CAPITAL FLOWS AND OUTPUT VOLATILITY: THE ROLE OF CAPITAL CONTROLS IN EMERGING ASIA

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ABSTRACT

In an era when financial sector development is an inevitable path to greater growth, the case for financial liberalisation is only getting stronger. Yet, the ripple of the Great Recession was felt at different ends of the global economy due to financial interconnectedness. Faced with this reality, emerging market economies need to find a balance in the trade-off between financial openness and capital control. This thesis explores the effect of capital controls on output volatility in ten emerging and frontier Asian economies. The thesis uses panel data for the year 1995 to 2015 from IMF and the World Bank for Bangladesh, China, India, Indonesia, Malaysia, Thailand, and Vietnam, Singapore and Hong Kong. The capital control indexes developed by Schindler (2009) from IMF's AREAER Reports are used to gauge the level of capital restrictions in the economies. Using a fixed effects method with fourth-order autocorrelation, the study finds that average capital controls have a significant negative effect on output volatility. This also holds for controls on capital outflows. However, there is no evidence in support of using controls based on the type of asset. Additionally, good institutions support the effectiveness of capital controls in curbing output volatility. The study concludes that the emerging Asian economies maintaining some level of average capital controls have experienced less output volatility. However, the cost of this policy risks stunting the growth of the domestic financial markets. The policy implications the analysis is discussed further.

Key words: capital controls, output volatility, capital account liberalisation, emerging markets

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LIST OF ABBREVIATIONS

FDI – Foreign Direct Investment

CC – Capital Controls

EQ – Portfolio Equity

FC – Financial Credit

AR – Autoregressive

IMF – International Monetary Fund

EME – Emerging Market Economy

INTRODUCTION

Capital controls have been used by nations to regulate the capitals inflows and outflows from a country. Such controls impose rules, taxes, or other fees on capital movements or financial transactions between domestic and foreign entities. But in the era where financial sector development appears to be the key to long-term prosperity, countries are struggling to find the right trade-off between regulation and openness. Fast growing emerging market economies already face volatility and market fluctuations, and an unrestrained access to global financial markets may further exacerbate external risks. Yet, a misdiagnosed capital control may simply harm the financing prospects for the economy and create undue inefficiencies. Thus, it is critical to understand the nature of inflows and their effects on macroeconomic imbalances before governing them through stringent capital controls. Economic policy in determining optimal capital controls is further strained with considerations of the type of control to be implemented or removed. The trade-off between long-standing and episodic capital controls is still a dilemma from the economic point of view (Klein, 2012).

During the 1980s, multilateral institutions such as the International Monetary Fund and the World Bank advocated for lifting the restrictions on capital as part of the greater push for global economic liberalisation. This position was underpinned by the neoclassical economic theory which insisted on the potency of the gains from free movement of capital. Countries with scarce capital resources could borrow funds and invest in building up resilient economies. Lending countries could attain higher returns through interest receipts.

Thus, by the next decade, many Asian countries had already commenced the economic liberalisation process and lifting capital account restrictions. Yet, the Asian economies were wary of untimely liberalisation and therefore focused on loosening capital restrictions only

after the adequate markets were liberalised. This highlights the importance of ensuring that the economy is resilient toward any external shocks that may arise due to the increased capital flows. But the critics maintained that the benefits of such liberalisation policies are ambiguous because it entailed financial assets rather than trade in goods. The financial contract always carried the inherent risk of default, if for instance the borrowed funds were funnelled in consumption rather than investments. Therefore, countries were advocated to allow limited financial openness to protect themselves from financial instability and ensuing exchange rate volatility (Krugman 1999, Stiglitz 2000 and 2002, Rodrik 2006). Critics of capital account liberalisation saw capital controls as a useful tool in this context, and one that can be employed in combination with other macroeconomic instruments.

In this vein, Asian economies held on to the use of capital controls all the while adopting policies that were slowly liberalising the economy. But policymakers were afraid that unfettered capital inflows would simply appreciate their respective domestic currencies, making their exports less competitive in the international market. Capital controls would allow them to keep a check on the capital inflows, and they could use expansionary monetary and fiscal policies to increase employment and boost the stock market. It also meant that the economy would remain relatively shielded from large capital outflows (which can be destabilising for many economies) during times of political instability. Furthermore, Asian financial markets still lacked depth and thus risked sudden stops that would cease all capital inflows. Such a situation can easily set the economy on a path of turmoil. The underdeveloped state of the capital markets convinced Asian policymakers that their respective economies were perhaps not ready for full capital account liberalisation.

The Asian Financial Crisis hit the economies in 1997, an event that validated the fears of the policymakers. Malaysia, among the countries that were entangled in the crisis, fared

quite well with its capital controls in place. This case sparked a new interest in capital controls as prudential tools and renewed the debate on the merits of capital account liberalisation. Even the IMF cancelled the plan of putting capital account convertibility into its amended Article VIII (Kawai and Takagi, 2008). But in general, the Asian economies all recovered soon after and regained the promised growth path even through the Dot Com bubble in 2001. Capital controls as viable policy tools were once again pushed under the rug.

