Hacettepe University Graduate School of Social Sciences

Department of Economics

CAPITAL FLOW MANAGEMENT POLICIES: A PANEL DATA ANALYSIS FOR DEVELOPING COUNTRIES

Büşra KUZUCU

Master's Thesis

Ankara, 2022

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ACCEPTANCE AND APPROVAL

The jury finds that Büşra Kuzucu has on the date of 12.01.2022 successfully passed the defense examination and approves her master's thesis titled "Capital Flow Management Policies: A Panel Data Analysis for Developing Countries".

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ABSTRACT

KUZUCU, Büşra. *Capital Flow Management Policies: A Panel Data Analysis for Developing Countries*, Master's Thesis, Ankara, 2022.

The Global Financial Crisis has signaled that the growing magnitude and volatility in financial flows increasingly complicates ensuring macroeconomic and financial stability in developing countries. With the renewed attention on a better understanding of which appropriate policy tools help policymakers to provide stability, the recent literature has started to advocate the use of capital flow management policies, in particular, capital controls. Given these recent developments in the literature and the policy environment, this thesis seeks to answer two questions: (i) what are the impacts of capital controls on the size and volatility of gross inflows and outflows, and (ii) does the level of a country's financial development affect the efficacy of capital controls? Based on a new dataset for capital controls developed by Fernandez et al. (2016) for a sample of 44 developing countries over the period 1998-2017, this study builds its empirical analysis on linear and nonlinear panel estimation procedures. The results show that the impact of capital controls differs across the volume of gross inflows and outflows suggesting increases in restrictions on outflows significantly reduce the volume of gross outflows. But there is no significant impact of capital controls on the gross inflows. Also, capital controls seem not to influence the volatility of gross inflows and outflows. Considering the panel threshold regressions, the results indicate that once a country surpasses a certain financial development threshold, higher levels of capital controls on inflows lead to lower gross inflow while there is no significant threshold for the size of gross outflows and volatility of the gross flows.

Keywords

Gross capital flows, macroeconomic and financial stability, capital flow management policies, capital controls, the panel threshold method.

ÖZET

KUZUCU, Büşra. *Capital Flow Management Policies: A Panel Data Analysis for Developing Countries*, Master's Thesis, Ankara, 2022.

Küresel Finansal Kriz, artan ve oynak hale gelen finansal akımların gelişmekte olan ülkelerde makroekonomik ve finansal istikrarı korumayı giderek zorlaştırdığını göstermektedir. İstikrarı sağlamak amacıyla hangi politika araçlarının politika yapıcılara yardımcı olduğunun anlaşılmasına yönelik artan ilgiyle birlikte, yakın zamanda ilgili literatür de sermaye akışı yönetimi politikalarının, özellikle sermaye kontrollerinin kullanımını savunmaya başlamıştır. Literatürdeki ve politika ortamındaki bu son gelişmeler göz önüne alındığında, bu tez iki soruyu yanıtlamayı amaçlamaktadır: (i) sermaye kontrollerinin brüt sermaye giriş ve çıkışların büyüklüğü ve oynaklığı üzerindeki etkileri nelerdir ve (ii) ülkenin finansal gelişimi sermaye kontrollerinin etkinliğini etkiler mi? 1998-2017 döneminde 44 gelişmekte olan ülkeyi içeren ve Fernandez ve diğerleri (2016) tarafından geliştirilen yeni bir veri setine dayanan bu çalışma, ampirik analizini doğrusal ve doğrusal olmayan panel tahmin yöntemi üzerine oluşturmaktadır. Sonuçlar, sermaye kontrollerinin etkisinin brüt giriş ve çıkışların hacminde farklılık gösterdiğine işaret etmektedir. Buna göre çıkışlarındaki kısıtlamalar arttıkça brüt çıkışların hacmi anlamlı ölçüde azalmaktadır. Ancak sermaye kontrollerinin brüt girişler üzerinde anlamlı bir etkisi yoktur. Ayrıca, sermaye kontrolleri brüt giriş ve çıkışların oynaklığını etkilememektedir. Panel eşik değer regresyonu sonuçları ise belirli bir finansal gelişme eşiğini aşıldıktan sonra sermaye kontrollerinin brüt girişleri azalttığını ancak brüt çıkışların büyüklüğü ve oynaklığı için anlamlı finansal gelişme eşiği olmadığını göstermektedir.

Anahtar Sözcükler

Brüt sermaye akımları, makroekonomik ve finansal istikrar, sermaye akışı yönetim politikaları, sermaye kontrolleri, panel eşik değer regresyon yöntemi.

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INTRODUCTION

From the early 1990s until recent years, the desirability of capital flow management policies, in particular, the implementation of capital controls has been considered as one of the controversial topics in international macroeconomics. The origin of this controversy is the widespread challenge of countries that open their capital accounts and allow financial liberalization since the late 1980s. Over that period, many countries, especially the developing countries have experienced difficulties in reaping the benefits of growing international capital flows while decreasing the related risks. These difficulties have become even more apparent aftermath of the Global Financial Crisis (GFC) as the volume and movements of international capital flows made the global financial environment more complex. Thus, new concerns such as mitigating the risks of increasing mobility of capital flows and protecting economies from financial instability and excessive exposure to foreign shocks have come into view. New concerns have been followed by new policy frameworks in the management of capital flows. More recently, the focus of economic research has shifted to a better understanding of the effects of capital flow management measures, in particular, capital controls as proper tools for ensuring financial stability.

We can interrelate the desirability and effects of capital flow management policies with the financial globalization (both openness and integration) process that we have witnessed over more than three decades. As financial globalization has grown, the world economy has been likely to see a substantial rise in cross-border capital flows. For the past decades characterized by financial liberalization, there has been a huge rise in gross capital flows. As reported in James et al. (2014) the share of global gross cross-border capital flows in global GDP have increased from about 10% at the end of the 1990s to 20% and over just before the global financial crisis. When financial globalization is measured by the financial openness (the sum of external assets and liabilities/GDP), it is seen that openness has increased from 150% to 350% in 1996-2007 and reached its historical record onset of the crisis.

The acceleration in financial openness and globalization in that period can be attributed to a variety of factors such as financial innovation and development, higher degrees of capital account openness, rapid growth in global trade, increased investment attractiveness of emerging countries, and cyclical determinants (low-interest-rate environment in major advanced economies and increase in global liquidity). Given these several factors, empirical studies have shown that in the long run, financial development, capital account, and trade openness are the main determinants of global capital flows (OECD, 2011). It is also worth noting that developing countries, in particular emerging economies, have contributed to the growing levels of financial globalization after the late 1990s and their share in global capital flows has doubled over the period 2000-2007. The increased contribution of developing and emerging economies has been an outcome of a rise in both inflows and outflows. Over the period 2000-2007, these countries accumulated reserves and invested in advanced markets and also, they continued to attract capital and hence remained as attractive locations for foreign investors.

The GFC has altered the acceleration trend and pulled down the historical records. In the aftermath of the crisis, global cross-border capital flows have substantially fallen as a result of a considerable decline in lending by banks. Broner et al. (2013) note that total banking flows have dropped by two-thirds of their size in 2007. This decreasing trend in gross capital flows has been following the poor macroeconomic and financial environment in the world economy. During the post-crisis period, in many countries, private sector agents (households, business firms, and banks) have become more risk-averse. The sluggish recovery of global trade after the great collapse in 2008 has resulted in decreased demand for international capital. Especially, banks have reduced their lending to fix their distorted balance sheets and improve capital requirements. Also, there has been a clear decline in portfolio investment while foreign direct investment has stayed relatively stable.

Although global banking flows and portfolio investment both experienced sharp declines in the post-crisis period, there have been remarkable differences across regions and counties. First, the contraction in global capital flows has been realized in advanced countries, in particular European countries. Second, global flows to developing countries, especially to emerging markets have increased, but these flows have tended to be volatile.

These distinct evolutions of global flows between advanced countries and developing countries have often been attributed to some cyclical and structural factors such as relatively strong economic growth, and the increase in trade relations in emerging economies. The accommodative policy environment in major advanced counties has also driven capital flows to the developing areas. Lower rates of return in advanced countries have directed investors to higher return assets in emerging markets, particularly in forms of bond and equity. As emerging markets have offered higher returns, global inflows have become larger and more volatile. It is important to note that in the post-crisis period, the larger volatility in capital flows was a common characteristic of gross capital flows for both advanced and emerging economies. Even so, emerging economies have continued to be more sensitive to increased volatility. From 2015 till recently, gross inflows to emerging economies have been likely to decrease due to slower economic growth in major emerging economies, sharp declines in oil and commodity prices, and appreciation of the US dollar (Broos et al., 2016).

Against this background, we see that the size and movements of international capital matter to developing and emerging economies. This importance is related to the concerns of these countries about achieving higher levels of economic activity and a more stable growth path. Developing countries have been regarding capital flows as a catalyst of growth, but these flows often have become drivers of boom and boost cycles. As documented in recent literature, (Kose et al., 2009, Rey, 2016) capital flows can be pro-cyclical indicating that they tend to boost economic activities in good times (booms) and also reduce them and foster recessions in bad times (busts). All these imply that the benefits and costs of international capital flow mobility for developing countries determine the desirability of capital flows and the policy responses of these countries to mitigate the risks arising from large and volatile capital flows.

By following the trend mentioned above and the well-documented literature on international capital flows over the past three decades, we can divide policy environment and policy responses of countries into two eras: (i) pre-crisis capital account liberalization policy environment (abandoning capital controls) and (ii) post-crisis policy environment that encourages capital flow management measures (repositioning of capital controls and the use of macro-prudential policies). While in the pre-crisis period, major developed

economies and international institutions such as IMF have promoted full capital mobilization and financial liberalization, in the post-crisis period, they have pursued capital flow management policies the risks associated with larger and volatile international capital flows.

The former policy environment is based on a traditional view, in general, a consensus that an open and globally integrated financial system is a catalyzer for enabling economic transactions efficiently. As in the neo-classical theory, capital flows have brought good in the sense that capital owners can earn higher yields and diversify risks by investing in foreign markets (better allocation of saving and investment). If capital flows are drawn in the form of direct investment, workers and employers in recipient economies can benefit from advanced technology, better employment opportunities, and improvement in managerial skills. When capital flows are in the form of portfolio flows, it serves to improve corporate governance. Thus, the increasing levels of mobility in international capital flows can promote long-term economic growth and efficient allocation of capital. (Kose et al., 2009). On the other hand, the second policy environment grounds the need to mitigate the risks of larger and volatile capital flows. As discussed briefly before, the increased financial globalization and mobility in capital flows can bring bad such as making macroeconomic management difficult, raising financial instability, bringing about financial crises and sudden stops, and ultimately allowing adverse shocks to economic activities. These complications signal the risks that are involved in the financial globalization process and force researchers to pay attention to the relative weights of potential benefits and costs.

As argued in OECD (2016), the GFC has raised the importance of economic resilience. Although financial globalization and higher mobility in capital flows serve as devices to manage risk allocation, lower the cost of capital and strengthen economic growth, they can threaten economic resiliency even if they are ordered by supervision. Thus, in recent years, the discussions on exploring the appropriate policy toolbox that policy makers can employ have gained importance. Both academics and international institutions have increased their research on how policy makers can provide a resilient economy in the presence of several economic and financial risks. Still recognizing the long-term growth effect of increasing mobility, it is noteworthy to find out risk-reducing or prudential

measures against large and volatile capital flows. The renewed discussion on full capital mobility can be seen as a "reality check" to promote long-run economic growth again and provide a more resilient financial environment.

This second policy environment that supports the use of capital flow management measures has practical relevance for policymakers in developing countries. The severe financial crisis in many developing countries in the 1990s and the early 2000s and the major global financial crisis in 2008 have underlined the growing risks and unnoticed vulnerabilities. As argued by Bush (2019), developing country experiences and the GFC have changed the common view that full capital mobility may be a "panacea" for the developing world. In other words, the global financial crisis itself has become a key signal of existing overlooked costs when financial markets are left uncontrolled. Following, developing countries have started to implement more restrictive measures in capital account such as capital controls to foster economic resiliency and cope with adverse impacts of large and volatile international flows.

In recent years, scholars have newly tended to use theoretical models to show the welfare impacts of employing capital controls. In the theoretical literature, the most common way to address the role played by controls is considering externalities that cause the over-borrowing onset of a sudden stop or a financial crisis (Korinek, 2011; Bianchi, 2011 and Kitano and Takaku, 2017). The empirical work on the use of capital controls has begun with the research of IMF on the economic rationale of capital flow management flows and their implementation process. Then, a few researchers have addressed the question of how capital controls and macro-prudential measures can impact international capital flows (see. Binici et al., 2010, Ghosh et al., 2014; Forbes et al, 2015; Fernandez et al., 2015 and Nispi Landi and Schiavone, 2021). Although the use of capital controls has been quickly brought into developing countries' policy agendas in recent years, there is little evidence of their effectiveness in these countries.

The renewed interest in capital controls motivates us to investigate the repositioning of capital controls in developing countries. Despite this interest, there is no general agreement on the effectiveness of capital controls. The results of earlier studies seem to remain unclear. Therefore, in this thesis, special emphasis is given to finding evidence on whether capital controls are effective tools to reduce the volume and volatility of gross

inflows and outflows in developing countries. Moreover, the second goal of this study is to explore the possible channels through that the effectiveness of capital controls changes. Given these goals, this thesis seeks to answer two questions: (i) what are the impacts of capital controls on the size and volatility of gross inflows and outflows, and (ii) does the level of a country's financial development affect the efficacy of capital controls? To find empirical evidence, this thesis employs linear and nonlinear panel estimation procedures relying on a new dataset for capital controls developed by Fernandez et al. (2016) for a sample of 44 developing countries over the period 1998-2017[1].

The contributions of this thesis are expected to be twofold. First, this thesis broadens the limited empirical knowledge on the impacts of capital controls on the size and volatility of capital flows by building its empirical analysis on gross capital inflows and outflows. That is, we consider the direction (residency-based separation of flows: gross inflows and outflows) of financial flows. Until recently, the traditional way to examine the behaviors of capital flows has been the use of net capital flows. However, in recent years, there is an increasing interest to study gross capital flows that demonstrate the importance of the residency of investors. After the GFC, empirical studies have started to emphasize the residency-based measures of capital flows because the movements in gross positions have changed and gross flows appear to be more related to financial stability (Lane and Milesi-Ferreti, 2011).

Second, this thesis tests the hypothesis that the financial development level of a country has an amplifying impact on the effectiveness of capital controls by using a nonlinear estimation technique developed by Hansen (1999). By doing so, this study analyzes an overlooked issue that has been previously raised by Kose et al. (2009), Ostry (2012), and Bush (2019). As these studies put forward, the dept and efficiency of individual countries' financial sectors can intensify the effectiveness of capital controls through increasing the enforcement capability of countries and easing the market functioning, and guiding the use of and design of capital controls. Additionally, Kose et al. (2009) have drawn our attention to the presence of possible financial development thresholds or prerequisites that may be influential on the efficacy of capital account policies to reap the benefits of capital flows or cope with the crises. Within the inspiration of these studies, we test the

[1] The countries in the sample are given in Appendix.

possible nonlinear association between capital controls and the volume and volatility of gross capital flows. To the best of our knowledge, only Bush (2019) has taken a new look at the link between financial development and the effectiveness of capital account policies and tested a similar hypothesis by adding an interaction term (multiplication of capital control measures by the level of financial development) into the regression. Bush (2019) has found that the positive effect of a policy that reduces restrictions in capital account on financial openness is amplified by the country's financial development. By interacting with financial development and capital account policy Bush (2019) prevents hiding heterogeneity in data, but he fails to provide strong evidence on an endogenously determined threshold of financial development. Our methodology in this thesis differs from Bush's (2019) and serves for obtaining endogenous thresholds to capture certain thresholds or prerequisite levels of financial development.

