85	0.22	0.33	-0.56	0.80
$TV2005$	54	0.41	0.30	-0.28	0.85
$KRV2004CGEXP$	88	0.22	0.35	-0.80	0.87
$KRV2004INFTAX$	92	-0.08	0.27	-0.74	0.74
$KRV2004INDEX$	88	0.16	0.24	-0.51	0.63
$AT2005SURPLUS$	83	0.03	0.28	-0.80	0.84
$AT2005REVENUE$	76	0.04	0.19	-0.58	0.63
GQ	134	0.48	0.18	0.21	0.86
$POLCORR$	134	0.52	0.25	0.12	0.99
$RELINF$	134	0.49	0.13	0.21	0.74
$EGLDEMO$	134	0.42	0.27	0.09	1
$LRGDPCH$	137	3.60	0.46	2.53	4.99
$GEXP$	137	15.81	4.99	4.97	32.03
$TRADE$	135	80.00	47.59	20.12	342.61
$PINSTAB$	128	0.10	0.10	0.00	0.42
$POLCON$	126	0.25	0.15	0.00	0.67
$CABSIZE$	122	20.72	5.69	7.55	40.00
$CHEKBALC$	122	2.64	1.12	1.00	5.89
CCR	99	49.72	23.25	11.42	100
$FINOPEN$	122	0.44	0 .28	0.10	1.00
$FINDEPTH$	135	0.49	0.37	0.04	2.37
$EUSETMENT$	102	25.23	37.61	0.00	100
$ENGLAW$	137	0.29	0 .46	0.00	1.00
$BRITCOL$	137	0.32	0.47	0.00	1.00
$\Delta log G_{it}^{CYC}$	5859	3.49e-14	0.054	-0.787	0.419
OUT_GAP	5859	3.83e-14	0.024	-0.270	0.206
$OUT\_GAP * LRGDPCH$	5859	1.37e-13	0.088	-1.348	0.773
$OUT\_GAP * GEXP$	5675	-0.005	0.474	-20.601	3.122
$OUT\_GAP * GQ$	4893	0.0001	0.009	-0.076	0.055
$OUT\_GAP * GQ^{1970(INITIAL}$)	4893	0.0001	0.008	-0.106	0.060
$OUT\_GAP * \Delta GQ$	4780	0.00004	0.002	-0.021	0.032
$OUT\_GAP * TRADE$	5600	0.031	2.855	-70.370	60.823
$OUT\_GAP * PINSTAB$	3980	-0.0003	0.008	-0.204	0.155
$OUT\_GAP * POLCON$	5355	3.14e-06	0.006	-0.113	0.067
$OUT\_GAP * CABSIZE$	3953	-0.008	0.594	-6.541	6.268
$OUT\_GAP * CHECKBAL$	4567	0.0003	0.056	-0.647	0.403
$OUT\_GAP * CCR$	1759	0.076	0.809	-5.449	5.042
$OUT\_GAP * FINOPEN$	5352	0.0001	0.010	-0.270	0.118
$OUT\_GAP * FINDEPTH$	5358	-.0001	0.013	-0.516	0.112

Appendix: Chapter 3

TABLE A3.1: DATA USED TO MEASURE CYCLICAL PROPERTIES OF MONETARY POLICY AND FEAR OF FREE FLOATING

VARIABLES	DESCRIPTION AND SOURCE
Interest rate cycle (i^{Cycle})	i^{Cycle} is the cyclical component of the central bank's nominal short term-policy rate derived from deviation of its Hodrick-Prescott Trend. We use discount window interest rate depending on data availability as a proxy for monetary policy instruments. For countries whenever the discount rate is not available, we use money market rate, lending rate or treasury bill rate. The rates are in percentage terms. We exclude observations of very large nominal interest rates during hyperinflation episodes above the 99th percentile to remove outliers. We start our analysis just after the hyperinflation period (i.e. inflation rate below 99th percentile) for the sample countries, which has experienced hyperinflation. Annual and quarterly data are covered over the time horizon 1960-2014. Data are obtained from Vegh and Vuletin (2012) and IMF International Financial Statistics (IFS, 2015), code 60ZF (Discount Rate), 60B-ZF (Money Market Rate) and 60P-ZF (Lending Rate). Access through UK data services.
Output gap (Y^{Cycle})	y^{Cycle} is the cyclical components of real GDP derived from logarithm deviation of its Hodrick-Prescott Trend. Real GDP converted from its nominal values, where possible, using GDP deflator and otherwise by using Consumer Price Index (CPI). Annual and quarterly data are covered over the time horizon 1960-2014. Seasonally adjusted data are used for quarterly frequency. For countries, whenever the seasonally adjusted data is not available, we use X12 multiplicative method to remove the seasonal components. For countries, whenever the nominal GDP data is not available in quarterly frequency for long horizon time period, we use real GDP volume index. Data are obtained from World Development Indicator (WDI, 2015) and IMF International Financial Statistics (IFS, 2015), code 99BVR (seasonally adjusted) or 99BVP (not seasonally adjusted) depending on the data availability. Access through UK data services. Access through UK data services.
Inflation cycle (π^{Cycle})	π^{Cycle} is the cyclical components of inflation derived from deviation of its Hodrick-Prescott Trend. Inflation is calculated using consumer price index (CPI) percentage change over corresponding period of previous year. For countries whenever the CPI is not available, we used GDP Deflator to calculate inflation. The rates are in percentage terms. We exclude observations of very large inflation during hyperinflation episodes above the 99th percentile to remove outliers. We start our analysis just after the hyperinflation period (i.e. inflation rate below 99th percentile) for the sample countries, which has experienced hyperinflation. Annual and quarterly data are covered over the time horizon 1960-2014. We use non-seasonally adjusted data for quarterly frequency, where we use X12 multiplicative method to remove the seasonal components. Data are obtained from World Development Indicator (WDI, 2015) and IMF International Financial Statistics (IFS, 2015), code 64-XZF (not seasonally adjusted). Access through UK data services.
Exchange Rate Cycle (EXE^{Cycle} Or Δe_{it}^{cycle})	EXE^{Cycle} is the cyclical component of the rate of change of the nominal exchange rates derived from deviation of its Hodrick-Prescott (HP) Trend. The rate of change of currency deprecation or appreciation is calculated by taking percentage change over corresponding period of previous year. To be precise, a positive value of EXE^{Cycle} is the currency depreciation and a negative value of EXE^{Cycle} is the currency appreciation. We use nominal exchange rate of domestic currency against US dollar. For European countries, we use the nominal effective exchange rate. We restrict our sample to include countries with floating or dirty floating exchange rate regimes (classified as pre announced horizontal band that is narrower than or equal to +/-2%, de facto peg, pre announced crawling peg, pre announced crawling band that is narrower than or equal to +/-2%, de factor crawling peg, de facto crawling band that is narrower than or equal to +/-2%, pre announced crawling band that is wider than or equal to +/-2%, de facto crawling band that is narrower than or equal to +/-5%, moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time), managed floating, freely floating, freely falling) with at least 15 consecutive observations. We do not incorporate countries or the time period with exchange rate that follow no separate legal tender and pre announced peg or currency board arrangement. We follow Ilzetzki *et al.* (2011) for exchange rate fine classification. Annual and quarterly data are covered over the time horizon 1960-2014. Data are obtained from World Development Indicator (WDI, 2015) and IMF International Financial Statistics (IFS, 2015), code AH (nominal exchange rate against the US Dollar) and NEC or NEU (nominal effective exchange rate). Access through UK data services.
Derivation of Cyclical Components	The cyclical component is defined as the difference between the variables (i, y, π and EXE) and their trend, where the trend is computed by using Hodrick-Prescott (HP) filter. We use HP filter with a frequency $\lambda = 100$ for annual data and $\lambda = 1600$ for quarterly data. These values are referred to as the "*de facto* industry standards" (Giorno *et al.*, 1995).

TABLE A3.2: DATA USED IN THE CROSS COUNTRY AND PANEL REGRESSION

VARIABLES	DESCRIPTION AND SOURCE
Fear of free floating (FOF)	Fear of free floating is the correlation between the cyclical components of the short-term nominal interest rate cycle (i^{Cycle}) and the rate of exchange rate cycle (EXE^{Cycle}) for the period 1960-2014. Cyclical components of short-term nominal interest rate (i^{Cycle}) and exchange rate cycle (EXE^{Cycle}) are measured by using HP filter. For annual data we denote them as FOF and quarterly data we denote them as FOF^{Q}. The cyclical component is defined as the difference between the variables (i^{Cycle} and EXE^{Cycle}) and their trend, where the trend is computed by using Hodrick-Prescott (HP) filter. We use seasonally adjusted data while we compute FOF^{Q}. We use HP filter with a frequency $\lambda = 100$ for annual data and $\lambda = 1600$ for quarterly data. Data are obtained from World Development Indicator (WDI, 2015) and IMF International Financial Statistics (IFS, 2015). Access through UK data services.
Cyclicality of fiscal policy ($FISCYC$)	For panel regression analysis $FISCYC$ indicator is constructed by using 10 years rolling backward correlation between the cyclical components of real government consumption and the real GDP. A positive (negative) value of $FISCYC$ specifies that government take procyclical (countercyclical) fiscal policy. The cyclical components are calculated by using Hodrick-Prescott filter. For cross country regression analysis, we estimate the fiscal cyclicality by using the equation $\Delta log G_{it}^{CYC} = \bar{\alpha}_i + \bar{\beta}_i\, OUT\_GAP_{it} + \mu_{it}$, where $\Delta log G_{it}^{CYC}$ is the deviation of the log of real government consumption from its Hodrick-Prescott trend and output gap (OUT_GAP_{it}) defined as the log deviation of real GDP from its Hodrick-Prescott trend. Estimated coefficient $\hat{\bar{\beta}}_i$ positive (negative) value specifies that government take procyclical (countercyclical) fiscal policy. Data are obtained from World Development Indicator (WDI, 2015) and IMF International Financial Statistics (IFS, 2015). Access through UK data services.
Institutional quality (IQ)	Institutional quality is a composite index of political corruption ($POLCORR$), release of information by government ($RELINF$), where these variables' annual data are equally weighted by taking averaged for each country for each year over the time horizon 1960-2014. The institutional quality is a normalized index, ranges between 0 (lowest institutional quality) to 1 (highest institutional quality). For cross country regression, institutional quality index are averaged over 1960-2014. ***POLCORR***: Political corruption index is constructed by taking the average of (a) public sector corruption; (b) executive corruption; (c) legislative corruption; and (d) judicial corruption. In other words, these four different government spheres are weighted equally by taking average for each country for each year over the time horizon 1960-2014 to construct the index. The index ranges from 0 (greater political corruption) to 1 (lowest political corruption). Data are obtained from Coppedge *et al.* (2015). ***RELINF***: Release of information by government as a measure of government transparency more specifically economic (both monetary and fiscal policy) and social data released by the government. It is a normalized annual data index ranges from 0 (lowest release of information) to 1 (highest release of information). Data are obtained from Williams (2015).
Central bank independence (CBI)	Central bank independence is the set of restrictions to the government's influence on the central bank management of monetary policy. We use the weighted index of CBI, ranging from 0 (lowest CBI) to 1 (highest CBI). For cross country regression, data are averaged over 1960-2014. We collect the data from Garriga (2016).
Monetary freedom (MF)	Monetary freedom combines a measure of price stability with an assessment of price controls. Both inflation and price controls distort market activity. Price stability without sector-specific government intervention is the ideal state for the free market. Monetary freedom score ranges from 0 (lowest monetary freedom) to 100 (highest monetary freedom). For cross country regression, data are averaged over 1960-2014. Data are obtained from Index of Economic Freedom (2016). Access through Heritage.org (2016)
Inflation targeting (IT)	The adoption date of inflation targeting from Hammond (2012) and Ebeke and Azangue (2015). Inflation targeting is a dummy variable takes a value of one for the sample countries, who adopt inflation targeting regimes, and zero otherwise.
Financial openness ($FINOPEN$)	Measured with the Chinn-Ito financial openness index. The index measures a country's degree of capital account openness. The index ranges from 0 (lowest financial openness) to 1 (highest financial openness). Data are obtained from Chinn and Ito (2006). We use updated data which covers from 1970-2014. For cross country regression, data are averaged over 1970-2014. Access through Web.pdx.edu.