However, by 2006 capital inflows were one again surging into Asian economies, and capital controls were deployed in the face of volatile portfolio flows that were extremely sensitive to the international capital markets. Between 2006 to 2008, commodities prices soared which put inflationary pressures on the Asian countries' domestic economies. Amidst this shaky situation, the collapse of Lehman Brothers in 2008 sent shockwaves through the financial world. The crisis that followed affected the Asian economies through large capital outflows as the lender countries started the deleveraging process. Asian export trade with the US all but collapsed, causing a reduction in growth in emerging Asia through 2008 – 2009. These countries needed to replace the demand from the US with that of other nations within the region so they could prove a fiscal stimulus to pump the economies.

Emerging Asia has once again recovered well compared to the US and Europe but that does not disqualify policymakers' worries over potentially destabilising capital flows. The international rhetoric on the use of capital controls has transformed, and even the IMF has accepted that capital controls may be necessary under certain circumstances. Asia's growth record makes it increasingly attractive destination for investors, many of whom are now opting for derivative instruments which make controlling capital more difficult. These economies have resorted to liberalising capital outflows in order to prevent any sharp appreciation in their currencies. The global economy has begun to recover and the financial markets are once

working as before the financial crisis. This means that there should be a renewed interest in the policy tools that are meant to address the dangers of large capital movements.

In this light, the main focus of this thesis is the volatility effects of international capital flows in emerging Asian economies. The dataset represents ten Asian economies that have experience both increased capital flows as well as high growth rates. These are Bangladesh, China, Malaysia, Philippines, Indonesia, India, Thailand, Hong Kong, Singapore, and Vietnam. Capital control index developed by Schindler (2009) will be used to gauge the level of controls in the economy. As macroeconomic stability is a prerequisite for long-term economic success of any economy, this paper will use growth rate volatility as a proxy for a country's output volatility. The primary research question of this thesis is: **How effective are capital controls in reducing economic volatility in Emerging Asian economies?** Tentative sub-questions to be explored are as follows:

I. Does the effectiveness of capital controls in reducing volatility depend on restrictions on the direction of flow (i.e. inflow and outflow) or the asset type (i.e. FDI and portfolio equity)?
II. Is institutional capacity necessary for effective capital control policy for emerging Asian Economies?

The following chapter overviews the theoretical perspectives and the relevant literature linking capital controls to growth and volatility. As financial openness and output volatility are closely related, this chapter revisits the relevant research in the area of capital account liberalisation. This will provide the backdrop for the current paper and identify where it fits into the overall literature in this field. Chapter 2 focuses on the capital controls on the 10 countries and their specific circumstances. It is meant as providing a context for the empirical modelling and data analysis. Next, the first part of Chapter 3 explains the data sources, the

variables, the empirical model used for the dataset, and the methodology, while the second part explores the variables to ascertain their suitability for the analysis. Subsections 3.3 and 3.4 provide the estimation results for the different models, and 3.5 discusses the issue of endogeneity of capital controls. Chapter 4 discusses the empirical findings in relation to the research questions set out above. The concluding chapter reiterates the main results and briefly discusses the policy implications for these economies.

CHAPTER 1 – CAPITAL CONTROLS AND OUTPUT VOLATILITY: AN OVERVIEW

1.1. Theoretical Background

Palley (2009) sets forth the main theories of capital mobility and how they differ from each other. First, the neoclassical economic theory posits that free movement of capital ensures the efficient allocation of resources. Smooth capital mobility enhances the investment opportunities in the stock markets and increases the diversification opportunities available to the investors. This is likely to improve portfolio investment outcomes in the financial markets. In other words, free capital mobility increases the efficiency of the portfolios thereby leading to greater economic benefits.

Second, neoclassical economics suggests that capital mobility leads to greater efficiency gains through improving the global production chains. Capital mobility makes it possible for firms to invest in foreign production lines which directly affects the how global production is organized, and redistributes investment to where it is most productive. The neoclassical view tells us that by the principle of comparative advantage all countries should benefit from the net efficiency gains. However, in practice, some countries have faced adverse consequences of accepting outsourced production. The example of China shows that it is indeed possible to have large FDI flows without the corresponding capital mobility as states by the neoclassical economic theory.

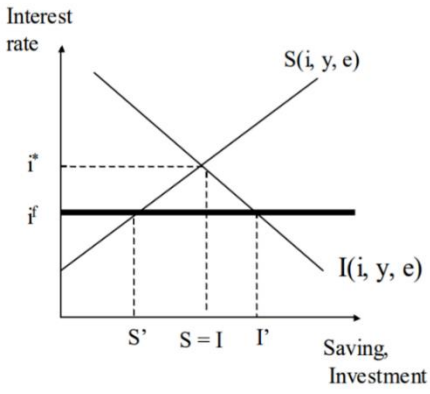

Figure 1 Loanable Funds Model

Third, the most important claim of the theory is that capital mobility increases the country's savings and investment which is a prerequisite for capital accumulation. As the theory goes that this capital accumulation in growth enhancing, capital mobility is believed to spur economic growth. This insight is based

on the loanable funds model where the interest rate in the economy is determined by the demand and supply of loanable funds. Figure 1 shows the effects of capital mobility in an economy where the interest rate, i*, is the intersection between savings and investment (supply and demand for funds). However, when the economy opens its accounts, it can operate at the global interest rate, if. This is the typical developing country scenario where there is abundant demand for investment but not enough savings to supply the funds. Once there is capital mobility, the global savings is channelled into the economy where investors take advantage of the demand for investments. Such an inflow of capital improves the investment (from I to I'), but at the same time reduces domestic savings (from S to S'). Therefore, according to the model, capital mobility increases the overall well-being of the domestic economy.