The organization of our study is as follows: Chapter 1 examines the economic rationale of capital flow management measures and when and under what conditions they can be applied. Chapter 2 reviews the theoretical and empirical literature. Chapter 3 explains the data and methodology. Chapter 4 presents the empirical results and finally, the Conclusion section assesses the results and discusses policy implications.

CHAPTER 1

CAPITAL FLOW MANAGEMENT

The GFC has led researchers to rethink the conventional ideas on international macroeconomics. Many new ideas have emerged such as Rey (2013)'s global financial cycle analysis and discussion about trilemma vs. dilemma, views on new global cooperation, and particularly the arguments in favor of capital controls (Gopinath, 2017). Over the last few years, these new ideas have been challenging macroeconomic policies all over the world.

Among these new ideas, a special emphasis can be paid to the capital controls and more generally the capital flow management (CFM) issues. Although, CFM is a relatively new issue in terms of theoretical and empirical research, it gives significant rise to support intervening capital flows with several measures. In recent years, many economists and policy makers have been addressing the large and volatile capital flows that may be potential sources of financial vulnerabilities, and hence, they have been increasingly promoting CFM policies (Forbes et al., 2015).

The recent discussions on CFM policies have accelerated after a series of IMF papers (IMF, 2011, 2012; Ostry, 2012, 2010, and 2011) began to recommend the use of capital controls to overcome the negative effects of large and volatile capital flows. As argued in Ostry (2012), policymakers started to support using capital controls aftermath of the 1997 Asian financial crisis to cope with capital flow reversals and sudden stops. Then, capital control policies became an option in the run-up to the GFC in 2008 when countries were again faced with financial risk resulting from capital flow movements. The extent of the size and volatility of capital flows to developing regions in the early 2000s raised the financial and macroeconomic risks such as appreciation pressure on exchange rates, asset bubbles, etc. Especially, the substantial levels of portfolio inflows to emerging markets increased the concerns about financial stability in many emerging economies, and hence a new process that encourages the use of a policy tool kit including management of capital flows began.

With the reexamination of this old issue, several countries followed the advice of the IMF and became supporters of capital controls. For instance, more than 40 countries designed CFM measures between 2009 and 2011 (Forbes et al., 2015). In general, these measures were composed of limiting currency appreciation, reducing the size of portfolio investment, employing macro-prudential policies like stabilizing credit growth and controlling bank leverages, improvements in monetary policy independence, and preventing foreign currency exposures. All these measures were reflecting the goal of mitigating the risks arising from financial vulnerability after the resurgence of capital flows.

In the remaining parts of this section, we attempt to address some important issues about CFM policies. First, we explain the economic rationale of CFM. Second, we assess the design of CFM policies, and finally, we discuss the costs and benefits of CFM and describe how countries accomplish the goals of CFM.

1.1 ECONOMIC RATIONALE OF CFM

The use of capital flow management refers to a rehabilitation mechanism of the mainstream view that advocates full capital account openness. The need for rehabilitation is firstly recognized in Asian Crisis. For example, in the aftermath of the Asian crisis, Malaysia started to employ capital controls instead of adjusting an IMF stabilization and support program. Nevertheless, up to the global financial crisis, the mainstream view strictly supported the free movement of capital and continued to dominate the international macroeconomic policies in developing economies. Here, the dominant position of the mainstream view was standing on well-accepted beliefs in the literature pointing out the benefits of full financial liberalization or capital account openness. As mentioned in Prasad et al. (2003) and Mendoza et al., (2009), there are mainly four benefits of financial liberalization in developing countries: augmentation in domestic savings, a reduction in the cost of capital by allowing risk sharing, technological transfer, and contribution to the development of the domestic financial sector.

The extent of the support on full financial liberalization and attributed merits can also be assessed from the perspective of financial integration. Financial integration can be defined as the de-facto rise in capital flows all over the world and it is fed by the increasing

levels of financial globalization (Abraham and Schmukler, 2018). Since the early 1990s, financial globalization has bolstered financial integration by eliminating the price and interest differentials among countries and also allowing the free movement of capital across the countries. One of the arguments that promote international financial integration is risk diversification. Lane and Milesi-Ferreti (2003) state that the exchange of assets provides risk-sharing and leads to an efficient allocation of capital and ultimately it serves as a mechanism for consumption smoothing.

Given these benefits, there may be an uneven distribution among countries. That is, although financial integration is considerably higher than in the pre-1980 period, not all countries can succeed to reap the benefits of international financial integration. Also, with the increased financial interaction countries are exposed to foreign shocks more than they were a few decades ago. Abraham and Schmukler (2018) and Kose et al., (2009) argue that countries can take the advantage of international financial integration by promoting financial and institutional development and trade openness. However, a more integrated financial system can make countries more vulnerable to external shocks. In a similar vein, Perri and Quadrini (2018) underline that the effects of crisis and exposure to a foreign shock tend to be higher in more financially integrated countries.

In this context, Magud, et al. (2011) emphasize that CFM policies are vital due to the 4 risks: (i) Fear of Appreciation, (ii) Fear of Hot Money, (iii) Fear of Large Inflows, and (iv) Fear of Loss of Monetary Autonomy. The risks explained in Magud et al., 2011 can be summarized in brief as follows:

Fear of Appreciation: Owing to the rapid increase in capital inflows, there is upward pressure on the domestic currency. The appreciation of the domestic currency makes domestic manufacturers less competitive in the global markets. Policies implemented to prevent this appreciation trigger foreign exchange reserves to accumulate. In other words, the reserve accumulation is sterilized. Eventually, sterilization of the reserve accumulation becomes more difficult and requires more direct intervention.

Fear of Hot Money: In developing countries, the interest of foreign investors may be “fleeting” and hence, policy makers mostly find this temporary attention disturbing. Especially in small open economies, a sudden and large increase in funds can lead to

sudden reversals. The abrupt movements (sudden injections and withdrawals) give rise to fear of instability in capital flows and reduce the trust in international financial markets. In these circumstances, policymakers tend to impose taxes on Tobin's proposal about "high enough tax". If policy makers apply tax policy effectively, initial inflows can be discouraged, and ultimately the negative impacts of inevitable withdrawals can be avoided.

Fear of Large Inflows: The most common drawback of developing country policy makers is large capital inflows that can cause financial distortion. Substantial levels of capital flow whether arising from higher returns or not, can be a source of instability in the financial sector. For instance, external funds can enhance excessive risk-taking behavior and manifest themselves as pressure on asset markets leading to price bubbles. In such cases, the policy stance of policy makers can be in favor of using taxation.

Fear of Loss of Monetary Autonomy: Owing to impossible trinity in international macroeconomics, policy makers cannot have a fixed (or managed) exchange rate regime, an autonomous monetary policy, and open capital markets at the same time (see Frankel, 2001). If policy makers are in fear of floating, their views on monetary policy autonomy can be altered. To stabilize the movements in domestic currency, they can give up capital mobility instead of giving way to autonomous monetary policy. Therefore, policymakers can become more supportive of the use of capital controls.

As researchers and policy makers explicitly recognize the risks associated with increased capital flows and financial integration, there seems to be a tendency towards the use of capital controls or capital flow management policies rather than the post- Bretton Woods ideas that strictly support the free movement of capital and high degrees of financial integration. This tendency seems to be intensified after the Global financial crisis.

A few years after the global financial crisis, IMF (2012) has reformulated its mainstream stance and declared a new institutional view that states *"the temporary re-imposition of CFM measures under certain circumstances is consistent with an overall strategy of capital flow liberalization"* (IMF, 2012). IMF's (2012)'s view indicates an important change in the sentiment towards the use of capital controls and the long-standing position of IMF. A series of IMF research starts to consider a shift to the rehabilitation of the

mainstream view that approaches the capital flow management measures as undesirable. IMF, after a long time being opposed, has qualified capital controls as appropriate tools in a broad policy toolkit in certain circumstances.

Another international organization that supports the introduction of capital flow restrictions is OECD. The OECD Code of Liberalization of Capital Movements has joined this new debate and stressed the stabilizing role of capital controls. However, the stances of IMF and the OECD are somewhat different. Although the view of the OECD is more cautious than IMF, they are both more benign to the use of CFMs in macroeconomic and macro-prudential management.

Now, we examine renewed interest in capital flow management measures by focusing on the definition and economic rationale of these controls. There are several definitions of capital flow management. IMF's (2012) definition grounds on some measures to restrict capital flows to mitigate the significant risks which deepen macroeconomic and financial instability. Indeed, IMF (2012) does not deviate from the reference of "capital flow liberalization" which is the removal of measures that are designed to limit capital flows. Here, CFMs are seen as limitations or restrictions on capital flows. Thus, CFM can include all the measures that limit capital transactions as well as the related payments or transfers. Even, it implies a restriction of the convertibility of domestic currency in international financial transactions. In other words, IMF does not prefer to separate CFMs from the general concept of liberalization and it prefers implicitly to incorporate the temporary re-imposition of CFM measures under some conditions. This definition also does not rule out the macro-prudential practices that are designed for financial stability. Therefore, CFM refers to two kinds of measures: capital controls that limit the cross-border capital flows focusing on resident-based discrimination and macro-prudential measures that cannot be discriminated in terms of residency. The latter is related to financial stability and can limit cross-border or foreign currency exposure and lending (Forbes et al., 2015).

Ostry et al. (2011) categorize CFMs into three groups: (i) Foreign exchange-related prudential measures, (ii) other prudential measures, and (iii) capital controls. In this categorization, foreign exchange-related prudential measures differentiate capital flows on basis of currency instead of residency. In other words, they are applicable to regulated

financial institutions such as banks (Ostry et al, 2011). For example, these restrictions can be some limits on banks' open foreign exchange positions and foreign lending. In the second group, some measures are related to the loan to value ratios and a range of limitations on domestic credit growth, sectoral lending conditions, and especially countercyclical capital requirements. The goals of these types of measures are mainly reducing the systemic risk and they can be differentiated on basis of currency or residency. The third group explicitly includes restrictions on capital flows and these restrictions can discriminate flows only on basis of residency (Ostry et al., 2011). Capital controls can be formulated as sector-specific, but they can also be economy-wide. Common examples of capital controls are taxes, remuneration of reserve requirements, and strict or full limitations (walls) can be classified as capital control measures.

1.2 DESIGN OF CAPITAL FLOW MANAGEMENT POLICIES

When the volume and volatility of capital flows, both inflows and outflows, substantially rise and some macroeconomic variables respond to this surge and macroeconomic and financial stability risks rapidly arise. In such circumstances, policymakers have limited options to safeguard stability such as (i) using conventional policies that lead to an adjustment in macroeconomic variables, (ii) using capital flow management policies, and (iii) combining adjustment mechanisms and capital flow management measures. Among these options, policy makers generally tend to use the third option: a combination of conventional response and capital flow management measures (Ostry, 2012). However, the use of capital flow management measures requires further attention because they are likely to be effective in certain conditions. Ostry (2012) defines these conditions as (a) the presence of overvalued domestic currency, (b) inadequate levels of reserves, (c) high and unavoidable levels of inflation, and unsustainable fiscal balance or public debt. Besides the macroeconomic risks mentioned above, the increased risk of financial instability is another condition for employing capital controls.

Ostry (2012) and IMF (2012) illustrate the management of capital controls in Figure 1 and Figure 2.

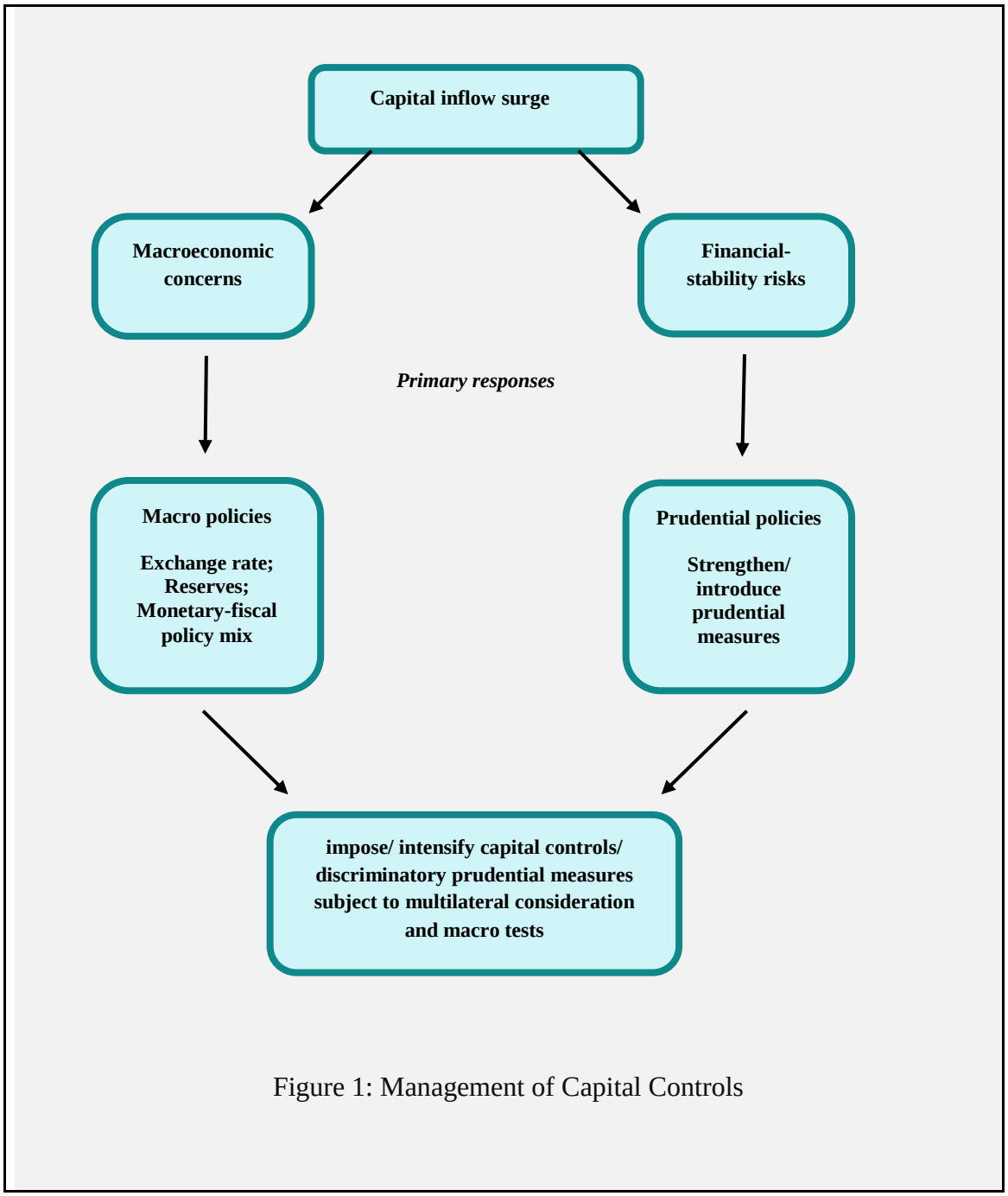

Figure 1: Management of Capital Controls

Source: Ostry (2012).