TABLE A3.2 (CONTINUED): DATA USED IN THE CROSS COUNTRY AND PANEL REGRESSION

VARIABLES	DESCRIPTION AND SOURCE
Financial depth ($FINDEPTH$)	Measures country's liquid liabilities over the GDP in percentage terms. For cross country regression, data are averaged over 1960-2014. Data are obtained from International Financial Statistics (IFS, 2015) and International Monetary Fund (IMF, 2015). Access through UK data services.
Number of external debt crisis ($NEED$)	Number of episodes of sovereign external default from 1800 to 1960 for the sample country. External debt crisis as any failure to meet contractual repayment obligations on foreign debts, including both rescheduling or repayments and outright default. Please note that if the sample country is not independent, then we use their colonial regime data. Data are obtained from Reinhart and Rogoff (2011).
Number of IMF programme (IMF)	Number of episodes of IMF programme to help a member country to improve an economy to recover from its crisis (i.e. financial support) from 1945 to 1960. Please note that if the sample country is not independent, then we use their colonial regime data. Data obtained from Reinhart and Rogoff (2011).
Number of currency crisis (CC)	Number of episodes of currency crisis from 1800 to 1960. Please note that if the sample country is not independent, then we use their colonial regime data. The crisis episodes are obtained from Reinhart and Rogoff (2011).
Number of other crisis (OC)	Combined number of episodes of other crisis (i.e. inflation crisis, stock market crashes, domestic debt crisis, external debt crisis and banking crisis) from 1800 to 1960. Please note that if the sample country is not independent, then we use their colonial regime data. The crisis episodes are obtained from Reinhart and Rogoff (2011).

TABLE A3.3: MONETARY POLICY CYCLICALITY, FEAR OF FLOATING, POLICY RATE, HYPERINFLATION EPISODE, INFLATION TARGETING AND EXCHANGE RATE REGIME (ADVANCED ECONOMIES)

COUNTRY GROUP (29 ADVANCED ECONOMIES)	Time Coverage			Cyclicality Statistics[1] 1960-2014		Cyclicality Over The Time[2] 1960-1999 VS 2000-2014			FOF[3] 1960-2014				
	Start	End	Number of Years	$corr\ (i^{Cycle}, Y^{Cycle})$ 1960-2014	$\hat{\beta}^{Y}$ 1960-2014	$corr\ (i^{Cycle}, Y^{Cycle})$ 1960-1999	$corr\ (i^{Cycle}, Y^{Cycle})$ 2000-2014	Cyclicality Trap	FOF $corr\ (i^{Cycle}, EXE^{Cycle})$ 1960-2014	Policy Rate	Hyperinflation Episode Above 100%	Inflation Targeting (IT) Year	Exchange Rate Regime (1960-2014) [Reported only for the time and country, when they follow pre announced peg or currency board arrangement or No separate legal tender 1960-2014]
Australia	1975	2014	39	0.63	1.06**	0.66	0.27	C	-0.07	Discount Rate	NA	June 1993	1960-1974
Austria	1972	1998	26	0.55	1.10***	0.55	NA	NA	-0.01	Discount Rate	1921-1922	NA	1960-1971
Belgium	1980	2014	34	0.55	0.45***	0.46	0.79	C	0.05	T-Bill Rate	NA	NA	NA
Canada	1972	2014	42	0.58	0.97***	0.58	0.63	C	-0.27	Discount Rate	NA	February 1991	1960-1971
Cyprus	1970	2007	37	0.05	0.00	0.03	0.30	C	0.01	Discount Rate	NA	NA	1960-1973
Czech Rep	1993	2014	21	0.30	-0.03	0.12	0.49	C	0.18	Lending Rate	NA	NA	NA
Denmark	1972	2011	39	0.05	0.60**	-0.26	0.88	PC	0.16	Discount Rate	NA	NA	1960-1971
Finland	1978	2014	36	0.29	0.09	0.14	0.86	C	0.25	Money Market Rate	NA	NA	1968-1972
France	1970	2014	44	0.41	0.61**	0.35	0.82	C	0.37	T-Bill Rate	NA	NA	NA
Germany	1971	2012	41	0.59	0.50**	0.57	0.88	C	0.06	Money Market Rate	1923-1924	NA	1960-1970
Greece	1974	2014	40	0.16	0.15	-0.02	0.44	PC	0.09	T-Bill Rate	1941-1944	NA	1960-1965
Ireland	1971	2014	43	0.19	0.10	0.06	0.70	C	0.03	Money Market Rate	NA	NA	1960-1975
Israel	1986	2014	28	0.38	1.32**	0.60	0.03	C	-0.17	Discount Rate	1982-1985	June 1997	1962-1970
Italy	1973	2012	39	0.48	0.79**	0.44	0.72	C	0.25	Discount Rate	1944	NA	1960-1972
Japan	1960	2014	54	0.16	0.22	0.16	0.63	C	0.36	Lending Rate	1945	NA	NA
Korea, rep.	1980	2014	34	0.46	0.54***	0.46	0.47	C	0.01	Discount Rate	NA	April 1998	1974-1979
Macao	1989	2014	25	-0.07	-0.04	-0.57	0.30	PC	0.40	Lending Rate	NA	NA	NA
Malta	1975	2014	39	0.23	0.05	0.16	0.55	C	0.17	Lending Rate	NA	NA	1960-1972
Netherlands	1978	2012	34	0.49	0.79***	0.47	0.74	C	0.01	Lending Rate	NA	NA	1960-1970
New Zealand	1974	2014	40	0.65	1.28***	0.64	0.78	C	-0.26	Discount Rate	NA	December 1989	1960-1973
Norway	1961	2014	53	0.38	0.68**	0.31	0.61	C	-0.26	Discount Rate	NA	March 2001	NA
Portugal	1973	1999	26	0.04	0.15	0.04	NA	NA	0.45	Discount Rate	NA	NA	1960-1972
Singapore	1972	2014	42	0.48	0.27**	0.49	0.57	C	-0.08	Money Market Rate	NA	NA	1960-1971
Slovenia	1995	2014	19	0.36	0.24	NA	NA	NA	0.10	Money Market Rate	NA	NA	NA
Spain	1974	2014	40	0.37	0.55*	0.35	0.65	C	0.35	Money Market Rate	NA	NA	1960-1972
Sweden	1973	2014	41	0.30	0.26***	0.17	0.65	C	-0.14	T-Bill Rate	NA	1995	1960-1972
Switzerland	1980	2014	34	0.64	0.65	0.63	0.67	C	0.32	Discount Rate	NA	NA	1960-1972
UK	1973	2014	41	0.59	0.92***	0.56	0.78	C	-0.25	Discount Rate	NA	October 1992	1960-1972
USA	1973	2014	41	0.46	0.83***	0.36	0.69	C	-0.03	Discount Rate	NA	NA	1960-1972

[1] The cyclicality statistics of $\boldsymbol{corr}\ (\boldsymbol{i^{Cycle}}, \boldsymbol{Y^{Cycle}})$ is the correlation between the cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and the real GDP ($\boldsymbol{Y^{Cycle}}$) for the time 1960-2014, where cyclical components of $\boldsymbol{i^{Cycle}}$ and $\boldsymbol{Y^{Cycle}}$ are measured by using HP filter. The $\hat{\boldsymbol{\beta}}^{\boldsymbol{Y}}$ is the estimated coefficient shows the relation between cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and the real GDP ($\boldsymbol{Y^{Cycle}}$). The $\hat{\boldsymbol{\beta}}^{\boldsymbol{Y}}$ is the estimated coefficient using Tylor Rule for the time 1960-2014, where level of significance is indicated by ***1%, **5%, *10% . A positive (negative) value of $\boldsymbol{corr}\ (\boldsymbol{i^{Cycle}}, \boldsymbol{Y^{Cycle}})$ and $\hat{\boldsymbol{\beta}}^{\boldsymbol{Y}}$ indicates countercyclical (procyclical) monetary policy.

[2] Monetary policy cyclicality stance over the time 1960-2014. We divide the time 1960-2014 into two sub-time periods: 1960-1999 and 2000-2014. We compute the two sub-time period cyclicality stance by utilizing a simple correlation between the cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and the real GDP ($\boldsymbol{Y^{Cycle}}$) for the time 1960-1999 and 2000-2014. Please note PT=Procyclicality Trap means conducting procyclical monetary policy in both sub-time period; PC=From Procyclical (1960-1999) to Countercyclical (2000-2014); CP=From Countercyclical (1960-1999) to Procyclical (2000-2014); C=Countercyclical in both sub-time period.