Fourth, efficiency claim stems from the informal argument that there is an array of collateral advantages that come together with capital mobility. These include greater trade, foreign investment, financial sector development, and technological transfers. However, many of these are contested by empirical findings that cast doubts on their alleged benefits. Furthermore, these collateral benefits can also be present while the country has capital controls and therefore capital mobility is not a prerequisite for attaining these.

The economic efficiency arguments that were explained are complemented by the claims from the neoliberal political economy. First, it argues that capital mobility fosters market discipline which is essential for improving the quality of governance. This is because investors are likely to pull out their funds from countries with bad governance conditions and place them in other countries with better governance indicators. Therefore, developing countries should, theoretically, be trying to out-do each other in a competition to attract capital and strive for good governance. This creates better market conditions that are free undue government interventions and market distortions.

Second, the freedom to move one's capital is a fundamental part of personal freedom, a notion fervently championed by Hayek (1944). This supports the case for capital mobility acts as a vessel for expressing personal freedom, and it protects this freedom from government infringement. While this argument appears noble, the consequences are usually risk-laden (see the next section). Furthermore, the same principle can be applied to the free movement of people across national borders but there is ample evidence on why there are restrictions on labour. Thus, it is dubious as to why capital should receive a different treatment.

Third, restricting capital is associated with rent-seeking behaviour from economic agents which is likely to be more costly than the initial market failure that led to the controls being imposed in the first place. The argument is that actors will spend their resources on rent-seeking and finding avenues to avoid the controls. They may also seek to influence government officials which increases the chances of corruption and lead to bad governance and biased policies.

Fourth, hindering capital mobility through controls is unlikely to be effective if the country has developed financial markets. Financial institutions and the markets can internalize the effects of controls and adapt their operations in tune to circumvent controls. The net result is that capital inflows are deterred only for the short term.

In Keynesian theory differs from the neoclassical model in its determination of interest rate, investment, saving, and the exchange rates. In this model, the exchange rate is determined by foreign exchange market, and the interest rate is determined by the financial markets that are subject to the policies of the central banks. The savings and investment levels are determined by the households and the firms in the goods market. In the Keynesian case, capital mobility is can cause macroeconomic problems, such as inflation or unemployment. Under fixed exchange rate regime, capital inflows can cause the domestic currency to appreciate

which in turn put undue pressure on the central bank to take corrective measures such as monetary expansion. On the other hand, capital outflow has to be addressed to protect the exchange rate, which puts the country's reserves at risk. This is problematic also because outflow needs to be countered by a contractionary monetary policy which means keeping the interest rate above average to retain capital. This may not be compatible with the full employment in the country.

Under the flexible exchange rate, capital mobility is likely to lead to large capital inflows which once again would appreciate the domestic exchange rate. This will decrease investment and net exports alike, leading to a contraction in output. This effect is likely to be more severe in an interconnected world where the capital inflows are very large in volume and the economies are prone to exchange rate shocks as they are likely to have a greater share of exports and imports in GDP.

Open capital markets are also disconcerting given their potential effects on the internal balance due to capital inflows. The US is a good example where the boom years from 2001 to 2007 capital inflows increased and depressed long-term interest rates. The Federal Reserve was unable to respond and raise the interest rates, which paved way for the imbalance through the remarkable expansion of the non-traded sector while there was a slump in the traded sector.

To summarize, the Keynesian macroeconomic model has a far less optimistic view of capital mobility than the neoclassical theory. The Keynesian model shows that capital flows have a profound effect on the exchange rate which can in turn negatively affect both output and growth. Under this model, capital mobility is favourable when the economy has a shortage of foreign currency. Here the underlying problem is not the lack of savings on part of a developing country as argued by the neoclassical model, but rather the shortage of foreign

currency to import capital goods. Thus, the main problem here is the foreign exchange gaps rather than a shortage of capital.

In recent literature, Korniek's (2011) work has led to the establishment of the 'externalities paradigm' which supports the case for capital controls in emerging economies due to prudential concerns. Korniek (2011) argues that research shows that financial crises in EMEs are episodes of financial amplification when the economy suffers a shock which leads to a fall in aggregate demand, asset prices and an appreciation of the exchange rate. This has a negative effect on the countries' balance sheets which deteriorates their chances of attaining external financing. In such circumstances, the government will have to cut back spending, depressing the aggregate demand further. Financial amplification leads to a rise in pecuniary externalities, which is when a certain economic activity affects relative prices, inducing an economic agent to alter their consumption set and thereby affecting their welfare. Financial amplification in EMEs tends to also work through the price system. One of the main effects of financial amplification is over-borrowing by the agents because these agents do not fully internalize the social cost of incurring excessive debts. In such cases, prudential capital controls appear to be the right policy response.