As seen in Figure 1, capital inflow surges lead to an increase in macroeconomic concerns and risks of financial stability. On the macroeconomic front, the policy responses are related to exchange rates, reserves and they are typical monetary and fiscal policies. On

the financial front, the apparent option is to use prudential policies to mitigate the risks. It is also possible to combine these two options. However, sometimes these options may not be sufficient to reduce the risks associated with inflow surges. Hence, intensifying capital controls can be a proper tool. Also, the underlying economic conditions can change rapidly and the response of policymakers can be late. In such cases, CFMs, in particular capital controls, may be time-saving.

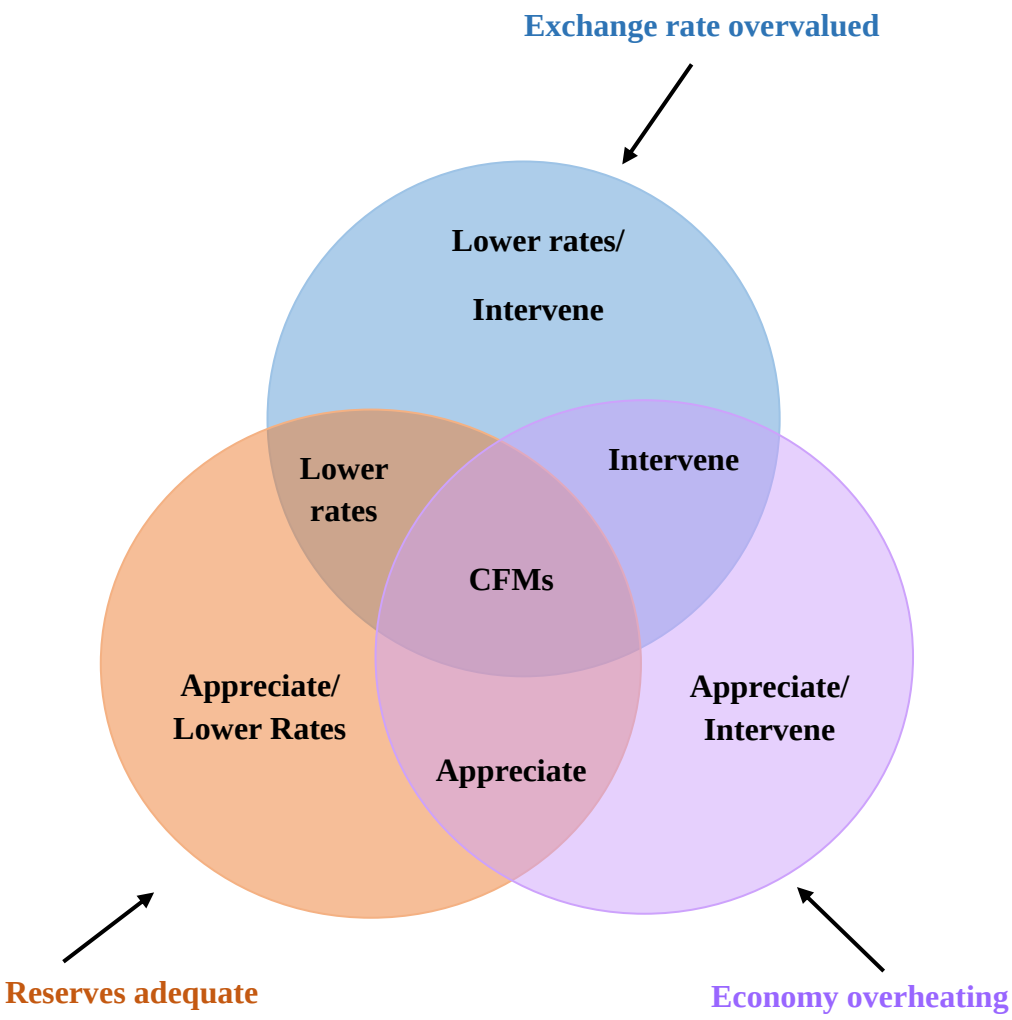

Figure 2: Appropriate Adjusting Mechanisms

Source: IMF (2012).

Figure 2 illustrates the macroeconomic stance of a country after an inflow surge as a combination of monetary and fiscal policies consistent with inflation and growth targets.

In most cases, policymakers use three adjusting policies. First, they can lower interest rates in the absence of asset price bubbles and overheating (i.e. expansionary monetary policy stance) or they can tighten the fiscal policy if expansionary monetary policy is expected to give rise to higher inflation. By using a tight fiscal policy, the interest rate differential can be reduced. The second policy is to strengthen the currency if it is not overvalued. That is the option of appreciation of the currency. The third policy option is intervening in the foreign exchange market and building more reserves. The increasing levels of reserves can help to mitigate the volatility of inflows. Here, it is important to note that if reserves are already high, the costs of intervention may exceed their benefits. Thus, in sustained inflows, intervention accelerates the appreciation and increases the level of flows by raising the expectations about further appreciation.

Figure 2 explains the policy options and the required conditions for the use of them. The circles in the figure show the different cases of the economy. For example, if the economy is not overheating, policymakers can lower interest rates or if the exchange rate is not overvalued, they can make the currency appreciate, and finally, if reserves are inadequate, they can intervene in the foreign exchange market. However, the implementation of these policies is not quite easy. In cases of inflexibility, the appropriate adjusting mechanism may not work effectively. Thus, policymakers can be directed to the use of capital flow management policies. This is exactly the intersection of the three circles shown in Figure 2. The intersection of the circles indicates that there is not enough room and time to adjust policies. If the required steps of the adjustment mechanism need more time or if there is a rising uncertainty about the decision of policymakers, capital flow management policies can be time-saving as argued in Ostry (2012).

Korinek (2010, 2018) support the recommendations of Ostry (2012) and IMF (2012). He underlines the necessary circumstances to implement them: (i) limited room to adjust macroeconomic and structural policies, (ii) limited time to macroeconomic and structural policies, and (iii) an inflow surge that threatens financial system stability. In these circumstances, the implementation of CFMs can assist macroeconomic policy and safeguard the financial sector against instabilities.

Ostry (2012), IMF (2012), and Korinek (2011, 2018) also emphasize that CFMs should be reasonable and consistent with the adjustment policies. They warn policymakers

against the potential distortions of CFMs. The first distortion may be the unreasonable change in the value of domestic currency after the use of CFMs. This may lead to unfair advantage and distort the international monetary system. The second problem may be the immediate use of CFMs. If inflow surges are driven by specific pull and push factors and there is enough room for macroeconomic and structural policies, the immediate use of CFMs may not be effective. The third problem arises from the nontransparent and permanent use of CFMs. If CFMs are not transparent, target-specific, and temporary, the costs of CFMs may outweigh their benefits (IMF, 2012). Given these concerns, there is a need for an "intelligent formulation" of capital flow management policies.

In the process of intelligent formulation, policy makers take into account some other issues. First, policy makers must be aware of effectiveness and efficiency. The former refers to the accomplishment of the intended goal. The latter is about minimizing the possible distortions. CFMs must satisfy both efficiency and effectiveness purposes. Second, policymakers must differentiate the inflows as sustained and speculative while introducing CFMs. If inflows are speculative and volatile, it is more appropriate to use capital controls. But for permanent flows, the macroeconomic adjustment policies seem to be more effective. Third, policymakers must consider whether controls are broad-based or targeted. Ostry (2012) proposes that the former is a more appropriate tool for macroeconomic concerns while the latter is for prudential issues. Finally, policymakers must be aware of the effectiveness of CFMs depending on the country's financial, administrative and institutional capacity. As recommended in Ostry (2012), CFMs should certainly be supported by a well-established institutional structure, a developed financial system, and a strong administrative capacity.

1.3 COSTS AND BENEFITS OF CAPITAL CONTROLS AND EARLY DISCUSSIONS ON EFFECTIVENESS

Capital controls have been applied in many emerging countries such as Brazil, Chile, Colombia, Thailand, and Argentina, etc. The consequences of implementing capital controls differ from country to country. In the literature, studies on the success (effectiveness) of capital controls are evaluated from different perspectives, and the criterion of success is a matter of debate. Magud and Reinhart (2006) state that there is no theoretical framework to reach a consensus in terms of the results of the controls.

However, the costs and benefits can be discussed through the examination of the potential channels that can affect country experiences.

Forbes (2005)'s ideas on the costs of capital controls are based on microeconomic evidence. Forbes (2005) states that capital controls are likely to decrease the supply of capital and increase the cost of external financing. These together may lead to a rise in financial constraints especially for small firms in emerging economies. Capital controls may also cause a loss in the market discipline in the financial sector and ultimately may become barriers to the efficient allocation of resources. Additionally, capital controls may distort the decision-making process of private agents, allowing them to escape from these controls to minimize the costs and create unexpected results. More importantly, according to Forbes (2005) implementing capital control policies isolate markets from the competition and their enforcement is highly difficult even in financially and institutionally developed countries. Forbes (2005) summarizes capital controls as "no free lunch". Since the interpretation of Forbes (2005) is based on individual experiences of private agents, one can question the general validity of this argument in favor of market liberalization. To respond to this criticism, Forbes acknowledges that her research takes the "cumulative weight of the evidence" when supporting the benefits of market liberalization.

In the context of the costs of capital controls, Klein (2012) draws attention to the distinction between long-standing (permanent) and periodic (event-based) controls on capital flows. Since some countries implement longstanding capital controls (e.g. China), others impose restrictions depending on specific events. This is the debate between gates and walls. The longstanding controls can be seen as "walls" and periodic ones can be "gates". Therefore, the common costs arising from walls are insulating economies to provide cheap capital and more developed financial markets and more room for diversifying risks. Contrarily, the gates are temporary and often have a particular intention. Klein (2012) states that the gates are less distortionary, but he confirms their inefficiency in a broad sense. Klein (2012) emphasizes the destabilizing role of capital controls in turbulent periods and financial crises fueled by financial distortions.

In contrast to Forbes's (2005) strict objection to capital controls, Pasricha (2012) considers the use of capital controls as a last resort option to be used in certain

circumstances. Pasricha (2012) states that international integration is likely to create some risks, especially in emerging countries, and hence capital controls may provide an advantage in terms of risk-sharing, optimal use of resources, and motivating financial development. However, she points to the costs of capital controls even if they are used as substitutes for macroeconomic management. As argued, the costs of using capital controls may be a reason for the evolving domestic and global imbalances in the long run (Pasricha, 2012).

In this thesis, the empirical evidence on the effectiveness of the controls is examined in the next chapter. However, to make an introduction to the issue of effectiveness, we review the first glance results of some country experiences in the 1990s and the early 2000s.

Knorr (2002) underlines that capital controls applied in Malaysia in 1994 were effective in reducing the volume of inflows and altering the composition of inflows. Similarly, Magud and Reinhart (2006) document that in Malaysia, controls on capital outflows reduced net outflows, and provided a more independent monetary policy while pointing to the ineffectiveness of capital controls in other countries.

Ostry et al. (2010) confirms the evidence of Magud and Reinhart (2006) and states that the controls on capital inflows in Chile, Colombia, and Brazil in the 1990s did not affect volume, and exchange rate pressures. In addition, Thailand's controls on short-term flows in 2006 did not produce effective results, prompting appreciation within a week. However, Ostry et al. (2010) argue that controls on inflows in Chile and Colombia partly served for changing the composition of capital inflows to longer maturity asset categories. Another study that examines the Colombian experience is by Clements and Kamil (2009). They argue that the measures were effective in reducing external debt while there was no effect on portfolio investments and other investments, monetary policy independence, and currency appreciation.

Overall, there is no consensus on the effective use of capital controls. Advocates of capital controls put more emphasis on the complementary role of capital controls and propose temporary and episodic measures to mitigate some macroeconomic risks. However,

academics with opposing views strictly support full liberalization, because of uncertainty in implementing restrictions, mixed country experiences, and the costs of controls.

CHAPTER 2

LITERATURE REVIEW

In recent years, countries have started to use capital controls as a policy tool to protect themselves from various instabilities arising from high and volatile capital flows. Following that there is a growing body of literature on the role played by capital controls to manage macroeconomic policies. This chapter reviews the previous theoretical and empirical studies. The first part of the section gives a brief overview of theoretical literature and the second part assesses the empirical work that points to the effectiveness of capital controls.

2.1 THEORETICAL LITERATURE

Over the past decade, the risks arising from high and volatile capital flows have increased the concerns about financial and macroeconomic instability and then academic discussions vastly shifted to the issue of the appropriate use of capital controls. In recent years, there has been a growing body of theoretical literature that focuses on the desirability and welfare impact of capital controls policies.

The theoretical literature has three dimensions. The first of these is related to externalities resulting from financial frictions and over-borrowing. In this strand of literature (Bianchi and Mendoza, 2010; Jeanne and Korinek, 2010; Bianchi, 2011; Korinek, 2011; Devereux et al. 2018), the prevalence of externalities can alter the positive welfare effects of fully open capital markets. These studies argue that if small open economies cannot manage the external shocks in the presence of financial frictions, capital controls and macro prudential tools can be employed to complement macroeconomic policies (Rey, 2015). Thus, in this stream of literature, capital control measures appear to be the second-best policy option as long as they help to reduce the probability of the occurrence and severity of a financial crisis. According to these studies, with capital controls, many developing countries can decrease the externalities that emerged during financial crisis periods.

Korinek (2011) investigates the role of capital controls by using a small open economy model that creates externalities depending on the financial crisis. In his model, individuals

are not fully aware of their contribution to financial instability. When a financial crisis restrains access to international financial markets, the economy falls into a "feedback loop" that can be explained by a vicious circle of falling demand, declining prices, and adverse balance sheet impacts. Since individuals take falling exchange rates and asset prices as given and act without internalization of their choices, their common tendency becomes taking excessive risks that often trigger financial instability further. The distorted actions such as over-borrowing, selecting risky instruments in financial markets, raising the level of foreign currency debt, heavily borrowing in short maturity cause an increase in financial fragility. Korinek's (2011) view emphasizes that capital controls can help individual market participants to internalize their externalities and in turn, reduce macroeconomic instability. For instance, if individual market participants can reduce their excessive risk-taking actions and short-term over-borrowing after the imposition of capital controls, financial crises may not deepen and the risk of sudden stops may decline. Thus, prudent capital controls can be viewed as the second-best policy in the presence of externalities.