[3] Fear of free floating ($\boldsymbol{FOF}$) is the correlation between the cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and nominal exchange rate ($\boldsymbol{EXE^{Cycle}}$) for the time 1960-2014, where cyclical components of $\boldsymbol{i^{Cycle}}$ and $\boldsymbol{EXE^{Cycle}}$ are measured by using HP filter. A positive value of $\boldsymbol{FOF}$ indicates the evidence of $\boldsymbol{FOF}$ and $\boldsymbol{FOF \leq 0}$ indicates no evidence of $\boldsymbol{FOF}$.

TABLE A3.4: MONETARY POLICY CYCLICALITY, FEAR OF FLOATING, POLICY RATE, HYPERINFLATION EPISODE, INFLATION TARGETING AND EXCHANGE RATE REGIME (EMERGING MARKET)

COUNTRY GROUP (46 EMERGING MARKET)	Time Coverage			Cyclicality Statistics[1] 1960-2014		Cyclicality Over The Time[2] 1960-1999 VS 2000-2014			FOF[3] 1960-2014				
	Start	End	Number of Years	$corr\ (i^{Cycle}, y^{Cycle})$ 1960-2014	$\hat{\beta}^{Y}$ 1960-2014	$corr\ (i^{Cycle}, y^{Cycle})$ 1960-1999	$corr\ (i^{Cycle}, y^{Cycle})$ 2000-2014	Cyclicality Trap	FOF $corr\ (i^{Cycle}, EXE^{Cycle})$ 1960-2014	Policy Rate	Hyperinflation Episode Above 100%	Inflation Targeting (IT) Year	Exchange Rate Regime (1960-2014) [Reported only for the time and country, when they follow pre announced peg or currency board arrangement or No separate legal tender 1960-2014]
Albania	1993	2014	21	-0.58	-0.74*	-0.77	0.11	PC	0.67	Discount Rate	NA	NA	NA
Algeria	1980	2014	34	-0.53	-0.83*	-0.53	-0.51	PT	0.24	T-Bill Rate	NA	NA	1960-1963
Argentina	1992	2014	22	-0.54	-0.81	-0.74	-0.52	PT	0.85	Money Market Rate	1984-1985 1989-1990	NA	1964-1970 1991-2001
Azerbaijan	1996	2014	18	0.36	0.04	0.80	0.34	C	-0.36	Discount Rate	1992-1995	NA	NA
Botswana	1980	2014	34	-0.10	-0.59	-0.07	-0.34	PT	0.33	Lending Rate	NA	NA	1960-1979
Brazil	1995	2014	19	0.19	0.79	0.41	-0.02	CP	0.23	Money Market Rate	1981-1994	June 1999	NA
Chile	1977	2014	37	-0.31	-0.12	-0.35	0.64	PC	0.48	Discount Rate	1973-1977	September 1999	1960-1961 1980-1981
China	1980	2014	34	0.36	0.10	0.27	0.60	C	0.00	Lending Rate	1946-1948	NA	NA
Colombia	1961	2014	53	0.62	2.14*	0.53	0.91	C	-0.12	Discount Rate	NA	October 1999	NA
Costa Rica	1982	2014	32	-0.28	-1.09*	-0.02	-0.75	PT	0.49	Lending Rate	NA	NA	1970-1971 1974-1980
Croatia	1995	2014	19	0.03	0.11	-0.24	0.15	PC	-0.15	Lending Rate	1993-1994	NA	NA
Dominican rep.	1991	2014	23	-0.71	-1.15**	-0.48	-0.79	PT	0.59	Lending Rate	NA	NA	NA
Egypt	1976	2014	38	-0.28	-0.22	-0.19	-0.71	PT	0.38	Lending Rate	NA	NA	NA
Equatorial guinea	1986	2007	21	0.51	0.04*	0.55	0.42	C	-0.06	Lending Rate	NA	NA	1960-1979
Fiji	1977	2014	37	-0.04	-0.03	-0.19	0.18	PC	0.12	Discount Rate		NA	NA
Guatemala	1986	2014	28	-0.20	-0.99	-0.63	0.26	PC	0.14	Lending Rate	NA	2005	1960-1984
Hungary	1988	2014	26	-0.23	-0.01	-0.22	-0.16	PT	0.17	T-Bill Rate	1945-1946	June 2001	NA
India	1978	2014	36	-0.17	-0.07	-0.35	0.04	PC	0.39	Lending Rate	NA	NA	1960-1975
Indonesia	1974	2014	40	-0.17	0.27	-0.30	0.73	PC	0.86	Money Market Rate	1966	July 2005	NA
Jamaica	1978	2014	36	0.29	0.17	0.35	-0.07	CP	0.12	T-Bill Rate	NA	NA	1960-1977
Jordan	1989	2014	25	-0.03	-0.01	-0.28	0.18	PC	0.14	Lending Rate	NA	NA	1960-1988
Kuwait	1979	2014	35	-0.12	0.00	-0.41	0.57	PC	0.13	Lending Rate	NA	NA	1960
Latvia	1995	2014	19	0.12	-0.51*	0.32	0.11	C	-0.14	Lending Rate	NA	NA	NA
Libya	1990	2014	24	-0.43	-0.01*	-0.65	-0.45	PT	0.38	Lending Rate	NA	NA	1960-1971
Lithuania	1995	2014	19	0.32	0.05	0.00	0.81	PC	-0.14	Money Market Rate	NA	NA	1995-2003 2007-2008
Malaysia	1976	2014	38	0.60	0.35***	0.58	0.65	C	0.15	Discount Rate	NA	NA	1960-1975
Mauritius	1978	2014	36	-0.14	-0.07	-0.17	-0.18	PT	0.11	Discount Rate	NA	NA	1960-1968
Mexico	1989	2014	25	-0.50	-0.42	-0.84	0.33	PC	0.82	Discount Rate	1987-1988	2001	1960-1977
Morocco	1973	2014	41	0.04	0.08	0.00	0.51	PC	0.16	Discount Rate	NA	NA	1960-1972
Pakistan	1982	2014	32	0.25	0.16	-0.24	0.41	PC	0.53	Money Market Rate	NA	NA	1971-1981
Paraguay	1990	2014	24	-0.20	-0.62	-0.14	-0.21	PT	0.25	Lending Rate	NA	NA	NA
Peru	1994	2014	20	-0.24	-0.25**	0.32	0.63	C	0.61	Discount Rate	1988-1991	January 2002	1960-1967
Philippines	1961	2014	53	-0.10	-0.10	-0.16	0.32	PC	0.40	Discount Rate	NA	January 2002	1966-1969
Poland	1991	2014	23	0.50	1.14***	0.50	0.61	C	-0.38	Money Market Rate	1919-1923 & 1990	1998	NA
Romania	1998	2014	16	-0.37	-0.84***	NA	-0.37	NA	0.88	Lending Rate	1997	August 2005	NA
Russia	1996	2014	18	-0.09	-0.40	-0.18	0.20	PC	0.07	Lending Rate	1918-1924 & 1993	NA	NA
Seychelles	1980	2014	34	-0.15	-0.20	-0.41	-0.08	PT	0.61	T-Bill Rate	NA	NA	NA
South Africa	1973	2014	41	0.48	1.25***	0.46	0.60	C	0.45	Discount Rate	NA	February 2000	1960-1971
Sri Lanka	1968	2014	46	0.52	0.81***	0.30	0.89	C	0.05	Discount Rate	NA	NA	1960-1967
Swaziland	1979	2011	32	-0.28	-0.33	-0.38	0.52	PC	0.56	Lending Rate	NA	NA	1960-1974 1974-1978
Thailand	1978	2014	36	0.34	0.09	0.26	0.60	C	0.56	Lending Rate	NA	May 2000	1964-1977
Trinidad	1965	2014	49	0.13	0.18	-0.15	0.46	PC	0.01	T-Bill Rate	NA	NA	NA
Tunisia	1981	2014	33	0.28	0.22	0.36	0.17	C	-0.33	Money Market Rate	NA	NA	1960-1973
Turkey	1961	2010	49	-0.31	-0.31	-0.24	-0.50	PT	0.26	Discount Rate	NA	January 2006	NA
Uruguay	1976	2014	38	-0.42	-1.66**	-0.41	-0.46	PT	0.65	Lending Rate	NA	NA	1968-1970
Venezuela	1984	2014	30	-0.02	-0.07	0.04	-0.16	CP	0.10	Lending Rate	NA	NA	1960-1983

[1] The cyclicality statistics of $\boldsymbol{Corr}\ (\boldsymbol{i^{Cycle}}, \boldsymbol{Y^{Cycle}})$ is the correlation between the cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and the real GDP ($\boldsymbol{Y^{Cycle}}$) for the time 1960-2014, where cyclical components of $\boldsymbol{i^{Cycle}}$ and $\boldsymbol{Y^{Cycle}}$ are measured by using HP filter. The $\hat{\boldsymbol{\beta}}^{\boldsymbol{Y}}$ is the estimated coefficient shows the relation between cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and the real GDP ($\boldsymbol{Y^{Cycle}}$). The $\hat{\boldsymbol{\beta}}^{\boldsymbol{Y}}$ is the estimated coefficient using Tylor Rule for the time 1960-2014, where level of significance is indicated by ***1%, **5%, *10% . A positive (negative) value of $\boldsymbol{Corr}\ (\boldsymbol{i^{Cycle}}, \boldsymbol{Y^{Cycle}})$ and $\hat{\boldsymbol{\beta}}^{\boldsymbol{Y}}$ indicates countercyclical (procyclical) monetary policy.

[2] Monetary policy cyclicality stance over the time 1960-2014. We divide the time 1960-2014 into two sub-time periods: 1960-1999 and 2000-2014. We compute the two sub-time period cyclicality stance by utilizing a simple correlation between the cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and the real GDP ($\boldsymbol{Y^{Cycle}}$) for the time 1960-1999 and 2000-2014. Please note PT=Procyclicality Trap means conducting procyclical monetary policy in both sub-time period; PC=From Procyclical (1960-1999) to Countercyclical (2000-2014); CP=From Countercyclical (1960-1999) to Procyclical (2000-2014); C=Countercyclical in both sub-time period.

[3] Fear of free floating ($\boldsymbol{FOF}$) is the correlation between the cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and nominal exchange rate ($\boldsymbol{EXE^{Cycle}}$) for the time 1960-2014, where cyclical components of $\boldsymbol{i^{Cycle}}$ and $\boldsymbol{EXE^{Cycle}}$ are measured by using HP filter. A positive value of $\boldsymbol{FOF}$ indicates the evidence of $\boldsymbol{FOF}$ and $\boldsymbol{FOF} \leq \boldsymbol{0}$ indicates no evidence of $\boldsymbol{FOF}$.