Korniek (2011) argues that such externalities distort financing decisions made by market participants in EMEs. In particular, private participants will end up raising too much debt, engage in excessive risk-taking, and borrow at short-term maturities. While they have incentives of doing so, such activities only add to the financial fragility of the economy. Thus, policy-makers should be aiming to internalize these externalities and ensure that participants do not add to the financial fragility. Capital controls are one policy option that can discourage risky behaviour from the market participants. Therefore, capital controls are justified for prudential purposes in the EME context.

1.2. Literature Review

Capital account liberalisation is linked to four main 'fears', namely – currency appreciation, the volatility associated with 'hot money', large capital inflows, and losing monetary autonomy (Magud and Reinhart, 2007). In this light, capital controls have been imposed for (i) barring the sheer volume of capital flows and changing the composition to long-term flows; (ii) decreasing the exchange rate volatility; (iii) control the resulting currency appreciation; (iv) retain the monetary autonomy of policymakers; and (v) avoid the advent of financial instability or all-out crisis. In case of Asia, it is unsurprising that the governments are unwilling to completely give up monetary autonomy through complete capital account liberalisation as they want to have control over the volume and type of inflows. Yet, this has become increasingly difficult with greater global financial integration and increase in capital flows, as well as the invention of new financial instruments.

Capital restrictions can be grouped as administrative or market-based controls (Ariyoshi, et al. 2000). Administrative controls are direct restrictions on the transfer of capital or funds or hard limits on how much can be transferred. Such controls are aimed at regulating the volume of international capital flows through creating an additional burden on the banking system. Market-based controls are indirect restrictions that impose fees on either the price or the volume of the financial transaction. The aim is to discourage investors from making such transactions as they become more expensive. Tobin taxes are a good example of taxing the cross-border capital flows. Some explicit restrictions are also imposed based on the maturity of the asset or its type. Implicit controls are often imposed through compulsory reserve or deposit requirement whereby the banks involved in international financial transactions must deposit reserve amounts with the central bank. This is known as the unremunerated reserve requirement (URR).

Ariyoshi, et al. (2000) reports that during the surge in capital flows to emerging markets in the 1990s, many countries opted for capital controls on short-term inflows. These countries included Brazil, Chile, Colombia, Malaysia, and Thailand. Market-based controls that taxed inflows and outflows were also used by these economies. Brazil, Chile, and Malaysia opted for administrative control and taxed several types of foreign exchange transactions. However, it must be noted that the macroeconomic situation in these economies varied widely. For instance, Thailand operated under a fixed exchange rate regime during the controls during 1995 – 1997, while the other economies strictly managed their exchange rates. Chile set itself apart from the other countries because its policymakers did not believe traditional controls adequate to handle large capital inflows.

After the Asian financial crisis, Asian economies began to experience large inflows once more, bringing about the worrisome currency appreciation effects. McCauley (2008) argues that these economies opted for a combination of policy instruments rather than simply imposing capital flow restrictions. These included sterilisation as a well direct intervention in the foreign exchange market, stricter prudential regulation along with greater exchange rate flexibility. The Asian economies also focused on liberalising capital outflows while maintaining or strengthening controls on inflows.

Despite the seemingly widespread use of capital controls, the empirical evidence of its effectiveness is varying. It is difficult to establish a firm understanding of the channels through which capital account liberalisation or controls operate in different country contexts. Furthermore, it is hard to ascertain the extent to which an economy's openness is affected by capital restrictions or liberalisation. Thus, it is extremely challenging to empirically isolate the effects of capital controls. So, there is no absolute theoretical framework which can be used to

study the effects of capital controls in different countries where they have been implemented in unison with other policy measures.

Capital controls are often associated with excessive government oversight, and despite their usefulness in many contexts, controls are deemed ineffective and distortionary. Ghosh and Qureshi (2016) address the roots of the stigma that came to be associated with inflow controls. They explain that advanced economies had relied on controls in the late twentieth century to deal with an excessive inflow of 'hot money'. Taking this historical perspective on capital controls as a policy tool, they determine that the turnaround came due to inflow controls being increasingly linked to outflow controls. Outflow controls were problematic as they were the more popular among the autocratic regimes, with dubious macroeconomic policies. The authors also claim that capital controls tend to be linked to restrictions on the current account and this was undesirable in an era of trade integration. Finally, Ghosh and Qureshi (2016) note the ideological shift to neoliberal economics during the 1970s induced policymakers to abandon capital control even a prudential measure in the following decades. This aptly explains why many emerging economies back then were encouraged to liberalize their capital account regardless of the impending volatility risks. With the advent of the GFC this has begun to change, but still, capital controls continue to have a bad name in general.