The second strand of theoretical literature (Costinot et al., 2014, Farhi and Werning, 2014; Heathcote and Perri, 2016)) is based on the idea that the use of capital controls can be seen as a tool to control the terms of trade. Heathcote and Perri (2016) question whether capital controls increase a country's welfare by altering the equilibrium international prices in its favor. By using a two-country business cycle model, Heathcote and Perri (2016) find that countries can benefit by restricting international borrowing and lending.

There are two identical countries in Heathcote and Perri (2016) model. One of these countries is assumed to be exposed to a permanent positive productivity shock and have a negative net foreign asset position due to the increased investments. The other country is assumed to be more productive and have a positive net foreign asset position. Then, Heathcote and Perri (2016) impose a capital tax policy as a restriction into this model and assume that this policy subsidizes savings when the country is a borrower and it imposes taxes on the savings when the country is a lender. The aim of this policy is to borrow less in the short run and to save less in the long run. Therefore, this sort of policy allows country to borrow cheaply when it is a borrower and to earn higher returns when it is a creditor. Heathcote and Perri (2016) also propose that capital control policies influence

equilibrium prices (interest rate and terms of trade). When they check the responses of equilibrium prices, they find that for the case of interest rates, imposing capital controls leads to saving more at the beginning and consumption in later periods. That is, this policy allows to a decrease in interest rate when country is borrower and to increase an increase in interest rate when country is a lender. Therefore, country becomes better off with the use of capital controls. For the case of terms of trade, although the initial positive productivity shock worsens the country's terms of trade by lowering the relative price of domestically produced good, capital controls dampen the impact of worsening of terms of trade by retarding the increase in investment made in the more productive country. These two mechanisms in Heathcote and Perri (2016) model are the main reasons for proposing taxes on capital flows. Similarly, Costinot et al. (2014) advocate capital controls that aim to encourage exports by manipulating the terms of trade with a mercantilist perspective.

Another key study in the second strand of literature is Farhi and Werning (2014). They focus on the possible macroeconomic interventions that are required to overcome booms and busts arising from volatile capital flows in emerging markets. Farhi and Werning (2014) use a New Keynesian model with nominal rigidities and time-varying risk premium in the interest rates to determine capital inflow surges and sudden stops. In contrast to the logic of Bianchi and Mendoza (2010), Jeanne and Korinek (2010), Bianchi (2011), Korinek (2011), Farhi and Werning (2014) model is based on a Mundellian logic that emphasizes the role of the exchange rate system. Given this background, their model determines the optimal level of capital controls. Farhi and Werning (2014) argue that there may be room for capital controls even in flexible exchange rates. Capital controls in the forms of temporary taxes/ subsidies are found to be useful tools to deal with large capital inflows/outflows. Additionally, temporary subsidies/taxes on inflows/outflows are required to tackle with sudden stops. If a sudden stop occurs under a flexible exchange rate regime and the absence of capital controls, the nominal exchange rate depreciates, and the nominal interest rate increases. In such an environment, domestic expenditures fall, and current account rebalances. To smooth drastic responses of the nominal exchange rate, interest rate, and current account described above, an optimal control policy can be temporary subsidies on inflows and taxes on outflows. Thus, monetary policy and capital controls can be used together to stabilize the economy.

In the third strand of literature, Kitano and Takaku (2017) examine the welfare effects of capital controls when the degree of financial friction between banks and foreign countries increases. They document that the greater the degree of financial friction, the more effective capital controls are in improving welfare. In a similar study, Devereux et al. (2019) reveal that financial frictions make traditional monetary policy instruments less effective and capital controls can be implemented as a supplement to the traditional monetary policy. Unsal (2011), another study that analyzes the interaction between monetary and macro-prudential policies, describes macro-prudential policies as supplementary tools for monetary policies. The author states that broad macro-prudential measures may be beneficial in times of crisis, but financial instability may continue, even if the volume of capital inflows decreases. Nispi Landi (2017), one of the recent studies this line of literature, points to three main findings on the impact of capital controls in his study: (a) Capital controls and macroprudential policies can mitigate the negative impact of the increase in foreign interest rates, (b) to use capital controls and macroprudential policies, it is necessary to look at the situation of shocks and (c) capital controls and traditional monetary policies play a complementary role in maintaining the balance between inflation and financial instability.

2.2 EMPIRICAL LITERATURE

In this part, we aim to review recent empirical studies about the effectiveness of capital controls. We can classify the empirical work as (i) country studies that rely on specific capital control measures that are experienced in some emerging countries such as India, Malaysia, Chile, Thailand, etc. and (ii) multi-country studies that analyze the impacts of capital controls on capital flows and other macroeconomic variables such as exchange rates, interest rate differentials, etc.

The former group of studies is surveyed in Edwards (2009) and Magud et al. (2018). The main motivation of these studies is to summarize the experiences of countries after implementing capital controls. As argued in Magud et al. (2018), the country studies have not a common strategy and mostly give more weight to some countries like Chile and Malaysia. Thus, it is not easy to document the “success” of the country's experiences. Nevertheless, we capture some important findings suggesting that capital controls appear to have a limited impact in reducing large capital inflows and real exchange rate pressures.

Although these results imply that capital controls may not be effective in macroeconomic management, there is room for capital controls to change the composition of capital flows and provide more independent monetary policy (Magud et al., 2018).

Our main interest in this thesis is to analyze the role of capital controls on capital flows and hence, we try to concentrate on the empirical work related to capital inflows/outflows. However, many of the studies in this literature investigate the effectiveness of capital controls on a broad set of macroeconomic indicators. In other words, it is very difficult to separate the studies that only focus on capital inflows and outflows. Given this background, we review the empirical work that is concerning both capital flows and various macroeconomic indicators such as exchange rates, interest rate differentials, output, financial instability.

Before describing the empirical studies on capital control effectiveness, recall that there is considerable diversity in the measures of capital controls used in empirical studies. Thus, the results from empirical work in this field are mixed. Now, we proceed by reviewing the studies that our research builds upon.

Ghosh et al. (2014) examine how effective are capital controls by using a rich bilateral CFMs data set for 76 recipient countries (both advanced and emerging) over 1995-2012. Based upon a panel on the gravity-type model, Ghosh et al. (2014) analyze the impacts of CFMs on both aggregate and disaggregated flows. They also consider banking flows that are relatively more volatile than other flows. The findings of Ghosh et al. (2014) reveal that CFMs at both recipient and source countries have an impact on the volume of cross-border banking flows. For source countries, controls on outflows (bond, equity, FDI, credits) lead to a decrease in nonresidents' flows. For recipient countries, CFMs (specifically controls on bond inflows, foreign exchange-related restrictions) help to reduce inflows.

Forbes et al. (2015) use weekly data for 60 advanced and emerging countries over 2009-2011. Their capital control measures are the numbers of CFM events in individual countries such as the number of inflow/outflow controls and macro-prudential measures that were implemented. By using a propensity-score matching methodology, Forbes et al. (2015) find that capital controls and macro-prudential measures have limited effects on

exchange rates, net capital flows, and other macroeconomic indicators. They also underline that macroprudential measures can be more effective in reducing financial fragility. Similarly, Blundell- Wignall, and Roulet (2015) provide evidence on the limited effects of CFMs by employing cross-country panel regressions on a panel of 37 emerging economies. Their results suggest that currency-based CFMs positively impact the decoupling of countries from global credit cycles. More clearly, they state that the sensitivity of most of the countries in the sample has increased in the post-2010 period, and hence, the number of CFMs has increased. However, CFMs, particularly the macro-prudential ones are not quite effective to reduce the sensitivity of countries to global exposures.

Fernandez et al. (2015) present an empirical analysis of capital controls in 78 countries over the period 1995-2011 by updating the capital control index published by Schindler (2009). Their data set includes capital control indices for inflows and outflows and also these indices are disaggregated in terms of types of assets and residency. Fernandez et al. (2015) show that capital controls do not accompany economic cycles, that is, they are acyclical. Independent from booms and busts (measured by different indicators such as output, current account, and real exchange rate), capital controls stay flat. This situation indicates that policymakers cannot manage capital controls under cyclical movements.

Zhang and Zoli (2014) analyze the effects of CFMs by covering 46 developing countries from different regions and utilizing cross-country panel regressions. Their findings show that CFMs are not likely to decrease overall credit growth between 2001 and 2013. However, CFMs seem to mitigate the rise in housing prices in Emerging Europe and reduce equity flows in some countries outside the Asian region. Thus, Zhang and Zoli (2014) confirm the limited effects CFMs.

Pasricha et al. (2018) is another study that investigates 17 emerging economies over 2001-2011. The results of Pasricha et al. (2018) indicate once again the limited role of capital controls on net inflows and exchange rates. They also note that since Global Financial Crisis, the limited impact of capital controls has declined and there is some evidence that gross outflows have been offsetting the influence of CFMs on gross inflows. That is, differentiating the impact of capital controls on inflows and outflows is important to determine the effectiveness of capital controls on capital flows.

In the literature, some studies attach specific attention to some asset categories such as bond and banking inflows. Bruno et al. (2015) evaluate the impacts of macro-prudential measures and capital controls on 12 Asia-Pacific countries spanning over 2004-2013. They find that CFMs have no significant impact on bond and banking inflows. However, the type of capital controls can be important for the change in the composition of capital flows. Bruno et al. (2015) state that controls on bond flows encouraged banking flows after 2009 while in the pre-crisis period, banking flows stimulate the bond flows. In a similar vein, De Crescenzio et al. (2017) point to cross-border banking flows by using a dataset that includes 49 countries' currency-based measures imposed on banks between 1993 and 2013. They find that these types of regulations help to reduce short-term cross banking flows and their impact is relatively higher for loans than for securities or deposits.

Beirne and Friedrich (2017) also find evidence of the effectiveness of macro-prudential policies on cross-border bank flows and report that the effectiveness of CFMs is related to the banking sector structure of the economy. Their evidence indicates that improved regulatory quality, higher bank profitability, and increased efficiency in intermediation are associated with higher effectiveness of CFMs.

The most recent study on the effectiveness of capital controls is by Nispi Landi and Schiavone (2021). In this study, the authors analyze the impacts of capital controls by using the Fernandez et al. (2015) dataset over the period 1997-2017 for several advanced and emerging economies. Nispi Landi and Schiavone (2021) find evidence that capital controls have a significant impact on the size of capital flows, capital surges and flights, exchange rates, and financial stability. The results of this study distinctly suggest that the use of capital controls is effective in reducing the volume of capital flows and the probability of surges and flights. Also, the effects of capital controls differ across advanced countries and emerging countries. They report that in emerging economies, the impacts of capital controls are larger than in developed countries. With less precision, Nispi Landi and Schiavone (2021) show that there is a positive link between capital controls and financial stability in the sense of decreasing credit growth and foreign currency loans in domestic banking systems.

In sum, the results of previous studies imply that the effectiveness of CFMs is quite limited in achieving the goals mentioned in Magud et al. (2018): reducing the size of

capital flows, changing composition of capital flows toward more stable and longer maturity assets, mitigating the exchange rate pressures and providing more independent monetary policy. The evaluation of the effectiveness of CFMs seems to be challenging and rather uncertain.

Table 1: Empirical Studies

Study	Period and Method	Empirical Evidence
Ghosh et al. (2014)	1995-2012, cross border data of 31 source and 76 recipient countries, a k-means clustering method	CFMs at both recipient and source countries have an impact on the volume of cross-border banking flows.
Forbes et al. (2015)	2009-2011, own dataset for 60 advanced and emerging countries and propensity-score matching method	Capital controls and macro-prudential measures have limited effects on exchange rates, net capital flows, and other macroeconomic indicators. Macroprudential policies can be an effective tool in reducing financial vulnerability.
Bruno et al. (2015)	2004-2013, 12 Asia-Pacific countries, Panel regression.	CFMs have no significant impact on bond and banking inflows. The type of capital controls can be important for the change in the composition of capital flows.
Fernandez et al. (2015)	1995-2011 updates the capital control index published by Schindler (2009) in 78 countries,	Capital controls follow a nearly constant course throughout economic cycles.

De Crescenzio et al. (2017)	1993- 2013, 49 countries	Regulations help to reduce short-term cross banking flows and their impact is relatively higher for loans than for securities or deposits.
Pasricha et al. (2018)	2001-2011, a new dataset for 17 emerging economies, panel VAR method.	Capital controls have a limited impact on net capital inflows, monetary policy independence, or the exchange rate.
Nispi Landi and Schiavone (2021)	1997-2017, Fernandez data for 100 countries, GMM and TSLS method	Capital controls have a significant impact on the size of capital flows, capital surges and flights, exchange rates, and financial stability.

Source: Prepared by the author.

CHAPTER 3

METHODOLOGY AND DATA

This thesis questions whether capital controls have impacts on the volume and volatility of gross capital inflows and outflows to assess the effectiveness of capital flow management policies. In the first part of this chapter, we describe the models to estimate the effects of capital controls on the volume and volatility of the gross flows. In the second part, we explain the data issues in detail.

3.1 METHODOLOGY

In this part, we describe the models that are employed in the empirical analysis. First, we build the baseline specification to quantify the impacts of capital controls on the volume of gross capital flows. Second, we calculate the volatility of gross capital flows and build a model to estimate the impacts of capital controls on volatility measures. Third, we explain the panel threshold model developed by Hansen (1999) to test whether the effects of capital controls change across different financial development regimes.

3.1.1 Model for the Volume of Gross Capital Inflows and Outflows

By following the literature, the baseline model for the volume of gross capital flows can be represented with the following equations:

$$gci_{it}^{c} = \alpha + \beta_1 kai_{it-1} + \beta_2 push_{it-1} + \beta_3 pull_{it-1} + \omega_t + \delta_i + \varepsilon_{it} \quad (1.1)$$

$$gco_{it}^{c} = \alpha + \beta_1 kao_{it-1} + \beta_2 push_{it-1} + \beta_3 pull_{it-1} + \omega_t + \delta_i + \varepsilon_{it} \quad (1.2)$$

where $i = 1, \dots, N$ and $t = 1, \dots, T$.

In these specifications, gci_{it}^{c} and gco_{it}^{c} denote gross capital inflows and outflows as a percentage of GDP. The superscript c refers to the sub-categories of inflows or outflows such as FDI inflows (gdi_inf)/outflows (gdi_out), portfolio inflows (gpi_inf)/outflows (gpi_out) and other investment inflows

(goi_inf)/outflows (goi_out). kai_{it-1} and kao_{it-1} represent capital controls on inflows and outflows respectively. kai_{it-1} and kao_{it-1} are our main variables of interest. $push_{it-1}$ and $pull_{it-1}$ are the vectors of control variables classified as push and pull factors. Push factors are global liquidity and global risk. Pull factors are real GDP growth, trade openness, CPI inflation rate, and financial development index. ω_t and δ_i refer to time and country fixed effects. ε_{it} is the error term.

Equations (1.1) and (1.2) include the lagged independent variables to minimize the problems of endogeneity as suggested in Broto et al. (2011) and Nispi Landi and Schiavone (2021). Autocorrelation and heteroscedasticity problems are controlled by using Driscoll and Kraay (1998) standard errors. Finally, Equations (1.1) and (1.2) are estimated by panel fixed effect techniques.