TABLE A3.5: MONETARY POLICY CYCLICALITY, FEAR OF FLOATING, POLICY RATE, HYPERINFLATION EPISODE, INFLATION TARGETING AND EXCHANGE RATE REGIME (DEVELOPING ECONOMIES)

COUNTRY GROUP (25 LOW INCOME DEVELOPING ECONOMIES)	Time Coverage			Cyclicality Statistics[1] 1960-2014		Cyclicality Over The Time[2] 1960-1999 VS 2000-2014			FOF[3] 1960-2014				
	Start	End	Number of Years	$corr\,(i^{Cycle}, Y^{Cycle})$ 1960-2014	$\hat{\beta}^{Y}$ 1960-2014	$corr\,(i^{Cycle}, Y^{Cycle})$ 1960-1999	$corr\,(i^{Cycle}, Y^{Cycle})$ 2000-2014	Cyclicality Trap	FOF $corr\,(i^{Cycle}, EXE^{Cycle})$ 1960-2014	Policy Rate	Hyperinflation Episode Above 100%	Inflation Targeting (IT) Year	Exchange Rate Regime (1960-2014) [Reported only for the time and country, when they follow pre announced peg or currency board arrangement or No separate legal tender 1960-2014]
Armenia	1996	2014	18	0.24	-0.03	0.03	0.98	C	0.14	Lending Rate	NA	NA	NA
Bangladesh	1972	2014	42	0.05	0.11	0.28	0.00	C	0.60	Discount Rate	NA	NA	NA
Bolivia	1987	2014	27	0.46	1.25	0.25	0.26	C	0.72	Lending Rate	1980-1986	NA	NA
Burundi	1983	2014	31	-0.30	-0.29	-0.16	-0.32	PT	-0.43	Lending Rate	NA	NA	1970-1982
Ethiopia	1990	2008	18	-0.36	-0.34*	0.49	-0.45	PT	-0.01	T-Bill Rate	NA	NA	1978-1989
Gambia, the	1978	2014	36	0.26	0.06	0.30	0.25	C	0.58	Discount Rate	NA	NA	1960-1980
Ghana	1984	2014	30	0.02	0.51	0.10	-0.16	PC	0.05	Discount Rate	1983	May 2007	1960-1971
Guyana	1982	2014	32	-0.60	-0.64***	0.63	-0.66	PC	0.17	Discount Rate	NA	NA	1960-1965 1966-1981
Honduras	1985	2014	29	-0.24	-0.34	-0.17	-0.19	PT	-0.45	Lending Rate	NA	NA	1960-1984
Kyrgyz republic	1996	2014	18	0.09	0.04	0.41	-0.32	PC	0.27	T-Bill Rate	NA	NA	NA
Liberia	1988	2014	26	0.30	0.04	0.03	0.34	C	0.28	Lending Rate	NA	NA	1960-1987
Madagascar	1989	2014	25	0.10	0.42	0.00	-0.42	PC	0.35	Lending Rate	NA	NA	1960-1971 1974-1981
Malawi	1980	2014	34	-0.12	-0.36	0.19	0.04	CP	-0.29	Lending Rate	NA	NA	1960-1973
Mauritania	1980	2012	32	0.43	0.37*	0.28	0.15	C	0.78	Lending Rate	NA	NA	1960-1971
Myanmar	1976	2009	33	0.19	0.08	-0.01	0.27	CP	-0.13	Lending Rate	NA	NA	1960-1974
Nepal	1976	2014	38	-0.07	0.04	0.31	-0.10	PC	0.09	Discount Rate	NA	NA	1960-1977
Nicaragua	1992	2014	22	-0.09	-0.29	-0.01	-0.21	PT	-0.03	Lending Rate	1985-1990	NA	1963-1978
Nigeria	1972	2014	42	-0.10	-0.04	0.18	0.07	CP	-0.48	Lending Rate	NA	NA	1960-1971
Papua guinea	1980	2014	34	-0.44	-0.32*	0.34	-0.58	PC	0.17	Lending Rate	NA	NA	NA
Rwanda	1966	2010	44	-0.02	0.02	0.50	-0.03	PC	0.08	Discount Rate	NA	NA	NA
Sierra Leone	1965	2014	49	0.17	-0.01	0.08	0.22	CP	-0.02	Lending Rate	NA	NA	NA
Solomon islands	1981	2014	33	-0.01	0.00	0.02	-0.32	PC	0.26	Lending Rate	NA	NA	NA
Tonga	1980	2014	34	-0.26	-0.01	0.13	-0.25	PT	-0.63	Lending Rate	NA	NA	NA
Vanuatu	1981	2014	33	0.01	0.04	0.10	-0.15	PC	0.33	Lending Rate	NA	NA	NA
Zambia	1994	2014	20	0.02	0.21	0.10	0.65	CP	-0.03	Lending Rate	1989-1993	NA	1960-1971

[1] The cyclicality statistics of $\boldsymbol{corr}\,(\boldsymbol{i^{Cycle}}, \boldsymbol{Y^{Cycle}})$ is the correlation between the cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and the real GDP ($\boldsymbol{Y^{Cycle}}$) for the time 1960-2014, where cyclical components of $\boldsymbol{i^{Cycle}}$ and $\boldsymbol{Y^{Cycle}}$ are measured by using HP filter. The $\hat{\boldsymbol{\beta}}^{\boldsymbol{Y}}$ is the estimated coefficient shows the relation between cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and the real GDP ($\boldsymbol{Y^{Cycle}}$). The $\hat{\boldsymbol{\beta}}^{\boldsymbol{Y}}$ is the estimated coefficient using Tylor Rule for the time 1960-2014, where level of significance is indicated by ***1%, **5%, *10% . A positive (negative) value of $\boldsymbol{corr}\,(\boldsymbol{i^{Cycle}}, \boldsymbol{Y^{Cycle}})$ and $\hat{\boldsymbol{\beta}}^{\boldsymbol{Y}}$ indicates countercyclical (procyclical) monetary policy.

[2] Monetary policy cyclicality stance over the time 1960-2014. We divide the time 1960-2014 into two sub-time periods: 1960-1999 and 2000-2014. We compute the two sub-time period cyclicality stance by utilizing a simple correlation between the cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and the real GDP ($\boldsymbol{Y^{Cycle}}$) for the time 1960-1999 and 2000-2014. Please note PT=Procyclicality Trap means conducting procyclical monetary policy in both sub-time period; PC=From Procyclical (1960-1999) to Countercyclical (2000-2014); CP=From Countercyclical (1960-1999) to Procyclical (2000-2014); C=Countercyclical in both sub-time period.

[3] Fear of free floating ($\boldsymbol{FOF}$) is the correlation between the cyclical components of the short-term nominal interest rate cycle ($\boldsymbol{i^{Cycle}}$) and nominal exchange rate ($\boldsymbol{EXE^{Cycle}}$) for the time 1960-2014, where cyclical components of $\boldsymbol{i^{Cycle}}$ and $\boldsymbol{EXE^{Cycle}}$ are measured by using HP filter. A positive value of $\boldsymbol{FOF}$ indicates the evidence of $\boldsymbol{FOF}$ and $\boldsymbol{FOF \leq 0}$ indicates no evidence of $\boldsymbol{FOF}$.

TABLE A3.6: DESCRIPTIVE STATISTICS

VARIABLES	Number of Observation	Mean	Standard Deviation	Minimum	Maximum
$Corr(i_i^{cycle}, Y_i^{cycle})$	100	0.088	0.339	-0.707	0.652
$\widehat{\beta}_i^Y$	100	0.111	0.586	-1.659	2.136
FOF^A	100	0.187	0.279	-0.381	0.881
FISCALCYC	78	0.58	0.605	-0.517	2.376
IQ	94	0.563	0.174	0.201	0.843
CBI	97	0.489	0.157	0.153	0.830
MF	98	74.033	8.646	42.537	90.3
IT	100	0.24	0.429	0	1
FINOPEN	99	0.523	0.286	0.096	1
FINDEPTH	100	0.514	0.302	0.114	1.573
NEED	41	1.731	1.949	0	6
IMF	41	0.560	0.975	0	4
CC	43	6.511	5.443	0	22
OC	43	36	30.484	0	131
VV2012	36	0.069	0.204	-0.29	0.53
YYCORR2008	25	0.075	0.333	-0.69	0.63
YYTSLS2008	23	-0.02	0.403	-0.63	0.81
MCCORR2013	31	0.066	0.241	-0.39	0.54
MCTR2013	31	-0.068	0.393	-1.06	0.85
RD2014	46	0.127	0.241	-0.53	0.64
INTEREST RATE CYCLE [i_i^c]	2383	0.0014	0.036	-0.179	0.691
RGDP CYCLE [y_i^c]	2383	0.0006	0.030	-0.381	0.737
INFLATION CYCLE [π_i^c]	2383	0.0005	0.063	-0.442	1.004
FOF^A	2383	0.1315	0.388	-0.905	0.978
RGDP CYCLE [y_i^c]× FOF^A	2383	-0.0001	0.010	-0.159	0.079
EXCHNAGE RATE CYCLE [Δe_i^c]	2383	-0.0012	0.145	-1.018	2.802
RGDP CYCLE [y_i^{cycle}] × FISCYC	2171	0.0004	0.012	-0.217	0.135
RGDP CYCLE [y_i^{cycle}] × IQ	1922	0.0006	0.013	-0.168	0.316
RGDP CYCLE [y_i^{cycle}] × CBI	2033	0.0005	0.014	-0.183	0.354
RGDP CYCLE [y_i^{cycle}] × MF	1558	0.0713	1.977	-23.939	48.278
RGDP CYCLE [y_i^{cycle}] × IT	2380	-.00006	0.004	-0.029	0.071
RGDP CYCLE [y_i^{cycle}] × FINOPEN	2350	0.0003	0.015	-0.269	0.209
RGDP CYCLE [y_i^{cycle}] × FINDEPTH	2290	-.0004	0.017	-0.514	0.159
INTEREST RATE CYCLE [i_i^{QC}]	5104	0.00006	0.024	-0.173	0.593
RGDP CYCLE [y_i^{QC}]	5104	-0.00002	0.011	-0.097	0.097
INFLATION CYCLE [π_i^{QC}]	5104	-0.0001	0.020	-0.162	0.301
FOF^Q	5104	0.0270	0.317	-0.760	0.975
RGDP CYCLE [y_i^{QC}]× FOF^Q	5104	-0.0003	0.004	-0.029	0.048
EXCHNAGE RATE CYCLE [Δe_i^{QC}]	5104	-0.0001	0.043	-0.222	0.827