MacFarlane (2015) assessed this trend formally in the position of the International Monetary Fund (IMF) that has long advocated capital account liberalization for developing countries that seek to improve their growth. The author notes that the IMF changed its view in 2012 and accepted the use of capital controls under some circumstances. Yet, MacFarlane (2015) casts doubt on the effectiveness of capital controls in prudential purposes due to the interconnected nature of the global economy. But, since 2011 several EMEs have already implemented episodic controls to ensure financial stability (Gallagher, 2012). While optimal

capital control policy is a conundrum for many EMEs, the debate at one level is whether they are needed at all. As global financial integration deepens, the relationship between financial openness and macroeconomic shocks and volatility should be taken more seriously.

There is ample literature on the effects of financial liberalization on different parts of the economy and governance. For instance, Levine (2001) finds that financial liberalization enhances the performances of the domestic financial markets and institutions, and as a result, it has long run positive effect on economic growth. Conversely, Stiglitz (2000) notes that in light of the Asian Financial Crisis, there are several theoretical and empirical weaknesses in the case for international financial liberalization. According to him, short-term capital flows are an inherent source of instability in the economy and thus requires intervention from to the state to mitigate the risk. Ang and McKibbin (2007) examine the case of Malaysia to analyze the effects of financial liberalization on a small open economy using data from 1960 – 2001. They conclude that the liberalization policies positively affect growth by removing excessive controls, and spurs financial sector development. Klein and Olivei (2008) found similar results on cross-sectional data from two time periods, indicating the need for open capital accounts. But they also note that this result was driven by the advanced economies and the failure of financial liberalization policies in many developing countries should be taken seriously.

Despite the advantages, Cubillas and Gonzalez (2014) conclude that liberalization policies precipitate further risk-taking in banks worldwide. They used a sample of over 4000 banks in 83 countries to determine the effect of financial liberalization on bank's risk-taking. Interestingly, the study notes that channels of increased risk-taking are different for developed and developing countries. In developing country context, liberalization increases the opportunities for risk-taking for banks, and capital requirements are an effective means of addressing this increased risks. But this indicates the need for high-quality public institutions.

Indeed, Baekert, Harvey, and Lundblad (2005) found that in order to reap the growth effects of financial liberalization, the country needs to have strong and good quality institutions. This, however, has remained a challenge for many emerging markets and developing countries.

Liu and Spiegel (2015) examine the different capital control policies available to emerging market economies as more capital continues to flood there. They argue that in such contexts, capital account and sterilization policies are effective in addressing volatile capital flows. Edwards and Rigobon (2009) use the case of Chile during the 1990s to test the effectiveness of capital controls in reducing vulnerabilities to the economy through increased capital flows. While they found that capital controls made Chile less prone to external shocks, tightening the controls increases the exchange rate volatility of the country. There are not many studies on the link between capital controls and economic growth, which makes it hard to determine the relationship. Chanda (2005) takes on a different approach to this link and finds that the underlying ethnic composition of the country is a factor when considering the link between controls and growth. According to Chanda (2005), countries that have greater ethnic homogeneity experience a positive effect from controls via greater growth gains.

In an IMF working paper, Pagliari and Hannan (2017) relay the determinants of volatility in capital flows to EMEs. He claims that capital inflows into these countries are much larger compared to the size of the economies. EMEs are more prone to shocks in general due to less diversification in the economy and political instability. Finally, as the Global Financial Crisis has shown, capital inflows into EMEs are highly sensitive to the international system and curbing the effects of shocks are often beyond the control of domestic policies. The authors' volatility estimates confirm that portfolio debt and bank inflows are more volatile than FDI flows. More interestingly, he finds that during economic turmoil all types of flows tend to

become volatile. As capital volatility can be detrimental for EMEs, this calls for some sort of control on flows that will tackle the trends during the business cycle.

The literature review has thus far focused on the studies pertaining to capital flows, liberalisation and capital controls, but it is also important to survey the research on output volatility. Giovanni and Levchenko (2009) studied the effect of trade openness on output volatility and found that there is a significant positive relationship between trade openness and volatility. They used industry-level panel data from of 61 countries, across 28 manufacturing sectors, and over the period of 1970–1999. The study concludes that manufacturing sectors that are more open to foreign trade are more volatile and also tend to be more specialised. This results in an aggregate increase in volatility. However, these sectors are found to be less correlated with the overall economy which have a negative effect on volatility. Yet, the overall positive effect of trade openness on output volatility remains robust. Haddad, Jim, and Saborowski (2010) finds that the positive effect of trade openness on growth volatility is mitigated with increase in export diversification. Koren and Tenreyro (2007) assessed why poorer countries experience higher than average growth volatility and found that these countries tend to specialise in more volatile sectors and have low levels of trade diversification. Fluctuations in these sectors are highly correlated with overall macroeconomic fluctuations. Furthermore, perhaps due to inadequate macroeconomic policies, these countries experience severe external shocks more frequently.

Studies have also looked into the relationship between the level of financial development and growth volatility. For instance Easterly, Islam, and Stiglitz (2001) found that there is a non-linear relationship between the financial system and growth volatility. In general, the financial system functions as stabilizer of external shocks and thus decreases growth volatility. However, after a certain threshold, the risk-taking behaviour of the financial system

can inflate to a point where it increases growth volatility. Such threshold effects are also present in other studies. For example, Kose, Prasad, and Terrones (2003) studied the effects of international financial integration on macroeconomic volatility. They found that overall macroeconomic volatility has declined over the last three decades. However, consumption growth volatility compared to income growth volatility has increased in financially integrated developing states. But they also conclude that financial openness is associated with higher macroeconomic volatility, but after a certain threshold there are risk-sharing benefits to financial integration. This is somewhat in contrast to the conclusions of Easterly, Islam, and Stiglitz (2001).