3.1.2 Models for the Volatility of Gross Capital Inflows and Outflows

By following the literature, the baseline model for the volatility of gross capital flows can be represented with the following equations:

$$VGCI_{it}^{c} = \alpha + \beta_1 kai_{it-1} + \beta_2 push_{it-1} + \beta_3 pull_{it-1} + \omega_t + \delta_i + \varepsilon_{it} \quad (1.3)$$

$$VGCO_{it}^{c} = \alpha + \beta_1 kao_{it-1} + \beta_2 push_{it-1} + \beta_3 pull_{it-1} + \omega_t + \delta_i + \varepsilon_{it} \quad (1.4)$$

where $i = 1, \dots, N$ and $t = 1, \dots, T$

In these specifications, $VGCI_{it}^{c}$ and $VGCO_{it}^{c}$ denote the volatility of gross capital inflows and outflows as a percentage of GDP. All other representations are the same as in part 3.1.1.

To measure volatility, we use two approaches proposed by Broto et al. (2011) and Li and Rajan (2015). The first measure of the volatility of capital flows is based on an approximation that uses the standard deviation of capital flows over a rolling window of annual data. This measure can be represented as follows:

$$\tau_{it} = \left(\frac{1}{n}\sum_{k=t-(n-1)}^{t}(capitalflow_{ik} - \mu)^2\right)^{1/2} \quad (1.5)$$

$$\mu = \frac{1}{n}\sum_{k=t-(n-1)}^{t} capitalflow_{ik} \quad (1.6)$$

Where $capitalflow_{ik}$ refers to capital flow data and i and k represent countries and years respectively. The rolling window technique is a very commonly used approach in the literature Neumann et al. (2009) and IMF (2007) which has some advantages such as simplicity and application to short time intervals. In the rolling window approach, one of this advantage is the loss of the observations in the sample depending upon the length of the window. Another drawback can be the possibility of smoothing volatility process arising from the same weights given to $capitalflow_{it-1}$ and $capitalflow_{it-(n-1)}$.

A second alternative approach is fitting a suitable ARIMA model for each country in the sample and calculating the annual variance of capital flows based on the absolute value of residuals by following Broto et al. (2011) and Li and Rajan (2015)[2].

In this study, we both employ the rolling window method and ARIMA (1 1 0) model to measure the volatility of gross inflows and outflows in 44 countries over 1998-2017.

3.1.3 Panel Threshold Models for the Volume and the Volatility of Gross Capital Inflows and Outflows

Threshold models have attracted considerable interest in recent years. Within this context, Hansen (1999) develops a seminal model for static panels, which allows thresholds that can be determined endogenously. Hansen's (1999) threshold model is grounded on the heterogeneity of panel data. That is, the link between dependent and independent variables can differ across individuals (cross-section units) in the sample. Since fixed and random effect models only take into account the heterogeneity in intercepts, an extension is required to consider varying slopes in regressions. Hansen's (1999) panel threshold model simply touches on this issue and develops a panel data version of threshold models in time series analysis. This sort of model has important implications for economic policies. For instance, a threshold model can explain the nonlinear behavior of data by splitting the whole sample into different regimes. If a structural link includes thresholds, one can expect that under different regimes (upper regime: observations above the estimated threshold and lower regime: observations below the estimated threshold) the

[2] Broto et al. (2011) and Pagliari and Hannan (2017) compared different methods to measure the volatility of capital flows.

impact of the regime dependent variable can vary. Under these circumstances, the policy implications are likely to be different.

Hansen's (1999) panel threshold estimation has a procedure that relies on a critical assumption that regression (or structural link) can differ across observations. By regarding an observed variable, total observations in a panel can be divided into upper and lower regimes contingent on the threshold variable (q_{it}). In presence of a threshold variable, the responses of variables in regression can be nonlinear. Considering the heterogeneity in panel data, Hansen's (1999) model allows the homogenization of the sample.

Hansen (1999) proposes a procedure for a balanced panel dataset, while i represents individual effects, t represents time. The model with only one possible threshold can be defined as follows:

$$y_{it} = \mu_i + \beta_1' x_{it} I(q_{it} \leq \gamma) + \beta_2' x_{it} I(q_{it} > \gamma) + e_{it} \quad (1.6)$$

In Equation (1.6), γ_{it} is the dependent variable, q_{it} is the threshold variable, x_{it} is a k-dimensional vector of exogenous regressors. I(.) represents the indicator function and e_{it} represents the error term.

In this model, γ is the threshold value. γ divides observations into two regimes: $(q_{it} \leq \gamma)$ and $(q_{it} > \gamma)$. The former can be called the lower regime and the latter is the upper regime. β represents the slope parameters of two different regimes. Therefore, Equation (1) can be rewritten:

$$y_{it} = \mu_i + \beta_1 x_{it} + e_{it}\,, (q_{it} \leq \gamma) \quad (1.7)$$

$$y_{it} = \mu_i + \beta_2 x_{it} + e_{it}\,, (q_{it} > \gamma) \quad (1.8)$$

In this specification, Hansen's (1999) main argument is that individual characteristics in the regression should be eliminated. Because individuals have a heterogeneous structure, that is, they have their characteristics, estimation of the true relationship becomes difficult with panel data techniques.

Panel threshold estimation has successive steps. First, this estimation requires the test of $H_0: \beta_1 = \beta_2$, that is the test of the significance of the threshold. Non-rejection of the H_0

implies that there is no threshold effect. If there is no threshold, it is more appropriate to estimate a linear model. Otherwise, the regression can be estimated through a panel threshold model.

The second important stage is the estimation of the regression in Equation (1.6). However, the individual fixed effects in Equation (1.6) must be eliminated. To do this, Hansen (1999) proposes to subtract individual-specific means from the actual data. After the ordering of all variables ascendingly according to the threshold variable, the sum of squared residuals is computed for potential thresholds by trimming η % of de-meaned data. This process gives us the threshold value which is equal to the minimum sum of squared residuals. After these steps, the panel fixed effect model can be estimated.

In this thesis, we attempt to estimate the potential non-linear relationship between the size and volatility of gross capital inflows/outflows and capital controls by using Hansen's (1999) fixed effects panel threshold model. In our model, the threshold variable is the financial development level of countries. As argued in Kose et al. (2009) and Ostry (2012), the impact of capital controls on capital flows can vary depending on financial development. There may be a financial development threshold for the link between capital controls and the size and volatility of capital flows. The benefits of capital controls can be lower until some threshold level and once the threshold level is exceeded the effectiveness of capital controls can be larger. In sum, the sign and magnitude of the impacts of capital control can differ under high and low financial development regimes.

We analyze whether financial development matters and provide endogenous thresholds for the effects of capital controls on the size of gross capital inflows and outflows by estimating the following panel threshold regressions:

$$gci_{it}^{c} = \beta_0 + \beta_1 kai_{t-1}(fin\_dev_{it-1} \leq \gamma) + \beta_2 kai_{t-1}(fin\_dev_{it-1} > \gamma) + \beta_3 push_{it-1} + \beta_3 pull_{it-1} + \varepsilon_{it} \quad (1.9)$$

$$gco_{it}^{c} = \beta_0 + \beta_1 kao_{t-1}(fin\_dev_{it-1} \leq \gamma) + \beta_2 kao_{t-1}(fin\_dev_{it-1} > \gamma) + \beta_3 push_{it-1} + \beta_3 pull_{it-1} + \varepsilon_{it} \quad (1.10)$$

For the volatility of gross capital inflows and outflows, the panel threshold regressions are represented as follows:

$$vgci_{it}^{c} = \beta_0 + \beta_1 kai_{t-1}(fin\_dev_{it-1} \leq \gamma) + \beta_2 kai_{t-1}(fin\_dev_{it-1} > \gamma) + \beta_3 push_{it-1} + \beta_3 pull_{it-1} + \varepsilon_{it} \quad (1.11)$$

$$vgco_{it}^{c} = \beta_0 + \beta_1 kao_{t-1}(fin\_dev_{it-1} \leq \gamma) + \beta_2 kao_{t-1}(fin\_dev_{it-1} > \gamma) + \beta_3 push_{it-1} + \beta_3 pull_{it-1} + \varepsilon_{it} \quad (1.12)$$

In Equations (1.9) - (1.12), γ is an endogenously estimated threshold value of financial development. fin_dev_{it-1} represent the threshold variable. kai_{t-1} is the regime dependent variable. $push_{it-1}$ and $pull_{it-1}$ are the drivers of gross capital inflows and outflows.

3.2 DATA

In this thesis, by following the most recent literature, we analyze the behaviors of gross capital flows which are measured based on the residency of the investors. As argued in Forbes and Warnock (2012), the earlier focus of the literature on net capital flows has ignored the capital outflows of domestic investors. It is a reasonable way of thinking because in the 1990s net capital inflows have broadly mirrored gross inflows. However, especially aftermath of the Global Financial Crisis of 2008, we have witnessed an increase in the magnitude and volatility of gross positions while net capital flows have been following a stable path. In pursuit of these developments, the conventional literature on net capital flows has increasingly given way to the differentiation between gross inflows and outflows. Now, the recent literature has been emphasizing the importance of domestic investors' flows and suggesting that net capital flows cannot only be driven by foreign investors' behaviors. Otherwise, the pure focus on net flows might lead to mask the dramatic changes in gross positions. This crucial shift in the empirical literature motivates us to analyze the differentiated responses of gross inflows and outflows to capital control measures.

We base our work on Broner et. al. (2013) that defines gross capital inflows as capital inflows by foreign agents (purchases/sales of domestic assets by foreign investors) and gross capital outflows as capital outflows by domestic agents (purchases/sales of foreign assets by domestic investors). To obtain gross capital inflows and outflows data, we gather the Balance of Payments Statistics (BPM6) data in US dollars from the IMF. This

dataset is divided into two parts: (i) net acquisition of financial assets, and (ii) net incurrence of liabilities. Thus, gross capital inflows represent total liabilities, while gross capital outflows represent total assets. In other words, asset flows denote capital outflows by local intermediaries. liability flows denote capital inflows by foreign agents. We can divide gross capital inflows/outflows into three main categories: These are foreign direct investment inflows/outflows, portfolio investment inflows/outflows, and other investment inflows/outflows. Consequently, we consider the gross capital inflows (GCI) by summing up the liabilities of foreign direct investments (FDI), portfolio investments (PI), and other investments (OI). On the other hand, we obtain the gross capital outflows (GCO) by finding the sum of the assets of foreign direct investments (FDI), portfolio investments (PI), and other investments (OI). All these calculations can be summarized as follows:

GCI= investment in domestic assets by non-residents - disinvestment in domestic assets by non-residents (1.13)

GCO= investment in foreign assets by residents - disinvestment in foreign assets by residents. (1.14)

To quantify the impacts of capital controls on gross capital inflows/outflows, it is necessary to build the empirical analysis on appropriate capital control measures. However, the measurement of capital controls is a difficult task. First, since capital controls are seen as a part of capital flow management policies, they are often designed in a broad policy package that is composed of several types of controls and macro-prudential measures. Second, there is a significant diversity of measures employed by different countries. This limits the construction of an explicit measurement of capital controls for a broad panel of countries. Given these drawbacks, researchers have constructed at least six different datasets in recent years. These datasets mainly rely on IMF and AREAER and OECD Code of Liberalization of Capital Movements data. These datasets vary by frequency, country, and time dimensions. In addition, most of them can be classified as de-jure rather than de-facto indicators. De-jure indicators measure whether there is a regulatory policy on capital flows while de-facto indicators include

regulatory measures on economic variables (Nispi-Landi and Schiavone, 2021). The commonly used datasets on capital controls can be seen in Table 2.

Table 2: Datasets on Capital Controls

Dataset	**Frequency, countries, and time coverage**
Schindler (2009)	91 countries, the period of 1995- 2005, capital control indices for inflows and outflows, and different types of flows
Ghosh et al. (2014)	76 AEs and EMEs, the period of 1995–2012, CFM measures disaggregated by asset types.
Zhang and Zoli (2014)	46 AEs and EMEs, the period of 2000Q1-2013Q1, indices of macro-prudential policies and CFMs.
Forbes et al. (2015)	60 AEs and EMEs, weekly data in the period of 2009-2011, controls on inflows and outflows.
De Crescenzio et al. (2015)	49 countries, the period of 2005-2013, currency-based measures directed at banks.
Fernandez et al. (2016)	22 AEs, 45 EMEs, 24 developing economies, the period of 1995- 2011, capital control indices for inflows and outflows, and different types of flows
Pasricha et al. (2018)	17 EMEs, the period of 2001Q1-2011Q4, 193 CFMs.

Source: Guichard (2017).

Among a wide range of datasets on capital controls, this study relies on Fernandez et al.'s (2016) dataset that includes de-jure indicators. The dataset introduced by Fernandez et al. (2016) includes both controls imposed on capital inflows and capital outflows of 10 asset categories. This dataset identifies capital controls as indices that range between 0 and 1 (higher levels correspond to increases in the number of capital control measures, e.g.

countries become more restrictive). It also includes a broad set of countries (22 AEs, 45 EMEs, 24 developing economies) spanning the period between 1995 and 2017. An important advantage of Fernandez et al.'s (2016) data is its compatibility with IMF Balance of Payments Statistics. The asset categories in this dataset are designed through the use of IMF classifications.

Since one of the supplementary goals of this study is to investigate the main determinants of capital flows, in the models that are built, we consider several control variables. These control variables are disentangled as push (global factors) and pull (domestic) factors in receiving countries to better understand the size and volatility of capital inflows and outflows.

Several studies have been carried out on the effects of push and pull factors on capital flows.[3] Koepke (2019) provides an overview of the empirical findings of 40 papers on the drivers of capital flows to emerging markets since the early 1990s and brings together the drivers of capital flows in emerging markets. Koepke (2019) separates push factors into three dimensions: global risk aversion, mature economy interest rates, mature economy output growth, and pull factors in three dimensions: domestic output growth, asset return indicators, and country risk indicators. Koepke (2019) reveals that there is robust evidence that push factors are likely to be the most important drivers for portfolio flows. Push factors' influence on banking flows is relatively less and there is no clear evidence on the impact of push factors on FDI flows. On the other hand, Koepke (2019) identifies that pull factors are likely to be influential on portfolio flows, banking flows and FDI flows, but among them, the banking flows are more sensitive to pull factors.

Given this background, we select push and pull factors identified by Koepke (2019), Li and Rajan (2015), and Cerutti et al. (2019). While building up our empirical model, we first consider recent discussions such as the effects of global liquidity and global risk on capital flows. As stated in Milesi-Ferretti and Tille (2011) and Forbes and Warnock (2012), policymakers in major developed countries have devoted large efforts to overcome the decline in global liquidity due to the collapse in capital flows during and

[3] Koepke (2019), Cerutti et al. (2019), Sarno et al. (2016), Hoggarth et al. (2016), Avdjiev et al. (2017), Eichengreen et al. (2017) etc.

aftermath of the 2008 Global Financial Crisis. For instance, Federal Reserve and European Central Bank put into liquidity raising measures to offset the substantial slowdown in capital flows. These efforts also contributed to the developing countries that require external funding. Therefore, global liquidity has played a prominent role in determining the size and volatility of capital flows of all countries. In recent years, global risk has been highly under consideration of recent research. Several studies (Fratzscher, 2012, Byrnee and Fies, 2016, Eichengreen and Gupta, 2016) have confirmed the significance of global risk as a driver of capital flows. As argued in Fratzscher (2012), the increased risk during the 2008 Global Financial Crisis restricted foreign investors by distracting investors from risky assets and markets. In other words, there is a common risk factor that reduces investors' tolerance to the given risk level and leads to a decrease/increase in size/volatility of capital flows during and after crisis periods. In particular, Eichengreen and Gupta (2016) have emphasized that global risk aversion has become increasingly important in explaining the possibility of a sudden stop capital inflows to the emerging markets. Thus, we allow for common global factors and use both the global liquidity and global risk indicators.