Appendix: Chapter 4

TABLE A4.1: DATA USED IN THE CROSS COUNTRY REGRESSION AND IV GMM REGRESSION

VARIABLES	DESCRIPTION AND SOURCE
Growth rate of real GDP per capita (*GRGDPC*)	Average growth rate of real GDP per capita. Data are averaged over 1960-2014. Data are obtained from Penn World Table (PWT Version 7).
Output volatility (*RGDPCHVOL*)	Measures the volatility of growth rate of real GDP per-capita in percentage terms. The volatility is calculated by taking the standard deviation of annual percentage change of real GDP per-capita for the period 1960-2014. Data are obtained from World Development Indicator (WDI, 2015). Access through UK data services.
Inflation volatility (*INFVOL*)	Measures the GDP price deflator volatility in percentage terms. The volatility is calculated by taking the standard deviation of the annual percentage change of GDP deflator. The GDP price deflator π_t is obtained from World Development Indicator (WDI, 2016) and IMF International Financial Statistics (IFS, 2016). Following Cukierman *et al*. (1992), price deflator π_t is transformed using $\pi_t/(1+\pi_t)$ to remove the high inflation outliers; using the raw inflation figures would give undue weight to a few outliers with very high inflation rates.
Initial real GDP per-capita (*LNLRGDPCH*)	Initial real GDP per-capita measured by natural logarithm of real GDP per-capita in 1960. Data are obtained from Penn World Table (PWT Version 6.3).
Educational attainment (*LSYR*)	Log of average years of secondary schooling in the population over age fifteen, 1960. Data are obtained from Barro and Lee (2001).
Avg. Population (*POP*)	Population size measured by natural logarithm of number of population. Data are obtained from World Development Indicator (WDI, 2015). Access through UK data services.
Government expenditure to GDP (*GEXP*)	General government final consumption expenditure (% of GDP) in percentage terms. Data are averaged over 1960-2014. Data are obtained from World Development Indicator (WDI, 2015) and IMF International Financial Statistics (IFS, 2015). Access through UK data services.
Trade openness (*TRADE*)	Measures the trade openness (sum of export and import) to GDP in percentage terms. Data are averaged over 1960-2014. Data are obtained from World Development Indicator (WDI, 2015). Access through UK data services.
Exchange rate volatility (*EXEVOL*)	Measures the exchange rate volatility in percentage term. The volatility is calculated by taking the standard deviation of the annual nominal exchange rates between the sample country and the USA. For European countries, we use the nominal effective exchange rate. We do not incorporate countries with an exchange rate that follow no separate legal tender and pre-announced peg or currency board arrangement. More specifically, we restrict our sample to include the countries with a period of dirty floating and floating exchange rate regimes with at least 15 observations by following Ilzetzki *et al.,* (2011) for exchange rate *de facto* fine classification. Data are obtained from World Development Indicator (WDI, 2015) and IMF International Financial Statistics (IFS, 2015). Access through UK data services.
Terms of trade volatility (*TOTVOL*)	Measures the growth rate of net barter terms of trade volatility in percentage term. The volatility is calculated by taking the standard deviation of annual percentage change of terms of trade for the period 1960-2014. Data are obtained from World Development Indicator (2015). Access through UK data services.
Financial depth (*FINDEPTH*)	Measures country's liquid liabilities over the GDP in percentage terms. Data are averaged over 1960-2014. Data are obtained from International Financial Statistics (IFS, 2015) and International Monetary Fund (IMF, 2015). Access through UK data services.
Monetary freedom (*MF*)	Monetary freedom combines a measure of price stability with an assessment of price controls. Both inflation and price controls distort market activity. Price stability without sector-specific government intervention is the ideal state for the free market. Monetary freedom score ranges from 0 (lowest monetary freedom) to 100 (highest monetary freedom). Data are averaged over 1960-2014. Data are obtained from Index of Economic Freedom (2016). Access through Heritage.org (2016)
Fertility rate (*FERT*)	Fertility rate (births per woman) in percentage term. Data are averaged over 1960-2014. Data are obtained from World Development Indicator (WDI, 2015). Access through UK data services.
Life expectancy rate (*LIFEEXP*)	The log of the life expectancy at birth. Data are obtained from World Development Indicator (WDI, 2015). Access through UK data services.
Initial corruption (*INEXECORR*)	Initial level of executive corruption in 1946. The executive corruption is measured based on the question; how routinely do members of the executive, or their agents grant favours in exchange for bribes, kickbacks, or other material inducements, and how often do they steal, embezzle, or misappropriate public funds or other state resources for personal or family use? The index ranges from 0 (lower executive corruption) to 1 (highest executive corruption). Data are obtained from Coppedge *et al.* (2015).
Initial country credit ratings (*INICR*)	Initial level of institutional investor credit ratings in 1979. The index ranges from 0 (lower credit ratings) to 100 (highest credit ratings). Data are obtained from Reinhart and Rogoff (2009).

TABLE A4.2 : CYCLICALITY OF FISCAL AND MONETARY POLICY STATISTICS

COUNTRY GROUP (ADVANCED ECONOMIES)	Fiscal Policy Cyclicality		Monetary Policy Cyclicality		COUNTRY GROUP (EMERGING ECONOMIES)	Fiscal Policy Cyclicality		Monetary Policy Cyclicality		COUNTRY GROUP (DEVELOPING ECONOMIES)	Fiscal Policy Cyclicality		Monetary Policy Cyclicality	
	$\widehat{\beta}_i$	$\widehat{\beta}_i$	$Corr(i_t^{cycle}, Y_t^{cycle})$	$\widehat{\beta}_i^{\gamma}$		$\widehat{\beta}_i$	$\widehat{\beta}_i$	$Corr(i_t^{cycle}, Y_t^{cycle})$	$\widehat{\beta}_i^{\gamma}$		$\widehat{\beta}_i$	$\widehat{\beta}_i$	$Corr(i_t^{cycle}, Y_t^{cycle})$	$\widehat{\beta}_i^{\gamma}$
Australia	-0.21	-0.13	0.63	1.06	Albania	0.67	0.02	-0.58	-0.74	Armenia	**NA**	**NA**	0.24	-0.03
Austria	0.47	-0.01	0.55	1.10	Algeria	2.22	2.38	-0.53	-0.83	Bangladesh	2.89	3.22	0.05	0.11
Belgium	-0.41	-0.04	0.55	0.45	Antigua	0.49	0.41	**NA**	**NA**	Benin	1.14	1.18	**NA**	**NA**
Canada	-0.34	-0.52	0.58	0.97	Argentina	1.93	1.75	-0.54	-0.81	Bhutan	-0.11	-0.17	**NA**	**NA**
Cyprus	-0.14	0.50	0.05	0.00	Azerbaijan	**NA**	**NA**	0.36	0.04	Bolivia	2.20	1.99	0.46	1.25
Czech republic	**NA**	**NA**	0.30	-0.03	Bahamas	0.21	0.25	**NA**	**NA**	Burkina Faso	0.71	1.26	**NA**	**NA**
Denmark	-0.11	-0.32	0.05	0.60	Bahrain	0.12	0.18	**NA**	**NA**	Burundi	2.10	0.96	-0.30	-0.29
Finland	0.40	0.11	0.29	0.09	Barbados	0.67	0.86	**NA**	**NA**	Cameroon	1.00	0.85	**NA**	**NA**
France	-0.16	-0.21	0.41	0.61	Belize	0.15	-0.05	**NA**	**NA**	African Rep.	0.65	0.44	**NA**	**NA**
Germany	0.29	0.07	0.59	0.50	Botswana	0.62	0.19	-0.10	-0.59	Chad	1.10	1.31	**NA**	**NA**
Greece	0.41	0.36	0.16	0.15	Brazil	0.69	0.92	0.19	0.79	Comoros	0.42	0.22	**NA**	**NA**
Hong Kong	-0.14	-0.14	**NA**	**NA**	Bulgaria	0.40	0.26	**NA**	**NA**	Congo, D. Rep.	2.80	2.20	**NA**	**NA**
Iceland	0.72	0.85	0.19	0.10	Chile	0.79	0.73	-0.31	-0.12	Congo, Rep.	0.52	0.02	**NA**	**NA**
Ireland	0.92	0.39	0.38	1.32	China	0.30	0.33	0.36	0.10	Cote D'ivoire	1.37	1.48	**NA**	**NA**
Israel	1.08	1.20	0.19	0.10	Colombia	1.46	1.23	0.62	2.14	Dominica	-0.53	-0.81	**NA**	**NA**
Italy	0.26	0.16	0.48	0.79	Costa Rica	0.93	0.96	-0.28	-1.09	Ethiopia	1.17	1.05	-0.36	-0.34
Japan	0.17	0.17	0.16	0.22	Cuba	0.88	0.89	**NA**	**NA**	Gambia, The	2.67	0.65	0.26	0.06
Korea, rep.	-0.09	-0.20	0.46	0.54	Croatia	**NA**	**NA**	0.03	0.11	Georgia	0.46	1.30	**NA**	**NA**
Luxembourg	-0.23	-0.26	**NA**	**NA**	Dominican Rep	1.97	2.08	-0.71	-1.15	Ghana	1.66	2.64	0.02	0.51
Macao Sar,	-0.04	-0.21	-0.07	-0.04	Ecuador	2.13	2.39	**NA**	**NA**	Grenada	0.68	0.81	**NA**	**NA**
Malta	**NA**	**NA**	0.23	0.05	Egypt	0.53	0.56	-0.28	-0.22	Guinea	0.29	0.22	**NA**	**NA**
Netherlands	0.55	-0.04	0.49	0.79	El Salvador	0.52	0.35	**NA**	**NA**	Guinea-Bissau	0.23	0.54	**NA**	**NA**
New Zealand	0.37	0.18	0.65	1.28	Guinea	0.46	0.55	0.51	0.04	Guyana	1.73	1.48	-0.60	-0.64
Norway	-0.14	-0.08	0.38	0.68	Fiji	1.01	1.19	-0.04	-0.03	Honduras	-0.08	0.05	-0.24	-0.34
Portugal	0.48	0.70	0.04	0.15	Gabon	0.61	0.52	**NA**	**NA**	Kyrgyz Rep	**NA**	**NA**	0.09	0.04
Puerto Rico	0.34	0.59	**NA**	**NA**	Guatemala	0.90	0.73	-0.20	-0.99	Kenya	0.70	1.19	**NA**	**NA**
Singapore	-0.11	-0.07	0.48	0.27	Hungary	0.62	0.78	-0.23	-0.01	Liberia	**NA**	**NA**	0.30	0.04
Slovenia	**NA**	**NA**	0.36	0.24	India	1.01	0.80	-0.17	-0.07	Lesotho	-0.08	-0.31	**NA**	**NA**
Spain	0.67	0.48	0.37	0.55	Indonesia	0.46	1.39	-0.17	0.27	Madagascar	1.14	1.53	0.10	0.42
Sweden	-0.17	-0.06	0.30	0.26	Iran	0.33	0.71	**NA**	**NA**	Malawi	-0.33	-0.94	-0.12	-0.36
Switzerland	0.47	0.11	0.64	0.65	Iraq	1.06	0.81	**NA**	**NA**	Mali	0.76	0.96	**NA**	**NA**
UK	-0.08	-0.29	0.59	0.92	Jamaica	0.29	0.84	0.29	0.17	Mauritania	0.44	0.65	0.43	0.37
United states	-0.10	-0.14	0.46	0.83	Jordan	0.35	1.00	-0.03	-0.01	Mongolia	1.29	1.35	**NA**	**NA**
					Kuwait	-0.23	-0.04	-0.12	0.00	Mozambique	1.19	0.29	**NA**	**NA**
					Latvia	**NA**	**NA**	0.12	-0.51	Myanmar	**NA**	**NA**	0.19	0.08
					Libya	**NA**	**NA**	-0.43	-0.01	Nepal	0.79	0.78	-0.07	0.04
					Lithuania	**NA**	**NA**	0.32	0.05	Nicaragua	0.57	0.10	-0.09	-0.29
					Malaysia	0.17	0.38	0.60	0.35	Niger	0.73	0.98	**NA**	**NA**
					Mauritius	0.78	0.61	-0.14	-0.07	Nigeria	1.17	0.33	-0.10	-0.04
					Mexico	0.86	1.07	-0.50	-0.42	Papua Guinea	**NA**	**NA**	-0.44	-0.32
					Morocco	0.68	0.77	0.04	0.08	Rwanda	1.09	1.17	-0.02	0.02
					Namibia	1.64	1.01	**NA**	**NA**	Senegal	0.58	0.29	**NA**	**NA**
					Oman	1.03	0.36	**NA**	**NA**	Sierra Leone	0.76	0.75	0.17	-0.01
					Pakistan	1.48	1.09	0.25	0.16	Solomon Is.	**NA**	**NA**	-0.01	0.00
					Panama	0.64	0.65	**NA**	**NA**	St. Lucia	0.23	0.37	**NA**	**NA**
					Paraguay	1.01	1.00	-0.20	-0.62	St. Vincent	0.74	0.53	**NA**	**NA**
					Peru	0.82	1.28	-0.24	-0.25	Sudan	0.12	0.64	**NA**	**NA**
					Philippines	1.13	1.43	-0.10	-0.10	Tajikistan	0.61	0.26	**NA**	**NA**
					Poland	0.46	0.45	0.50	1.14	Togo	0.41	0.64	**NA**	**NA**
					Quater	0.45	0.95	**NA**	**NA**	Tonga	0.81	0.98	-0.26	-0.01
					Romania	0.53	0.23	-0.37	-0.84	Uganda	1.27	0.88	**NA**	**NA**
					Russia	**NA**	**NA**	-0.09	-0.40	Vanuatu	1.53	1.74	0.01	0.04
					Saudi Arabia	0.18	-0.07	**NA**	**NA**	Vietnam	0.69	2.39	**NA**	**NA**
					Seychelles	0.81	0.94	-0.15	-0.20	Zambia	1.20	1.25	0.02	0.21
					South Africa	0.89	0.68	0.48	1.25					
					Sri Lanka	0.60	0.55	0.52	0.81					
					St. Kitts Nevis	0.13	0.32	**NA**	**NA**					
					Swaziland	0.33	0.50	-0.28	-0.33					
					Thailand	0.56	0.40	0.34	0.09					
					Trinidad	1.09	0.69	0.13	0.18					
					Tunisia	-0.04	-0.04	0.28	0.22					
					Turkey	0.72	0.61	-0.31	-0.31					
					Uruguay	0.76	0.89	-0.42	-1.66					
					Venezuela	1.11	1.26	-0.02	-0.07					
					Zimbabwe	0.96	2.06	**NA**	**NA**					