Acemoglu, Robinson, and Thaicharoen (2003) examined the role of institutions in determining volatility resulting from poor macroeconomic policies. They argue that countries that have inherited "extractive" institutions from their colonisers tend to have weak institutions that result in effective and often disastrous economic policies. Their study finds that after controlling for the quality of institutions, there is very little effect of macroeconomic policies on volatility. They conclude that it is in fact "extractive" institutions that are ultimately causing economic volatility and poor policies are symptoms of the bigger problem.

This brief literature review highlights the complexity and controversy in determining a capital control policy. But it is also important to note that the effectiveness of capital controls in managing capital flows appears highly dependent on the country context and characteristics of the flows. Taking this insight into account, the current paper will examine a group of countries that have implemented capital controls and assess the extent of their success. The idea is to have a better understanding of the country characteristics that can help to determine the optimal capital control mix. However, the paper will first overview the theoretical foundations of capital mobility and capital controls before analysing the case studies.

CHAPTER 2 – CAPITAL CONTROLS IN EMERGING ASIAN ECONOMIES

After the Great Financial Crisis, the Asian economies experienced a sudden stop in capital flows during the period of 2008 – 2009. However, since 2010 the capital inflows into the region reached historic highs. This was helped by the massive quantitative easing (QE) undertaken by the Federal Reserve whereby the base money expanded by USD 2.3 trillion. Asian currencies appreciated against the dollar. Figure 1 shows the composition of capital flows in Bangladesh, China, India, Indonesia, Malaysia, Philippines, and Thailand. It clearly shows that since 2010, portfolio flows have also surged in these countries. This denotes that the countries have relatively open capital accounts. However, portfolio flows are short-term in nature and can be highly volatile which indicates that policymakers must address the growing risk of financial instability due to portfolio outflows. Emerging Asian economies has successfully attracted foreign investors and accumulated consistent inflows of foreign direct investment (FDI). China has received over half the total flows within the region, while India has also achieved significant FDI standing.

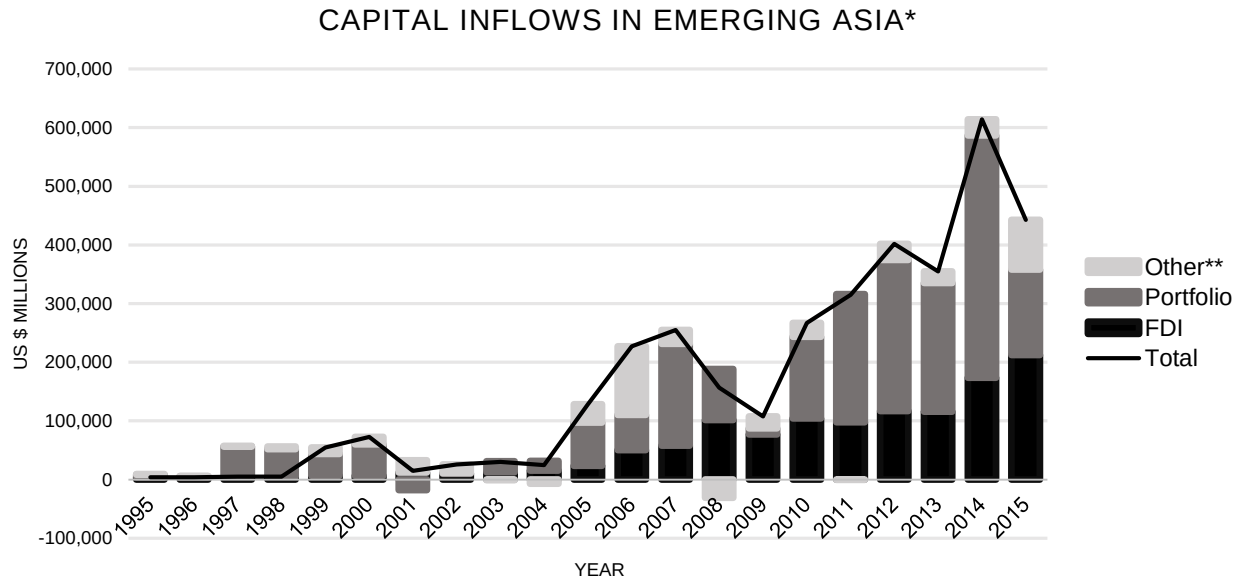

Figure 2 Capital Flows in Emerging Asia

*Bangladesh, China, India, Indonesia, Malaysia, Philippines, and Thailand
**Other flows includes derivatives
Source: IMF (2018). Author's own computations.