We measure global liquidity by calculating the weighted average of broad money growth of the US, Euro Area, Canada, and Japan. Global risk is represented by the implied volatility of S&P 500 index options (VIX) as proposed by Milesi-Ferretti and Tille (2011), Fratzscher (2012), Ghosh et al. (2014), and Eichengreen and Gupta (2016).

Following the previous literature, we analyze the role of pull factors on gross capital inflows/outflows. To show the impact of market size and domestic output growth we include the real GDP growth rate. To indicate the importance of trade openness, we use (Exports+Imports)/GDP measure, and to represent macroeconomic stability, we consider the CPI inflation rate. We also control for financial development levels to determine the effectiveness of financial markets. Except for financial development, all data is obtained from the World Bank World Development Indicators database. To represent financial development, we use IMF's Financial development index.

In this study, we specifically take financial development under consideration. Since Kose et al. (2009) and Bush (2019) have drawn our attention to the importance of financial development in increasing the effectiveness of capital control measures, we particularly

perform a threshold regression that split our sample into two regimes as in the seminal study of Hansen (1999): high financial development regime and low financial development regime. By doing this, we attempt to determine a threshold for financial development and then explore to what extent gross capital flows are affected under different financial development regimes.

The annual data used in this study consists of 44 developing countries over the period 1997-2017. Although Fernandez et al.'s (2016) dataset contains 69 developing and emerging countries throughout 1995-2017, data limitations restrain our time and country coverage. The first limitation is the missing years in the IMF's Balance of Payments dataset for capital inflows and outflows. This forces us to remove the countries that have missing data in specific years. In addition, the lack of data for some pull factors prevents us to use the full sample of developing countries. The second limitation is related to our empirical methodology that is explained in the previous section. Since the panel threshold regression of Hansen (1999) requires a strongly balanced data set, we construct a balanced panel of countries. Third, we exclude some off-shore countries and financial centers as argued in Tarashev et al. (2016), Chui et al. (2014), Bruno and Shin (2015), Serena and Moreno (2016), Caballero et al. (2015)) to maintain more reliable results. In Table 3 we report the summary statistics of the variables under examination.

Table 3: Summary Statistics

Variable	Obs	Mean	Std.Dev	Min	Max
gci	880	6.487	19.416	-109	343
gco	880	4.338	13.435	-43	241
kai	880	0.431	0.303	0	1
kao	880	0.518	0.365	0	1
g_risk	880	20.395	6.138	11	31.8
g_liq	880	4.752	2.541	-0.277	11.2
gdp_grw	880	3.902	3.524	-14.8	17.3
trd	880	74.818	34.873	16.4	220
fin_dev	880	0.328	0.167	0.06	0.84
inf	880	6.688	8.676	-1.54	96.1

3.2.1 Trends for Gross Capital Inflows/Outflows and Capital Flow Policies

In this section, we attempt to explain the trends of gross capital inflows, gross capital outflows, and capital flow management policies for 44 developing countries between 1998 and 2017. We show the trend of gross capital flows in Figure 3, direct investment, portfolio investments, and other investment flows respectively in Figures 4,5,6, and finally, the trend of capital controls in Figure 7.

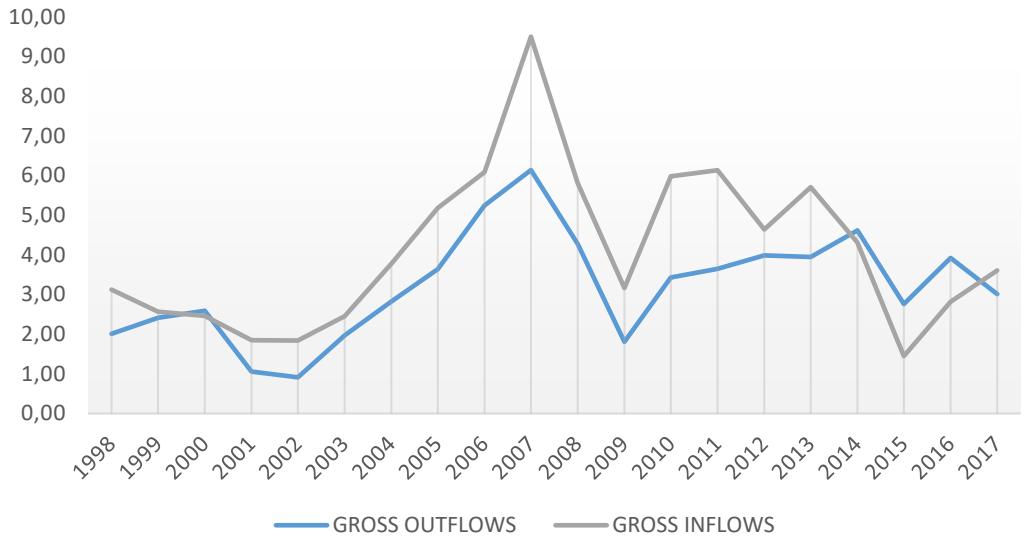

Figure 3 Gross Inflows and Outflow (% of GDP)

Figure 3 reports the behavior of gross capital inflows and outflows (% of GDP) for our sample developing countries. As seen in Figure 3, both flows have a stable path in the late 1990s and they accelerate in the second half of the 2000s. They reach their peaks in 2007 recording historical highs (around 10 % for inflows and over 5% for outflows). The GFC leads to a sharp decline in the volume of gross flows and makes inflows more fluctuating in further years. In contrast, gross flows tend to increase after recovery and follow a relatively stable trend between 2010 and 2015. However, the trend in gross flows is decreasing toward 2015 and there is a swift recovery at the end of the 2010s. In comparison to the period of acceleration over 2002-2007, gross positions are substantially lower and they turn back to their levels in the early 2000s in recent times.

Figure 3 also shows the co-movements between gross inflows and outflows. In the pre-crisis period, gross inflows and gross outflows relatively tend to move together and they seem to be highly correlated. In the post-crisis period, there are some divergences but

they are almost symmetric. This a/symmetry issue touches on a new discussion in recent literature argued in Milesi-Ferreti and Tille (2011), Broner et al. (2013), and Avdjiev et al. (2017). The conventional view is that the correlation between inflows and outflows is likely to be "close to zero or even negative". In other words, if a country is more attractive for foreign investors, domestic residents do not intend to invest more in foreign locations. This suggests that foreign and domestic residents' behaviors do not diverge. However, recent evidence reveals that gross inflows and outflows are highly correlated. This suggests when foreign residents invest in a country, domestic residents invest in foreign financial markets and vice versa. The reason for this asymmetry can be different responses of domestic and foreign residents to shocks. For instance, as argued in Milesi-Ferreti and Tille (2011) and Avdjiev et al. (2017), domestic and foreign investors may assess the risks of domestic and foreign assets differently. The differences between risk aversion may lead to asymmetries especially in periods of financial instability (Broner et al., 2013). Another explanation for the high positive correlation between gross positions is the similarities in saving rates between countries. According to Davis and van Wincoop (2017), a positive correlation arises from increasing financial integration and globalization. Higher financial integration leads to an increase in volatility in gross positions and hence, amplifies the correlation.

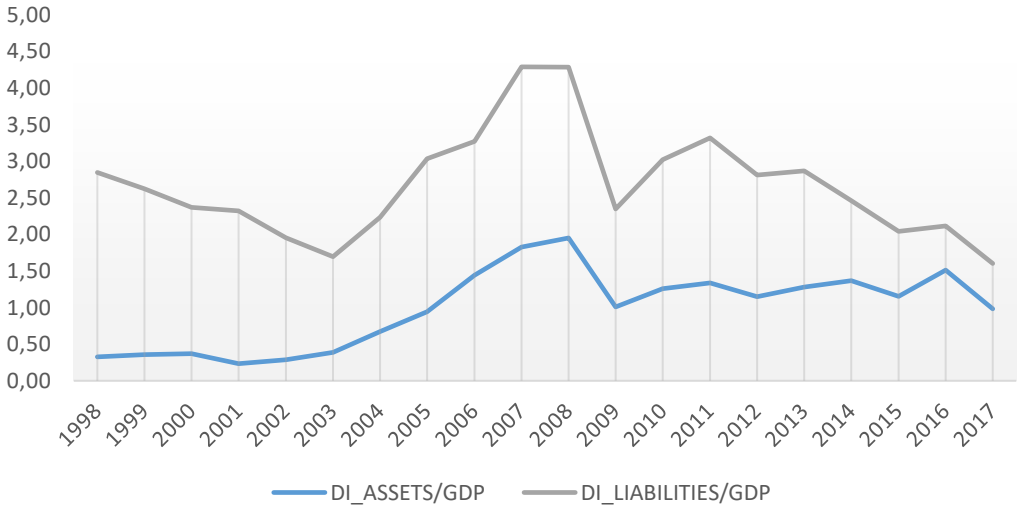

Figure 4: Gross FDI Inflows and Outflows.

Figure 4 shows the movements in the gross FDI inflows and outflows (% of GDP) over the period between 1998 and 2017. Gross FDI inflows represent liabilities, while gross

FDI outflows represent assets. Both the volume of FDI inflows and outflows increases between 2000 and 2007 and reaches its peak in 2007. This increasing trend is expected to represent the surge episodes of developing countries that are surrounded by an attractive investment environment enhanced by both domestic and global conditions. After a sharp decline in 2008 due to the collapse of international financial transactions, there is a moderate recovery between 2009 and 2011. After the recovery, gross inflows and outflows never reach the pre-crisis levels. Also, we observe a steady decline in both flows over the period 2011-2017.

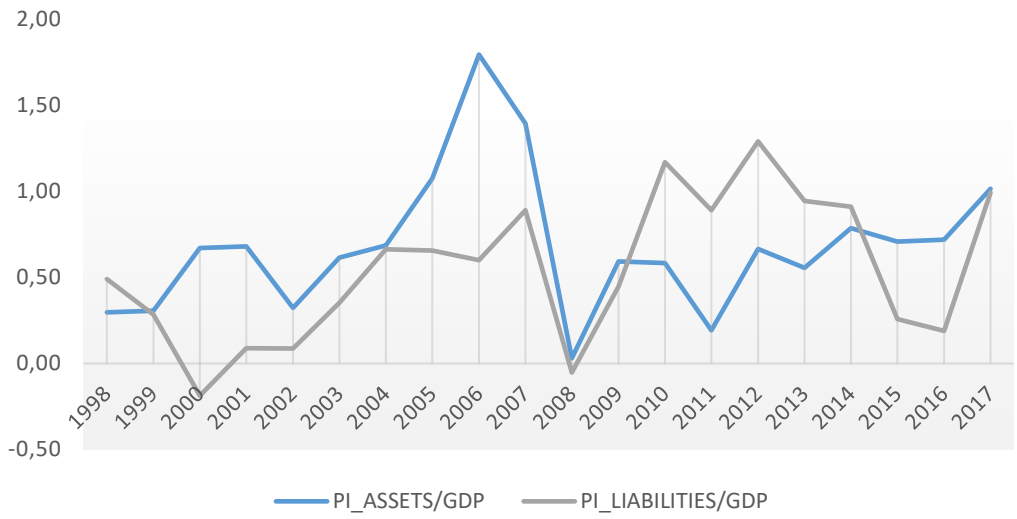

Figure 5: Gross Portfolio Investment Inflows and Outflows.

Figure 5 illustrates the movements in the gross portfolio investment inflows and outflows (% of GDP) over the period between 1998 and 2017. It is seen that the volume of gross outflows is remarkably larger in the first half of the 2000s and peaks in 2006. Then gross portfolio outflows follow a relatively volatile pattern and cannot never reach the pre-crisis levels. It is apparent that gross inflows instead surge mostly in the second half of the 1990s and experience a sharp decline with the Asian Crisis in 1997 and 1998. The pattern of inflows is relatively unstable like outflows due to the nature of the investment. Although the GFC leads to a dramatic decline in portfolio inflows, there is a relatively quick recovery. Even so, the period between 2012-2018 is highly volatile. In sum, there is a gradual momentum after the GFC but both inflows and outflows experience relatively more sudden movements than other types of investments.

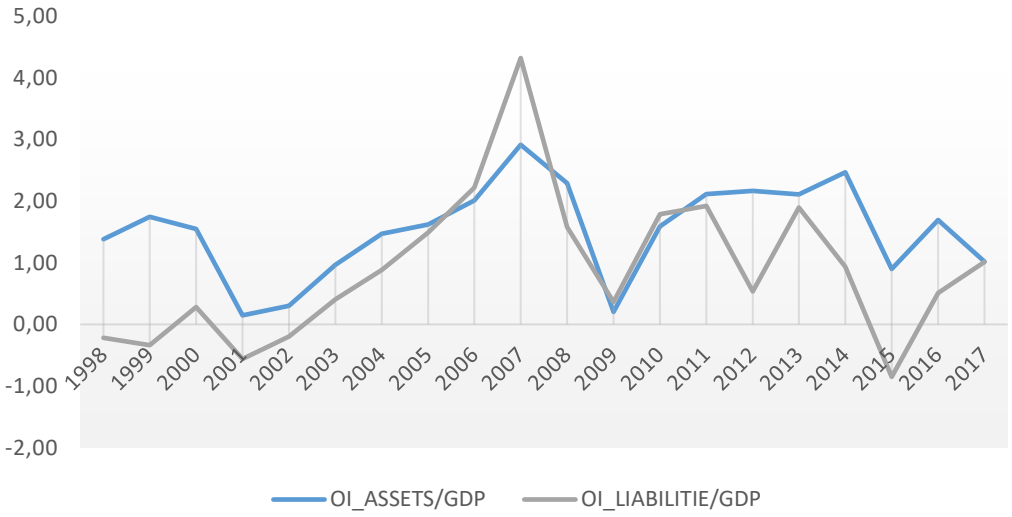

Figure 6: Gross Other Investment Inflows and Outflows.

Figure 6 presents the movements in the gross other investment inflows and outflows (% of GDP) over the period between 1998 and 2017. The overall trend in other investment flows seems to be relatively more fluctuating. Since other investment flows mostly include banking transactions, they are likely to be more volatile than FDI flows. In similar to other types of flows, the other investment inflows and outflows have an increasing trend in between 2000 and 2007 and they reach their historical records in 2007. Then a great collapse follows this surge and the historic highs fall dramatically. The recovery in other investment flows lasts almost three years after 2008 and gross positions continue to fluctuate over the period 2012-2018.