TABLE A4.3: DESCRIPTIVE STATISTICS FOR CROSS COUNTRY REGRESSION OF FISCAL POLICY CYCLICALITY

VARIABLES	Number of Observation	Mean	Standard Deviation	Minimum	Maximum
$\widehat{\beta}_i$	137	0.678	0.644	-0.526	2.885
$\widehat{\widehat{\beta}}_i$	137	0.655	0.700	-0.935	3.216
RGDPCHVOL	131	0.055	0.025	0.006	0.132
INFVOL	131	0.091	0.069	0.014	0.289
GRGDPC	136	0.023	0.016	-0.022	0.097
LNLRGDPCH	137	8.072	1.195	5.703	10.828
LSYR	115	0.666	0.522	-0.744	1.631
POP	137	15.505	1.991	10.734	20.758
GEXP	137	0.153	0.048	0.036	0.320
TRADE	137	0.764	0.447	0.188	3.305
EXEVOL	117	0.329	0.796	0.002	7.388
TOTVOL	136	0.093	0.074	0.011	0.622
FINDEPTH	135	0.465	0.336	0.039	2.369
MF	129	73.913	10.299	27.515	90.3
FERT	137	0.0041	0.016	0.016	0.076
LIFEEXP	137	1.794	0.076	1.586	1.889
INEXECORR	104	0.409	0.282	0.009	0.968
INICR	56	61.012	21.206	21	98.9

TABLE A4.4: DESCRIPTIVE STATISTICS FOR CROSS COUNTRY REGRESSION OF MONETARY POLICY CYCLICALITY

VARIABLES	Number of Observation	Mean	Standard Deviation	Minimum	Maximum
$Corr(i_i^{cycle}, Y_i^{cycle})$	100	0.088	0.339	-0.707	0.652
$\widehat{\beta}_i^Y$	100	0.111	0.586	-1.659	2.136
RGDPCHVOL	92	0.052	0.025	0.017	0.117
INFVOL	93	0.076	0.056	0.018	0.288
GRGDPC	98	0.025	0.017	-0.014	0.097
LNLRGDPCH	98	8.101	1.127	5.555	10.331
LSYR	92	0.790	0.460	-0.537	1.633
POP	100	15.916	1.845	11.110	20.758
GEXP	99	0.158	0.051	0.036	0.315
TRADE	100	0.745	0.453	0.071	3.305
EXEVOL	99	0.157	0.185	0.002	1.597
TOTVOL	100	0.080	0.058	0.010	0.269
FINDEPTH	100	0.473	0.287	0.123	1.573
MF	97	73.371	9.380	42.537	90.3
FERT	100	0.036	0.016	0.016	0.071
LIFEEXP	100	1.809	0.068	1.586	1.888
INEXECORR	91	0.363	0.269	0.009	0.968
INICR	57	61.059	23.499	10.4	98.9