China, a country which has maintained long-standing capital controls as well foreign exchange restrictions all the attracting high levels FDI and maintaining laudable economic growth record (Epstein, Grabel, and Jomo, 2008). China's capital management policies which included controls on outflows has not deterred foreign capital inflows into the economy. China adopted capital account liberalization policies on an incremental basis, often retracting its policies before taking a step toward further liberalization. This experimental, but tight capital control policy, was an integral part of the country's long-term developmental strategy. In regards to the Asian financial crisis, several scholars agree that the capital controls helped the Chinese economy insulate itself from the ensuing shocks that followed (Eichengreen, 2002; Fernald and Babson, 1999). More specifically, Chinese controls on equity flows are credited with preventing the spillover effects from the stock market bubble into other sectors of the economy. Most important, controls on outflows prevented capital flight which would have been devastating for the Chinese economy.

However, the success of Chinese capital management techniques was also costly for the development of its financial sector. The capital controls have mainly served the country's industrial policy rather than expanding the depth and breadth of its financial markets. Furthermore, controls have created more room for corruption in the public sector. But these are costs that the government understood and accepted. China was successful because it is adept at maintaining economic controls and allowing for a certain degree of flexibility, as well as its large foreign currency reserves which can often act as a cushion.

Similar to China, Indian developmental state was also highly dependent on its capital control policy. India has also maintained capital controls on both inflows and outflows over a range of asset categories including equity flows and direct investment. But the controls are marked by significant differences between resident and non-resident corporates and

individuals. For instance, while non-resident corporate entities can repatriate funds from the country relatively easily, this is not the case for individual residents. Indeed, India has maintained a remarkable level of restrictions on outflows by residents. However, similar to the case in China, the Indian controls also insulated the economy from the brunt of the crisis in 1997 (Rajaraman, 2001).

Yet, not all the countries in the dataset escaped the ravages of the Asian financial crisis. Malaysia's stunning economic growth path was stopped by the crisis, but instead of following the IMF stabilization program the government opted to implement capital controls. This was unforeseen as Malaysia was marked out because of its liberal capital account policies. The objective of these controls was to mitigate the effects of the crisis and protect the ringgit from speculative attacks.

The different cases show the nuances and the circumstances in which capital controls were utilized in these economies. The model estimates using the time and country fixed effects finds evidence in support of overall capital controls for this dataset, but rather than placing it on the asset categories, the controls should target the outflows. Furthermore, and counterintuitively, the results suggest that controls on FDI and equity can have a significant positive impact on output volatility. This can be an indication that some other asset category restriction (e.g. financial credit or debt instruments) has an effect on the average capital control index.

Capital controls are often associated with creating more resilient economic infrastructure in times of financial crises. Studies suggest that EMEs may benefit much from designing and implementing well-targeted and short-term controls can help curb any disruptive surges in capital inflows. The IMF stance shows in the weight with the proponents, but it must be noted that capital controls cannot be used in exchange for proper macroeconomic policies

and reforms. It should be viewed as a policy tool that a country can use in times of crises or other problems that arise due to capital volatility (Flowers, 2011).

Another major danger in legitimizing capital controls is that it may put an undue premium on participating in the emerging markets. It will make emerging markets appear riskier and this is especially true if the controls are set on the outflows of funds. This does not mean that increasing financial flows into the emerging markets is not a challenge and should remain unaddressed. But rather it should be addressed by other policy measures that do not have such administrative costs.

However, despite these costs, it should be noted that controls were essential for the development and growth of East Asia, especially in Japan, South Korea, and China. These developmental states took an activist stance and kept a firm hold on the capital flows because it was mandated to traverse the economy through a specific growth path. But this came at the price of severely underdeveloped capital markets. Indeed, one of the pitfalls of capital controls is that they are counterproductive for the development of stocks and bond markets. This explains why the main source of raining capital in Asia is through bank loans rather than through issuing stocks or bonds.

In order to assess the capital control scenario in these economies, this thesis uses the capital control index developed by Schindler (2009). Indexes were created for both capital inflows and outflows based on different asset categories such as DI, equity flows, and debt. The indexes are based on data published in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. Schindler's original dataset ranged from 1995 to 2005, however, Fernandez, et al. (2016) updated the dataset to include the figures up until 2015. Therefore, this thesis has used the updated dataset on capital controls ranging from 1995 to 2015. Each of the indexes ranges in value from 0 to 1, with 0 denoting no restrictions on capital

movements under the asset category and 1 denoting most restrictive scenario. The indexes are helpful in ascertaining small differences in capital controls over time for particular countries.