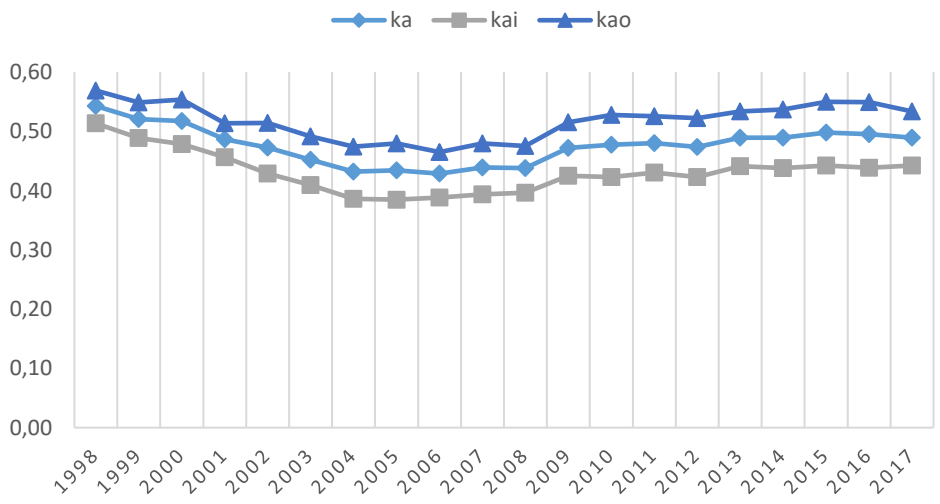

Figure 7: Trend in Capital Controls

Figure 7 represents the average year-over-year changes in capital controls for 44 developing countries. As mentioned at the beginning of this chapter, the data in Figure 7 is obtained from the Fernandez et al. (2016) dataset. This dataset contributes to our research by including more asset categories, countries and a longer time period. It has the advantages of separating capital controls for inflows and outflows, and being compatible with our capital flow data. This dataset also makes the measurement of capital controls easier by ranging between 0 and 1 and helps us to compare countries over a longer period.

First of all, if we examine the countries individually, some countries seem to use capital controls heavily. For example, Chile implemented maximum controls on capital inflows in 1998 and 1999. Predictably, China appears to have imposed both capital inflow restrictions and capital outflow restrictions at its maximum between 2000 and 2012. China is also one of the countries that impose highest restrictions on outflows. India heavily implemented capital controls on inflows between 1998 and 2002 and capital controls on outflows from 1998 until the end of 2016. Sri Lanka enforced high controls for both inflows and outflows from 1998 to 2017. Moreover, Ukraine implemented maximum capital controls on outflows between 2000 and 2005. In summary, developing countries are likely to be heterogeneous in using controls but on average, they tend to use these restrictions in cases of financial turbulences such as Asian Crisis in 1998 and the GFC in 2008.

Second, if we consider the trend of capital controls in general, we can see that there is strong co-movement between capital controls on inflows (kai) and capital controls on outflows (kao). As expected, countries seem to lower restrictions in the second half of the 1990s and become more open in the first half 2000s. However, the GFC alters the position of capital controls and countries become more supportive of using control measures. Most of the countries tend to turn back to early 1990s restrictive policies in recent years. It is also seen that outflow restrictions remain often higher than inflow restrictions. This may reflect the policy makers' choices in favor of encouraging inflows and being more open in inflow transactions. In contrast, they seem to be more restrictive in outflows indicating their unwillingness to encourage domestic investors to invest abroad. We can say that the trend between 1998 and 2007 is consistent with the mainstream view of higher capital mobilization and financial liberalization. However, the period between 2008-2017 is in

accordance with the new institutional view. Given the trend of capital controls, our study attempts to examine the effectiveness of these restrictions on gross capital flows.

CHAPTER 4

EMPIRICAL RESULTS

This section reports the empirical results and is divided into 3 parts: Part 5.1 shows the estimation results of the models represented by Equations (1.1) and (1.2), Part 5.2 interprets the results of the models specified by Equations (1.3) and (1.4) and finally Part 5.3 discusses the results of the panel threshold estimation model shown by Equations (1.9) - (1.10).

4.1 THE RESULTS OF THE ESTIMATION OF THE VOLUME OF GROSS CAPITAL INFLOWS AND OUTFLOWS

First, we estimate the model represented by Equations (1.1) and (1.2) for gross inflows and outflows and present the estimation results in Table 4. Second, we estimate Equations (1.1) and (1.2) for sub-categories of gross inflows and outflows, and the results are reported in Table 5.

Table 4: Estimation Results of Gross Capital Inflows and Gross Capital Outflows

Variables	**(1)** **Gross inflows**	**(2)** **Gross outflows**
kai/kao	-8.613	-14.002**
	(10.922)	(5.843)
g_risk	-0.209	0.035
	(0.131)	(0.093)
g_liq	1.004**	0.872**
	(0.455)	(0.360)
gdp_grw	0.703**	0.521**
	(0.295)	(0.218)

trd	-0.058	-0.042
	(0.055)	(0.380)
fin_de	30.040	38.619**
	(25.132)	(16.176)
infl	0.014	0.098*
	(0.067)	(0.052)
crisis_2008	-6.977*	-8.105**
	(4.067)	(3.176)
constant	228.409	-452.679
	(828.139)	(570.020)
# countries	44	44
# observations	836	836
R-squared	0.059	0.088

Notes: *, **, *** represent the significance levels of 10%, 5% and1% respectively. The standard errors are given in parenthesis.

As seen in Table 4, there is no significant relationship between capital controls on inflows and gross capital inflows while capital controls on outflows have a significant negative impact on gross capital outflows. A unit increase in capital controls on outflows results in a decrease in the volume of gross outflows by 14 units. This result suggests that the restrictions imposed on flows of domestic residents can be substantially effective in reducing the size of their flows. However, the increase in the use of capital controls on inflows does not seem to be effective in limiting the inflows.

Our findings for the effectiveness of capital controls on the size of gross flows are partially in line with the results of Pasricha et al. (2018) that assess the effectiveness of capital controls in terms of net inflows. As documented in Pasricha et al. (2018), net inflow tightening measures have limited effects on inflows and outflows. In the pre-crisis period, these tightening measures reduce both inflows and outflows, but in the post-crisis period, neither of them has significant negative impacts on inflows and outflows due to the increase in global liquidity and decline in profit opportunities in external investment.

Our evidence on gross outflows is also consistent with Nispi-Landi and Schiavone (2021), but the findings on inflows are not.

The findings in Table 4 also reveal that gross capital inflows are influenced only by global liquidity and real GDP growth. Increasing levels of global liquidity and market size lead to an increase in gross inflows. Global risk as a push factor and other pull factors are insignificant for gross inflows. In a similar vein, global liquidity and real GDP growth have a significant positive impact on gross outflows. Moreover, financial development and inflation are positively associated with gross outflows. The impact of the 2008 Global Financial Crisis is also significant in both regressions suggesting that in crisis periods, the volumes of gross inflows and outflows entirely reduce. Overall, we can confirm that capital control measures have differentiated effects on gross positions. The impact of inflow restrictions on gross inflow is likely to be insignificant while outflow restrictions are highly effective in reducing outflows.

Table 5: Estimation Results of Gross Direct Investment Inflows/Outflows and Gross Portfolio Investment Inflows/Outflows and Gross Other Investment Inflows/Outflows

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	gdi_i	**gpi_i**	**goi_i**	**gdi_o**	**gpi_o**	**goi_o**
kai/kao (fdi, pi, oi)	0.545	-4.592	-1.146	-2.999**	-1.532*	-3.410*
	(0.679)	(6.517)	(1.217)	(1.094)	(0.824)	(1.754)
g_risk	-0.044	-0.055	- 0.106	-0.045	-0.005	0.099
	(0.043)	(0.072)	(0 077)	(0.030)	(0.029)	(0.067)
g_liq	0.318	0.119	0.588	0.131	0.202**	0.614***
	(0.244)	(0.155)	(0.353)	(0.165)	(0.081)	(0.198)
gdp_grw	0.128*	0.177	0.408**	0.113*	0.083**	0.305**
	(0.064)	(0.137)	(0.192)	(0.065)	(0.037)	(0.142)
trd	-0.001	-0.027	-0.033	-0.010	0.005	-0.030
	(0.011)	(0.031)	(0.029)	(0.014)	(0.011)	(0.021)

fin_dev	7.563	8.411	14.996	11.863*	7.039*	20.127**
	(7.084)	(8.471)	(16.114)	(5.876)	(3.595)	(8.974)
inf	0.010	-0.047*	0.042	0.041**	0.012	0.029
	(0.017)	(0.023)	(0.041)	(0.018)	(0.012)	(0.022)
crisis_2008	-0.586	-2.542*	-3.851	-0.810	-2.511***	-5.037***
	(1.478)	(1.432)	(3.029)	(1.225)	(0.857)	(1.650)
constant	-0.512	2.454	-1.750	-1.015	-1.443	-6.519**
	(3.496)	(2.324)	(6.900)	(2.613)	(1.943)	(2.972)
# countries	44	44	44	44	44	44
# observations	836	836	836	836	836	836
R^2	0.063	0.026	0.049	0.053	0.047	0.080

Notes: *, **, *** represent the significance levels of 10%, 5% and1% respectively. The standard errors are given in parenthesis.

Table 5 reports the estimation results for the sub-categories of gross inflows and gross outflows. Columns (1) - (3) show regression results for gross FDI, portfolio, and other investment inflows. Columns (4) - (6) present gross FDI, portfolio, and other investment outflows as well. In these specifications, we use disaggregated levels of capital controls on different types of gross inflows and flows, that is, capital control indices are disentangled as capital controls in FDI, portfolio investment, and other investment inflows and outflows. All capital control measures in Table 5 are specific to types of flows.

In Table 5, the impact of capital controls imposed on different types of inflows is insignificant for all types of investment as consistent with the results found in the previous specification for aggregate flows. Also, the results show that capital controls on different types of outflows have negative impacts on outflows. In other words, outflow restrictions are effective in reducing all types of investments. When coefficients of capital control measures are examined, it is seen that they differ among these types of investments. A unit increase in capital controls reduces FDI, portfolio, and other investment outflows by 2.99%, 1.53%, and 3.41% respectively suggesting that the impact of capital controls on other investment outflows is larger than other capital controls.

As seen in columns (4) - (6), global liquidity has a positive impact on portfolio investment and other investment outflows, while it is insignificant for FDI outflows. That is, improved global liquidity conditions encourage domestic residents to invest more in foreign stock and bond markets. However, the role played by global liquidity is also an indicator of the vulnerability of a country to exogenous shocks. Countries that outflows are driven by global factors may be having limited domestic policy actions.

From the standpoint of pull factors, as in previous regressions, the real GDP growth and financial development seem to be the main domestic determinants of gross outflows. Inflation is significant for only foreign direct investment outflows indicating that domestic residents tend to invest more in physical capital when inflation increases.

As seen in columns (1) - (3), the drivers of gross capital inflows are a bit different from the drivers of outflows. First, all types of inflows except portfolio investment are influenced by the real GDP growth rate. Increasing levels of market size lead to an increase in all types of flows except gross portfolio inflows. This result is consistent with the recent literature including Ahmed and Zlate (2014), Eichengreen et al., (2018), and Avdjiev et al., (2018). As the main pull factor, the positive effect of real GDP growth on most of the types of capital inflows reveals that these types are pro-cyclical except portfolio inflows. as argued in Tasdemir and Ozmen (2019). Therefore, during higher growth periods gross capital inflows tend to increase and during slowdowns, they tend to fall. The insignificant relationship between real GDP growth and portfolio flows is also consistent with Sarno et al., (2016) and Boero et al., (2019). Although the recent literature suggests that portfolio flows are mainly driven by global factors, we do not find evidence of the significance of push factors. However, we find that global liquidity explains all types of gross capital outflows.

In the light of the results reported in Table 4 and Table 5, we can conclude that capital controls appear to be effective on gross capital outflows rather than gross capital inflows. To limit the size of capital flows policy-makers may need to consider the type of capital control measure and the area of influence of the measures taken.

4.2 THE RESULTS OF THE ESTIMATION OF THE VOLATILITY OF GROSS CAPITAL INFLOWS AND OUTFLOWS

To evaluate the impacts of capital control measures on the volatility of gross capital flows, we first calculate the volatility by using two approaches: obtaining the standard deviations over a rolling window and the absolute value of the residuals of an ARIMA (1 1 0) model as recommended in the previous literature. Afterward, we estimate Equations (1.3) and (1.4) and report the results in Table 6. The first two columns show the results for inflows and the remaining presents the results for outflows. rol_gci/rol_gco represents the volatility measured by rolling windows standard errors and res_gci/res_gco shows ARIMA residuals.

Table 6: Estimation Results for Volatility of Gross Capital Inflows and Gross Capital Outflows

	Volatility of gross inflows		**Volatility of gross outflows**	
	rol_gci	**res_gci**	**rol_gco**	**res_gco**
	(1)	**(2)**	**(3)**	**(4)**
kai/kao	-7.026	-3.388	5.372	3.529
	(6.245)	(3.850)	(7.509)	(2.978)
g_risk	0.096***	0.016*	0.052	-0.031
	(0.048)	(0.010)	(0.067)	(0.043)
g_liq	0.377***	0.124***	0.407***	0.003
	(0.063)	(0.046)	(0.085)	(0.063)
gdp_grw	-0.087	-0.175	-0.125	0.006
	(0.079)	(0.117)	(0.175)	(0.059)
trd	0.004	0.018*	0.058	0.044***
	(0.024)	(0.009)	(0.038)	(0.012)
fin_dev	12.173***	1.172	4.266	-2.836
	(3.220)	(2.464)	(6.927)	(3.580)
inf	0.064	0.045	0.090	0.023

	(0.050)	(0.040)	(0.079)	(0.024)
crisis_2008	1.166	2.028***	3.017***	1.989***
	(0.874)	(0.391)	(1.014)	(0.540)
constant	-2.351	0.429	-7.752**	-2.327**
	(3.368)	(2.095)	(3.422)	(1.275)
# countries	44	44	44	44
# observations	792	792	792	792
R^2	0.045	0.056	0.017	0.031

Notes: *, **, *** represent the significance levels of 10%, 5% and1% respectively. The standard errors are given in parenthesis.

As seen in columns (1) and (2), we find that the link between capital controls and the volatility of gross inflows is insignificant suggesting capital control measures do not affect the volatility of gross inflows. Among control variables, the variables that are consistently significant in explaining the volatility of gross inflows are global risk and global liquidity. Higher levels of global risk and global liquidity are positively related to the volatility of gross inflows. These findings underline the importance of push factors as drivers of the volatility of gross inflows. We also find that pull factors are not robust in explaining gross inflows.

The results reported in columns (3) and (4) show that capital controls on outflows are insignificant for gross outflows. The volatility in domestic residents' flows is not influenced by capital control restrictions. Additionally, there are some ambiguities in the push and pull factors. We cannot provide consistent evidence for the impacts of many push and pull factors. However, with less precision, we can state that once again global liquidity as a push factor may be influential on gross outflows.

These results for volatility measures suggest that countries may not benefit from these capital management policies to reduce the volatility of gross inflows and outflows.