Appendix: Chapter 5

Figure A5.1: Bivariate Scatter Plot

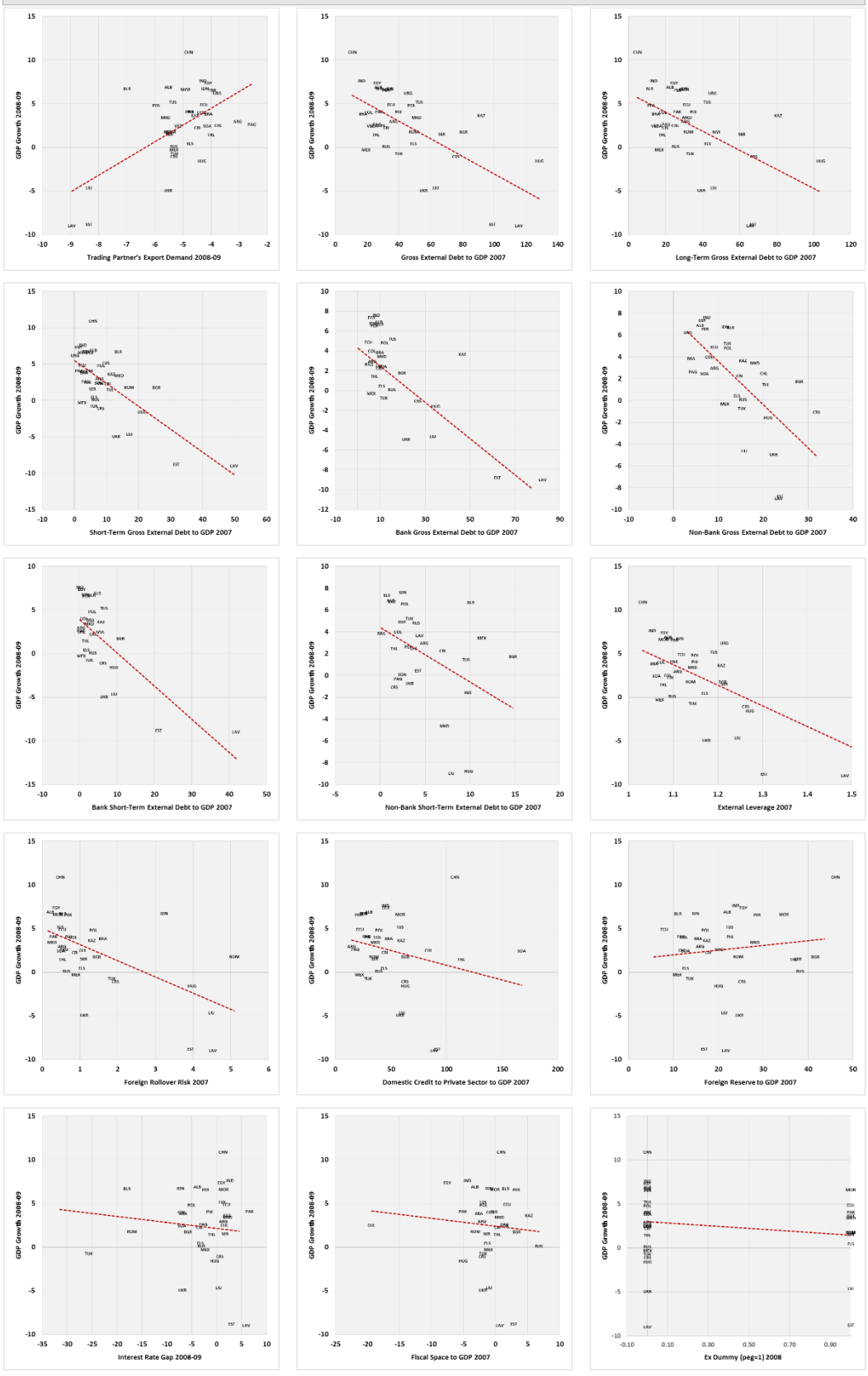


TABLE A5.1: VARIABLES DESCRIPTION

VARIABLES	DESCRIPTION AND SOURCE
GDP growth 2008-09 **GDP growth 2005-07** **GDP growth trend** **And** **GDP gap 2008-09**	GDP growth 2008-2009 is calculated by taking average of real GDP growth in 2008 and 2009. Similarly, GDP growth 2005-2007 is calculated by taking average of real GDP growth in 2005, 2006 and 2007. GDP growth trend is calculated by taking average of real GDP growth over 1997 to 2007. GDP gap is measured by average real GDP growth 2008-2009 minus real GDP growth trend 1997-2007. Here, real GDP growth calculated based on GDP constructed on purchasing-power-parity (PPP) valuation of country GDP (Current international dollar). Please note the term "real" has a different meaning when considering data in Purchasing Power Parity (PPP) terms. While "nominal" GDP in the International Comparison Program does refer to the regular national accounts GDP in current prices, "real" GDP is considered to be the PPP GDP in current prices. Data definition and data source are from World Development Indicator (2014) and IMF International Financial Statistics (IFS) (2014). Access through UK data services.
Industrial production growth 2008-09	Industrial production growth 2008-2009 is calculated by taking average of real industrial production growth in 2008 and 2009. Here, real industrial production 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$, seasonally adjusted. The base year is 2005. Data definition and data source are from World Bank staff calculations based on DataStream data (2014).
Real GDP per-capita 2007	Real GDP per-capita 2007 in natural logarithm. Real GDP per-capita is calculated as PPP converted GDP per-capita (Chain Series), at 2005 constant prices. Data are obtained from Penn World Table (PWT Version 6.3).
Trading partner's export demand 2008-09	Trading partner GDP Gap (2008-09) multiplied by merchandise export (2007). Below is the simplified equation that has been used for each emerging country (i) in order to calculate its trading partner's (j) export demand. $\text{Trading Partner's Export Demand}_{i2008-2009} = \sum_{J=1}^{J} W_{i2007}\left[\text{GDPGap}_{j2008-09}\right]$ Here, $\text{Trading Partner's Export Demand}_{i2008-2009}$ is declined export demand of partner country. $\overline{\text{GDPGrowth}}_{J2008-2009} - \overline{\text{GDPGrowth}}_{J1997-2007}$ is the trading partner's $\text{GDPGap}_{j2008-09}$. Here W_{i2007} is export weight during pre-crisis time. $W_{i2007} = \frac{\text{Export}_{j2007}}{\text{Total Export}}$ Data collected from Direction of Trade Statistics (DOTS) (2014). Access through UK data services.
Gross external debt to GDP 2007	Total external debt is debt owed to non-residents repayable in currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt. Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt. Data are in current U.S. dollars (% of GDP). Data collected from World Bank, International Debt Statistics (2014).
Long-term external debt to GDP 2007	Long-term debt that has an original maturity of more than one year. It has three components: public, publicly guaranteed, and private nonguaranteed debt. Data are in current U.S. dollars (% of GDP). Data collected from World Bank, International Debt Statistics (2014) and World Bank, Quarterly External Debt Statistics (2014).
Short-term external debt to GDP 2007 and short-term external debt to foreign reserve 2007	Short-term external debt is defined as debt that has an original maturity of one year or less. Short-term external accumulated debt data for end of the year 2007 (fourth quarter) has been collected which will be mature during end of 2008 (fourth quarter) or beginning of 2009 (first quarter). Data are in current U.S. dollars (% of GDP or foreign reserve). Data collected from World Bank, International Debt Statistics (2014) and World Bank, Quarterly External Debt Statistics (2014).
Bank gross external debt to GDP 2007	Deposit-taking corporations' (except the central bank) gross external debt, which composed of short-term and long-term external debt. We collect the accumulated data of the gross external debt for end of the year 2007. Data are in current U.S. dollars (% of GDP). Data collected from World Bank, Quarterly External Debt Statistics (2014).
Non-bank gross external debt to GDP 2007	Non-Bank sector defined as non-deposit taking corporations' (e.g. finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange company) external debt. The external debt is composed of short-term and long-term external debt. We collect the accumulated data of the gross external debt for end of the year 2007. Data are in current U.S. dollars (% of GDP). Data collected from World Bank, Quarterly External Debt Statistics (2014).

TABLE A5.1 (CONTINUED): VARIABLES DESCRIPTION

VARIABLES	DESCRIPTION AND SOURCE
Bank short-term external debt to GDP 2007	Deposit-taking corporations' (except the central bank) short-term external debt. Short-term external debt is defined as debt that has an original maturity of one year or less. Short-term external accumulated debt data for end of the year 2007 (fourth quarter) has been collected which will be mature during end of 2008 (fourth quarter) or beginning of 2009 (first quarter). Data are in current U.S. dollars (% of GDP). Data collected from World Bank, Quarterly External Debt Statistics (2014). In October 2014, the World Bank launched the new Quarterly External Debt Statistics (QEDS) SDDS database. Sort-term debt data are segregated based on excel template (country's external balance sheet position) provided by World Bank. The template is publicly available at //databank.worldbank.org/data/.../debt/SDDS_QEDS_template_v2.1.xlsx.//
Non-bank short-term external debt to GDP 2007	Non-Bank sector defined as non-deposit taking corporations' (e.g. finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange company) short-term external debt. Short-term external debt is defined as debt that has an original maturity of one year or less. Short-term external accumulated debt data for end of the year 2007 (fourth quarter) has been collected which will be mature during end of 2008 (fourth quarter) or beginning of 2009 (first quarter). Data are in current U.S. dollars (% of GDP). Data collected from World Bank, Quarterly External Debt Statistics (2014).
Net foreign asset to GDP 2007	Net foreign assets are the sum of foreign assets held by monetary authorities and deposit money banks, less their foreign liabilities. Data are in current U.S. dollar and it is a percent of GDP (current U.S. dollar). Here total foreign asset is the sum of debt asset, FDI asset and portfolio asset and reserves minus gold. Total liability is the sum of debt liability, FDI equity liability and portfolio equity liability. Data collected from External Wealth of Nations Mark II database (see Lane and Milesi-Ferretti, "The External Wealth of Nations Mark II", Journal of International Economics, November 2007).
Financial openness to GDP 2007	Financial openness measured as sum of total foreign asset and external liability as a percentage of GDP (current U.S. dollar). Here total foreign asset is the sum of debt asset, FDI asset and portfolio asset and reserves minus gold. Total liability is the sum of debt liability, FDI equity liability and portfolio equity liability (all the variables are current U.S. dollar). Data collected from External Wealth of Nations Mark II database (see Lane and Milesi-Ferretti, "The External Wealth of Nations Mark II", Journal of International Economics, November 2007).
Private sector domestic credit to GDP 2007	Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. The financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data are available. Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies. Data are in current U.S. dollars (% of GDP). Data collected from World Development Indicator (WDI)-World Bank (2014). Access through UK data services.
External leverage 2007	External leverage is calculated as the ratio of total asset relative to equity liability. Where total asset is sum of the value of domestic assets and the value of gross holdings of equity and direct investment in the rest of the world (resp. of foreign debt, loans and portfolio debt). On the other hand total equity liability defined as the gross foreign holdings of domestic equity and direct investment (resp. domestic debt); a residual item that measures the "net worth" of country's residents. Data Definition from Gourinchas and Obstfeld (p. 48, 2012). Data collected from External Wealth of Nations Mark II database (see Lane and Milesi-Ferretti, "The External Wealth of Nations Mark II", Journal of International Economics, November 2007). To define further, for example, a country has total assets valued at $2 billion and total equity debt of $1 billion. The leverage ratio would be 2.0 ($2 billion / $1 billion), meaning that one half of a county's assets are financed by equity debt. The balance must be financed by external debt. Now consider, if a country has a high amount of foreign currency denominated external debt during the pre-crisis period, and if the currency devaluation has taken place during crisis time, then the country has to pay back a higher level of principle and interest amount during the crisis. In this case, the balance sheet shock mainly arise from the high amount of external debt, with maturity and currency mismatch, which can lead to liquidity crisis. In contrast, the external equity debt are nothing else but the foreign owners' equity. Therefore, equity claims have the flexibility over the timing, and the size of the dividend payments, thereby allowing risk sharing between foreign investors and domestic issuers. So, the equity debt have a minimum impact on the balance sheet impact.
Foreign rollover risk 2007	Foreign rollover risk is defined as the sum of BIS banks' consolidated direct cross-border claims on a country and their local affiliates' claims that are not financed by local consumer deposits. It is proxied by bank-level information on loan to deposit ratios of foreign affiliates. Data Definition from Cerutti, Claessens and McGuire (2012). Data collected from Bank for International Settlements (BIS)-Locational Banking Statistics database (2014).

TABLE A5.1 (CONTINUED): VARIABLES DESCRIPTION

VARIABLES	DESCRIPTION AND SOURCE
Credit market regulation 2007	Credit market regulation Index refer policy regulation on credit market to maintain foreign capital inflow. Credit market regulation defined as rating index which varies from 1 to 10. 1=high credit market regulations (less freedom) and 10=low credit market regulations (more freedom). Data is measured in natural logarithm. Data collected from Fraser institute's "Economic Freedom of the World" Annual Report (2014); Rose and Spiegel (2011).
Country credit rating 2007	Institutional Investor's overall country credit rating index defined as country credit rating from 100 (highly credit rated country) to 0 (very poor credit rated country). Data is measured in natural logarithm. Data collected from Institutional Investor's Country Credit Rating, Annual Report 2007, 2008 & 2009.
Exchange rate regime (dummy) 2008-09	Exchange rate regime classified as based on 1 to 6 scaling rating, where 1=fixed exchange rate regime, 6=fully flexible exchange rate regime. This paper use dummy variable for exchange rate; 1=country have fixed exchange rate in 2008 and zero otherwise. Data collected from Ilzetzki, Reinhart and Rogoff (2011).
Foreign reserves to GDP 2007	Total reserves minus gold comprise special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. Gold holdings are excluded. Data are in current U.S. dollars (% of GDP). Data collected from World development indicator, World Bank (2014). Access through UK data services.
Interest rate gap 2008-09	Measured by average interest rate 2008-2009 minus interest rate trend 1997-2007. Interest rate trend is the average of interest rate over 1997 to 2007. We use discount window interest rate depending on data availability as a proxy for monetary policy instruments. For countries whenever the discount rate is not available, we use money market rate, lending rate or treasury bill rate. The rates are in percentage terms. Data obtained from Vegh and Vuletin (2012) and IMF International Financial Statistics (IFS, 2016), code 60ZF (Discount Rate), 60B-ZF (Money Market Rate) and 60P-ZF (Lending Rate). Access through UK data services.
Fiscal space to GDP 2007	Fiscal space calculated as general government revenue minus total expenditure as percent of GDP. Data collected from World development indicator, World Bank (2014). Access through UK data services.
Country size or population 2008	Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of the country of origin. Data is measured in natural logarithm. Data collected from World development indicator, World Bank (2014). Access through UK data services.

TABLE A5.2: GDP GAP, AVG. GDP GROWTH, EXPORT DEMAND, EXTERNAL DEBT AND OTHER STATISTICS

COUNTRY NAME AND CODE	GDP Gap 2008-09 (Percent)	Avg. GDP Growth 2008-09 (Percent)	Avg. Industrial Production Growth 2008-09 (Percent)	Trading Partners' Export Demand 2008-2009 (Percent)	Gross External Debt to GDP 2007 (Percent)	Bank Gross External Debt to GDP 2007 (Percent)	Bank Short-term External Debt to GDP 2007 (Percent)	External Leverage 2007 (Unit)	Foreign Rollover Risk 2007 (Unit)	Exchange Rate Dummy 2008 (peg=1)	Foreign Reserve to GDP 2007 (Percent)	Interest Rate Gap 2008-09 (Percent)	Fiscal Space to GDP 2007 (Percent)
Albania (ALB)	-0.93	6.89	2.52	-5.52	27.09	18.87	18.77	1.09	0.22	0	19.71	-5.91	-3.28
Argentina (ARG)	-2.58	2.97	NA	-3.05	36.57	6.70	1.64	1.11	0.53	0	13.60	-0.81	-2.11
Belarus (BLR)	-3.43	6.68	-2.07	-6.99	27.58	21.00	12.90	1.09	0.54	0	8.76	-19.98	1.52
Brazil (BRA)	-1.34	3.83	-8.87	-4.10	17.44	20.33	11.39	1.06	1.61	0	13.13	-8.88	-2.66
Bulgaria (BGR)	-4.75	1.76	-3.38	-5.54	80.51	59.70	43.41	1.21	1.44	1	39.24	-7.89	3.26
Chile (CHL)	-4.05	2.49	11.96	-3.74	29.33	20.35	2.14	1.09	1.08	0	9.73	-0.44	-19.37
China (CHN)	-1.39	10.91	-4.13	-4.79	10.61	**NA**	**NA**	1.03	0.47	0	43.70	-0.87	0.87
Colombia (COL)	-1.41	4.00	NA	-4.35	20.92	6.89	4.27	1.07	0.82	0	10.02	-9.06	-0.85
Costa Rica (CRI)	-5.64	2.24	-3.66	-4.49	32.10	20.54	13.74	1.09	0.86	0	15.63	-5.36	0.32
Croatia (CRS)	-7.32	-1.08	-2.44	-5.32	75.74	88.68	24.81	1.26	1.94	0	23.01	-1.41	-2.12
Ecuador (ECU)	-0.55	4.89	2.47	-4.25	35.03	0.23	NA	1.12	0.54	1	5.61	-0.09	1.76
Egypt (EGY)	-0.16	7.36	-1.26	-4.10	26.26	6.51	2.42	1.08	0.37	0	23.26	-1.05	-7.55
El Salvador (ELS)	-4.84	0.43	-14.27	-4.75	49.02	25.48	7.21	1.17	1.04	1	10.55	-5.26	-1.29
Estonia (EST)	-18.61	-8.78	-9.13	-8.34	98.90	230.81	84.21	1.30	3.93	1	14.66	1.02	2.82
Hungary (HUG)	-7.45	-1.59	4.01	-4.34	128.24	119.37	36.55	1.27	3.96	0	17.62	-2.62	-5.08
India (IDN)	-1.61	7.62	2.11	-4.29	16.48	14.66	0.26	1.05	2.15	0	21.61	0.61	-4.41
Indonesia (IDN)	1.57	6.76	3.66	-4.22	34.20	8.40	5.64	1.12	3.23	0	12.75	-9.29	-1.03
Kazakhstan (KAZ)	-6.35	3.65	-10.57	-4.58	91.78	167.98	22.69	1.21	1.32	1	15.16	0.01	5.22
Latvia (LAV)	-19.15	-8.97	-4.49	-8.95	115.49	310.96	167.29	1.48	4.52	0	19.40	3.87	0.64
Lithuania (LIU)	-13.79	-4.63	-1.78	-8.35	63.23	116.66	36.84	1.24	4.48	1	19.24	-1.52	-1.01
FYR Macedonia (MKD)	-1.83	3.42	-3.33	-5.61	51.05	22.39	10.27	1.14	0.25	1	25.62	-0.13	0.59
Mexico (MEX)	-5.84	-0.29	NA	-5.32	19.09	3.83	1.47	1.07	0.88	0	8.35	-4.51	-1.16
Morocco (MOR)	0.42	6.61	-2.35	-4.90	32.74	**NA**	**NA**	1.08	0.41	1	32.12	-0.83	-0.13
Pakistan (PAK)	-2.84	4.09	NA	-4.77	27.55	**NA**	**NA**	1.10	0.30	1	9.29	4.48	-5.12
Paraguay (PAG)	-1.50	2.60	1.04	-2.55	26.03	1.62	1.47	1.51	0.57	0	17.84	-4.86	1.37
Peru (PER)	-0.24	6.55	-5.91	-3.95	31.55	10.38	6.57	1.10	0.68	0	26.34	-4.28	3.19
Philippines (PHI)	-2.51	4.06	-0.82	-4.73	39.58	NA	NA	1.15	0.69	0	20.38	-3.44	-0.30
Poland (POL)	-1.98	4.79	-1.50	-5.94	47.71	29.38	13.33	1.15	1.35	0	14.84	-7.09	-1.88
Romania (ROM)	-3.55	1.79	-4.40	-5.43	49.42	**NA**	**NA**	1.14	5.10	1	21.89	-19.23	-3.12
Russia (RUS)	-7.65	0.11	NA	-5.32	31.90	42.59	14.24	1.10	0.64	0	35.97	-5.14	6.75
Serbia (SER)	-6.21	1.54	-7.02	-5.47	66.94	**NA**	**NA**	1.21	1.10	1	35.54	-0.28	-1.36
South Africa (SOA)	-3.48	2.44	-1.26	-4.14	24.27	25.77	22.07	1.06	0.50	0	10.43	-9.10	1.39
Thailand (THL)	-3.83	1.45	-0.62	-4.00	25.40	11.17	6.26	1.08	0.54	0	34.57	-3.05	0.23
Tunisia (TUS)	-2.09	5.20	-5.74	-5.36	52.70	43.15	25.84	1.19	0.47	0	20.21	-0.97	-2.01
Turkey (TUK)	-7.50	-0.73	-13.55	-5.29	39.98	28.04	10.23	1.14	1.85	0	11.38	-27.73	-1.95
Ukraine (UKR)	-12.22	-4.92	4.09	-5.53	55.34	66.77	25.86	1.17	1.11	0	22.30	-9.02	-1.98
Uruguay (URG)	2.28	6.20	-5.03	-3.79	45.62	**NA**	**NA**	1.21	0.18	0	17.54	-31.50	0.01
Venezuela (VEZ)	-3.36	2.44	2.52	-5.18	22.02	**NA**	**NA**	1.05	0.15	1	11.22	-4.27	-2.82

TABLE A5.3: DESCRIPTIVE STATISTICS

VARIABLES	Observation	Mean	Standard Deviation	Min	Max
GDP Gap 2008-09	38	-0.04	0.05	-0.19	0.02
GDP Growth 2008-2009	38	0.02	0.04	-0.09	0.11
GDP Growth 2005-2007	38	0.09	0.02	0.06	0.16
GDP Growth Trend 1997-07	38	0.07	0.02	0.04	0.12
Industrial Production Growth 2008-09	32	-0.03	0.05	-0.14	0.12
Trading Partner's Reduced Export Demand 2008-09	38	-0.05	0.013	-0.09	-0.03
Gross External Debt to GDP 2007	38	0.45	0.28	0.11	1.28
Long Term External Debt to GDP 2007	38	0.34	0.21	0.05	1.04
Short Term External Debt to GDP 2007	38	0.095	0.096	0.002	0.49
Short Term External Debt to Foreign Reserve 2007	38	0.554	0.541	0.012	2.568
Bank Gross External Debt to GDP 2007	30	0.52	0.72	0.002	3.11
Non-Bank Gross External Debt to GDP 2007	31	0.56	0.29	0.13	1.27
Bank Short-Term External Debt to GDP 2007	29	0.22	0.33	0.003	1.67
Non-Bank Short-Term External Debt to GDP 2007	31	0.19	0.15	0.004	0.59
External Leverage 2007	38	1.15	0.11	1.03	1.51
Domestic Credit to Private Sector to GDP 2007	38	0.49	0.31	0.14	1.68
Foreign Rollover Risk 2007	38	1.36	1.36	0.15	5.09
Foreign Reserve to GDP 2007	38	0.19	0.09	0.06	0.44
Exchange Rate Dummy (Peg=1)	38	0.32	0.47	0	1
Interest Rate Gap 2008-09	38	-0.054	0.077	-0.314	0.045
Fiscal Space to GDP 2007	38	-0.011	0.041	-0.19	0.07
Real GDP Per-Capita 2007	38	8.97	0.55	7.69	9.86
Ln of Population 2008	38	0.59	0.98	-1.48	2.46
Ln of Credit Market Freedom 2007	38	2.14	0.13	1.79	2.30
Ln of Country Credit Rating 2007	38	3.97	0.28	3.05	4.35

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