4.3 RESULTS OF PANEL THRESHOLD REGRESSIONS

In this empirical analysis, one of the key questions addressed is whether there is a certain threshold level of financial development that changes the impacts of capital controls on

the size and volatility of capital flows. To test the presence of a certain threshold, we estimate the Equation (1.9) - (1.10) and report the results in Table 7.

In Table 7, columns (1) and (2) present the results for gross inflows and gross outflows respectively. As seen in column (1), the estimated value of the threshold variable (financial development) is 0.52 and it is significant for gross inflows. This threshold splits the overall regression into two regimes: Lower regime (kai_lower) and upper regime (kai_upper).

Table 7: Estimation Results of Panel Threshold Regression for Gross Capital Inflows and Gross Capital Outflows

	(1) **Gross inflows**	**(2)** **Gross outflows**
threshold value	0.5200**	0.4700
kai/kao_lower	-2.082	-10.270***
	(5.285)	(3.050)
kai/kao_upper	-26.492***	-20.211***
	(6.441)	(3.358)
g_risk	-0.193	0.045
	(0.015)	(0. 098)
g_liq	1.025***	0. 864***
	(0.399)	(0. 262)
gdp_grw	0. 731***	0. 532***
	(0.210)	(0. 138)
trd	-0.064	-0.035
	(0.053)	(0. 034)
fin_dev	57.287***	52.062***
	(15.594)	(10.114)
inf	0.024	0.081
	(0. 090)	(0. 059)

crisis_2008	-7.558**	-8.208***
	(3.530)	(2.304)
constant	-7.819	-10.107
	(9.254)	(6.131)
# countries	44	44
# observations	836	836
R^2	0.083	0.103

Notes: *, **, *** represent the significance levels of 10%, 5% and1% respectively. The standard errors are given in parenthesis.

The results indicate that impacts of capital controls change across these regimes. In the lower regime, there is no significant link between capital controls and the size of gross inflows, but in the upper regime, the estimated coefficient of capital controls is significant and negative. Once financial development exceeds the threshold value of 0.52, capital controls become effective in reducing the volume of inflows. Compared with the results of linear models that are previously estimated, this result adds to our understanding of the effectiveness of capital controls. In the nonlinear specification, we show that well-functioning financial systems are likely to have an amplifying effect. This result underlines the crucial role played by the domestic financial sector. When a country changes its policy stance towards imposing more restrictions on capital inflows, it does not necessarily result in a reduction in inflows. The outcome of the target policy depends on the level of financial development of the country that implements capital control management policy. The benefits of employing capital controls on inflows can be gained by the countries that have deeper and more efficient financial sectors.

Column (1) also presents the estimates of potential drivers of gross inflows. As seen, global liquidity as a push factor has a positive impact on gross inflows while global risk has no significant effect as before. Among push variables, real GDP growth and financial development positively affect gross inflows.

The results reported in column (2) show that there is no significant financial development threshold for gross outflows. Thus, the relationship between capital controls and the size of gross outflows is linear. The impact of capital controls on gross outflows reduces the

volume of gross inflows for the overall sample, that is the size of gross outflows is invariant to the level of financial development. The results in column (2) also indicate that the main drivers of gross outflows are global liquidity, real GDP growth, and financial development.

In sum, the results shown in Table 7 underline the nonlinear association between capital controls and the size of gross inflows. According to this nonlinear link, when countries surpass a certain level of financial development, they can benefit more from capital controls in reducing the size of gross inflows. However, this sort of relationship is not true for gross outflows. For gross outflows, the impact of capital controls is invariant in different regimes and there is no significant nonlinear link between gross inflows and capital controls. This result is consistent with a view that proposes the effectiveness of capital controls may be contingent on the financial development of a country. As argued in Ostry et al. (2011), the guidance of capital controls with more developed financial sectors can intensify the impacts of control measures.

We now consider that whether the effect of capital controls on the volatility of capital inflows and outflows changes across different financial development levels. Table 8 summarizes the results of the estimation of Equation (1.11) – (1.12) which includes once again financial development as a threshold variable for the effect of capital controls.

Table 8: Estimation Results of Panel Threshold Regression for the Volatility Gross Capital Inflows and Gross Capital Outflows

	(1) **rol_gci**	**(2)** **res_gci**	**(3)** **rol_gco**	**(4)** **res_gco**
threshold value	0.39	0.43	0.52	0.52
kai/kao_lower	-2.831	-2.260	2.779	2.729**
	(2.699)	(1.412)	(3.402)	(1.382)
kai/kao_upper	-10.102***	-5.079***	13.864	6.419***
	(2.599)	(1.539)	(4.154)	(1.688)
g_risk	0.100**	0.019	0.069	-0.020

	(0.052)	(0.030)	(0.087)	(0.035)
g_liq	0.391***	0.143**	0.399**	-0.008
	(0.125)	(0.072)	(0.208)	(0.084)
gdp_grw	-0.086	-0.175***	-0.138	0.015
	(0.100)	(0.057)	(0.166)	(0.067)
trd	0.014	0.021*	0.066*	0.045***
	(0.023)	(0.013)	(0.038)	(0.015)
fin_dev	17.005***	4.467	-6.557	-2.234
	(6.428)	(3.791)	(10.753)	(4.370)
inf	0.014	0.024	0.051	0.022
	(0.042)	(0.024)	(0.070)	(0.028)
crisis_2008	1.097	2.023***	2.665	1.699**
	(1.147)	(0.659)	(1.896)	(0.770)
constant	-5.080	-1.043	-4.530	-2.735
	(3.335)	(1.921)	(5.451)	(2.215)
# countries	44	44	44	44
# observations	792	792	792	792
R^2	0.051	0.041	0.042	0.040

Notes: *, **, *** represent the significance levels of 10%, 5% and1% respectively. The standard errors are given in parenthesis.

For both volatility of gross inflows and outflows the estimated thresholds are statistically insignificant. Thus, the financial development level does not alter the relationship between capital controls and the volatility of flows. We can still take into account the findings of linear regression results. According to the estimates of push variables, higher levels of global risk and liquidity are associated with higher levels of volatility in gross inflows. For the volatility of gross outflows, the significant drivers are likely to be global liquidity and trade openness.

CONCLUSION

Capital flows have potential benefits to developing economies, however large and volatile flows threaten macroeconomic and financial stability. Even they can cause sudden stops and trigger financial crises. Thus, following the GFC, new research in international macroeconomics has devoted close attention to capital flow management policies, in particular, capital controls to overcome the problems magnified by the increase in the size and volatility of flows. In recent years, researchers have introduced capital controls as unconventional policy instruments that can support macroeconomic adjustment and prevent financial instability.

Against this background, this thesis investigates the effects of capital controls on the volume and volatility of gross capital flows in developing counties. To provide new evidence on whether capital controls are effective policy tools to reduce the size and volatility of gross capital inflows and outflows, the empirical analysis is built on both linear and nonlinear panel estimations relying on a panel of 44 developing countries over the period 1998-2017.

We find that the impact of capital controls differs across the volume of gross inflows and outflows. On average, capital controls have no significant impact on the volume of gross inflows, but they significantly reduce the volume of gross outflows. When controlling volatility, we provide evidence that capital controls do not have a significant impact. However, considering the panel threshold regressions, we find that in financially more developed countries, the impact of capital controls on the volume of gross inflows is significantly negative as expected –capital controls lead to a reduction in the size of gross inflows. Once a country surpasses a certain financial development threshold, higher levels of capital controls lead to lower inflows. We also do find that there is no significant threshold for the size of gross outflows, that is, the effectiveness of capital controls on the size of gross outflows is not influenced by the level of financial development. Finally, for the volatility, we find that there are no significant financial development thresholds.

Overall, our results highlight two important implications. First, the change in policy stance towards safeguarding the economy against the risks of capital inflows may not

alone induce expected outcomes. Restricting capital account by the use of capital controls on financial flows does not necessarily imply a reduction in their size and volatility. We suggest that developing countries' policy makers can take into account the different responses of gross inflows and outflows to the capital control measures. Gross outflows seem to respond to the changes in control measures, that is, more restrictive actions lead to reductions in foreign assets of domestic residents. However, foreign investors' purchases of domestic assets do not respond the restrictive measures imposed on them. A country that desires to reduce outflows can benefit from departing from the capital account openness, but cannot alone reach to goal of reducing inflows by increasing the inflow restrictions. Likewise, we assert that reducing volatility in both gross inflows and outflows by introducing higher levels of capital controls seems to be difficult for policymakers.

The second implication is that the effect of the selected policy stance (increasing capital controls) may be contingent on the financial development level of the country. As confirmed by the results, the impact of capital controls on inflows can only become effective when a certain level of financial development is exceeded. Thus, to increase the effectiveness of capital controls, strengthening the domestic financial sector might be an appropriate tool. Better guidance of the financial system might help developing countries to safeguard themselves against the risks inflow surges. It is noteworthy to point out that designing capital control policies requires devoting special attention to country-specific factors. Developing countries might be in need of strengthening the ability of the financial system to absorb the effects of capital inflows.

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APPENDIX A. COUNTRIES NAME AND CODE

Countries/Regions	ISO Country Code
Bangladesh	BGD
Bolivia	BOL
Brazil	BRA
Bulgaria	BGR
Chile	CHL
China, P.R.: Mainland	CHN
Colombia	COL
Czech Rep.	CZE
Ecuador	ECU
Egypt, Arab Rep. of	EGY
El Salvador	SLV
Guatemala	GTM
Hungary	HUN
Iceland	ISL
India	IND
Indonesia	IDN
Jamaica	JAM
Kazakhstan, Rep. of	KAZ
Kenya	KEN
Korea, Rep. Of	KOR
Kuwait	KWT
Kyrgyz Rep.	KGZ
Latvia	LVA
Malaysia	MYS
Mexico	MEX
Moldova, Rep. of	MDA

Morocco	MAR
Nigeria	NGA
Pakistan	PAK
Paraguay	PRY
Peru	PER
Poland, Rep. of	POL
Romania	ROU
Russian Federation	RUS
Saudi Arabia	SAU
Slovenia, Rep. of	SVN
South Africa	ZAF
Sri Lanka	LKA
Thailand	THA
Togo	TGO
Tunisia	TUN
Turkey	TUR
Uganda	UGA
Ukraine	UKR

APPENDIX B. DATA DEFINITIONS AND SOURCES

Variables	Definitions and Other Notes	Data Source
gci	Gross capital inflows (the sum of the liabilities of foreign direct investments (FDI), portfolio investments (PI), and other investments (OI))	International Monetary Fund, International Financial Statistics
gco	Gross capital outflows (the sum of the assets of foreign direct investments (FDI), portfolio investments (PI) and other investments (OI))	International Monetary Fund, International Financial Statistics
gdi_o	Gross foreign direct investment outflows (net acquisition of financial assets of FDI)	International Monetary Fund, International Financial Statistics
gdi_i	Gross foreign direct investment inflows (net incurrence of liabilities of FDI)	International Monetary Fund, International Financial Statistics
gpi_o	Gross portfolio investment outflows (net acquisition of financial assets of portfolio investment)	International Monetary Fund, International Financial Statistics
gpi_i	Gross portfolio investment inflows (net incurrence of liabilities of portfolio investment)	International Monetary Fund, International Financial Statistics

goi_o	Gross other investment outflows (net acquisition of financial assets of other investment)	International Monetary Fund, International Financial Statistics
goi_i	Gross other investment inflows (net incurrence of liabilities of other investment)	International Monetary Fund, International Financial Statistics
kai	Capital controls on inflows	Fernandez et al. (2016) dataset
kao	Capital controls on outflows	Fernandez et al. (2016) dataset
g_risk	Global risk (volatility of S&P 500 index options (VIX))	*Bloomberg HT* (https://www.bloomberght.com/borsa/endeks/vix)
g_liq	Global liquidity (calculating the weighted average of broad money growth of US, Euro Area, Canada and Japan.)	Own calculations, Source: The World Bank database for broad money (M2)
gdp_grw	Real GDP growth rate	The World Bank
trd	Trade openness (Exports+Imports)/GDP)	The World Bank
fin_dev	Financial development index	International Monetary Fund, International Financial Statistics
inf	Consumer price index inflation	The World Bank

Notes: All data are obtained annually.

APPENDIX C. ETHICS COMMISSION FORM

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SOSYAL BİLİMLER ENSTİTÜSÜ
TEZ ÇALIŞMASI ETİK KOMİSYON MUAFİYETİ FORMU

HACETTEPE ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ
İKTİSAT ANABİLİM DALI BAŞKANLIĞI'NA

Tarih: 03/02/2022

Tez Başlığı: SERMAYE AKIM YÖNETİMİ POLİTİKALARI: GELİŞMEKTE OLAN ÜLKELER İÇİN PANEL VERİ ANALİZİ

Yukarıda başlığı gösterilen tez çalışmam:

1. İnsan ve hayvan üzerinde deney niteliği taşımamaktadır,
2. Biyolojik materyal (kan, idrar vb. biyolojik sıvılar ve numuneler) kullanılmasını gerektirmemektedir.
3. Beden bütünlüğüne müdahale içermemektedir.
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Hacettepe Üniversitesi Etik Kurullar ve Komisyonlarının Yönergelerini inceledim ve bunlara göre tez çalışmamın yürütülebilmesi için herhangi bir Etik Kurul/Komisyon'dan izin alınmasına gerek olmadığını; aksi durumda doğabilecek her türlü hukuki sorumluluğu kabul ettiğimi ve yukarıda vermiş olduğum bilgilerin doğru olduğunu beyan ederim.

Gereğini saygılarımla arz ederim.

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Adı Soyadı:	Büşra KUZUCU
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Anabilim Dalı:	İktisat
Programı:	İktisat
Statüsü:	☒ Yüksek Lisans ☐ Doktora ☐ Bütünleşik Doktora

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My thesis work related to the title above:

1. Does not perform experimentation on animals or people.
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ADVISER COMMENTS AND APPROVAL

Dr. Öğr. Üyesi Zühal KURUL

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APPENDIX D. ORIGINALITY REPORT

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İKTİSAT ANABİLİM DALI BAŞKANLIĞI'NA

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Yukarıda başlığı gösterilen tez çalışmamın a) Kapak sayfası, b) Giriş, c) Ana bölümler ve d) Sonuç kısımlarından oluşan toplam 60 sayfalık kısmına ilişkin, 24/01/2022 tarihinde şahsım/tez danışmanım tarafından Turnitin adlı intihal tespit programından aşağıda işaretlenmiş filtrelemeler uygulanarak alınmış olan orijinallik raporuna göre, tezimin benzerlik oranı % 14'tür.

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Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü Tez Çalışması Orijinallik Raporu Alınması ve Kullanılması Uygulama Esasları'nı inceledim ve bu Uygulama Esasları'nda belirtilen azami benzerlik oranlarına göre tez çalışmamın herhangi bir intihal içermediğini; aksinin tespit edileceği muhtemel durumda doğabilecek her türlü hukuki sorumluluğu kabul ettiğimi ve yukarıda vermiş olduğum bilgilerin doğru olduğunu beyan ederim.

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UYGUNDUR.

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HACETTEPE UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
MASTER'S THESIS ORIGINALITY REPORT

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