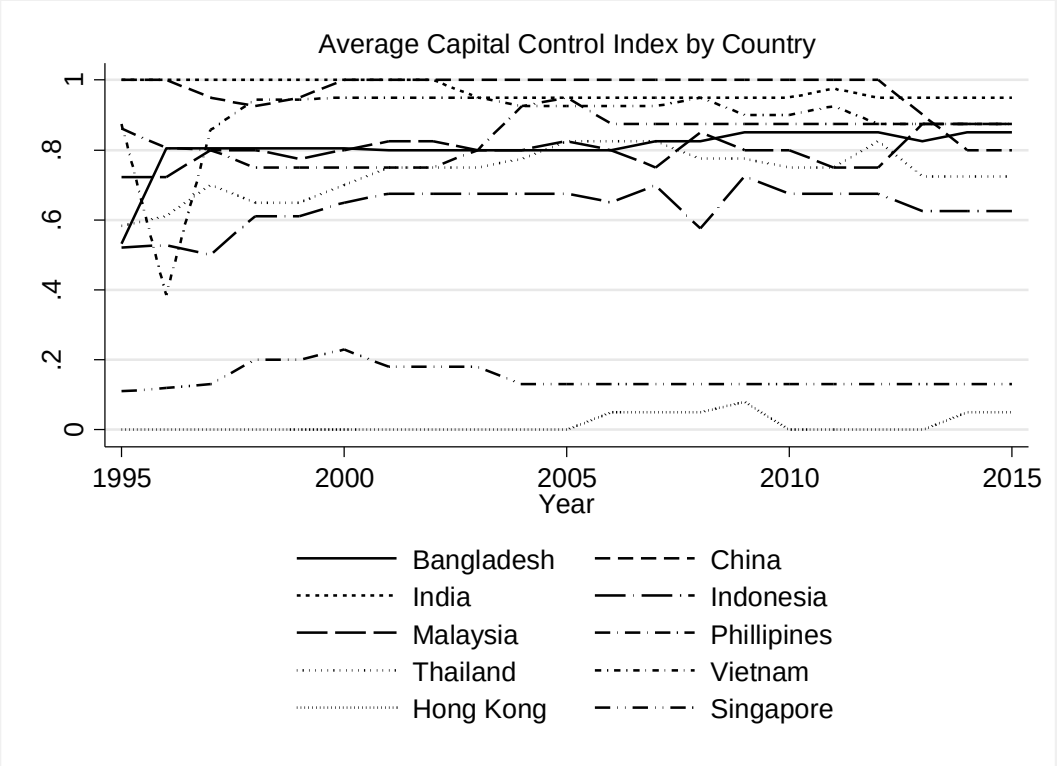

Figure 3 Average Capital Restrictions Index by Economy
Source: Fernandez, et al. (2016). Author's own computations.

Figure 2 shows the average capital control index (both inflow and outflow) for the ten emerging Asian countries. While all the countries started off with some degree of control, there are substantial differences in the magnitude of control among the countries. China and India, the two major emerging markets in Asia, have maintained a very high level of control throughout the last two decades. While Indonesia seems to have started off with a relatively low level of capital control. The graph depicts how each of the countries responded to the Asian financial crisis with an increase in capital controls. A similar trend can be observed during the global financial crisis in 2007. However, in the post-crisis period, capital controls in these economies seem to be coming down.

Figure 2 clearly depicts the divergent situation in Singapore and Hong Kong, two of the most open economies in emerging Asia. Hong Kong has maintained a strictly open capital control policy with some minor increases after the financial crisis in 2007. Singapore has maintained some level of capital controls throughout the last two decades, albeit at a very low level. Both Singapore and Hong Kong have transformed into global financial hubs in Asia with policies that ensure openness of the economy. Singapore's economic success, unlike China's, is often attributed to the country's completely open capital account. In 1978, Singapore lifted its exchange controls which enables both residents and non-residents alike to engage in cross-border financial transactions freely. However, Epstein et al. (2003) note that Singapore's long-standing policy[1] of deterring the internationalisation of the Singaporean dollar is rarely ever discussed in regards to the economy's success. This policy sets a limit on the borrowing of the Singaporean dollar residents and non-residents so as to decrease the chances of speculative attacks on the currency. Epstein et al. (2003) contend that this is a capital management technique and one that has had a significant impact on maintaining the macroeconomic stability of Singapore. This allowed the country to undertake large-scale industrial policy which led to rapid growth in the country, all the while government seemingly decreased state interventionism for greater liberalisation. The non-internationalisation policy came under pressure several times over the last three decades with authorities loosening the policy incrementally. Yet, Singapore's policies always focused on ensuring that their dollar does not come under speculative attacks. Some assert that the cost of this was the lack of development in the Singaporean bond market, although there is no concrete quantitative evidence to support the claim.

[1] Monetary Authority of Singapore (MAS) pursues a non-internationalisation policy for the Singaporean dollar.

Hong Kong is set apart from all the other countries in the dataset in terms of its positive non-interventionist economic policies. While still, a territory of mainland China, Hong Kong's capital management policy could not have been more different than that of China's. Hong Kong is considered the freest country in the world and most attractive for FDI in Asia by the Heritage Foundation (2017). Hong Kong uses the Linked Exchange Rate System (LERS)[2] as the cornerstone of its financial and monetary stability. This system is different from a fixed exchange rate mechanism as the Hong Kong Monetary Authority (HKMA) does not infringe in the foreign exchange market in order to manipulate the value of the currency. Hong Kong imposes no controls on direct investment or portfolio flows and like Singapore, the economy is marked by high level of trust and confidence from the investors resulting in large flows. Only recently in 2014, Hong Kong introduced the duty stamp to be paid on any real estate investments by non-residents, but there is no further restriction upon payment of the duties (Fernandez, et al., 2016).

This analysis of the country-specific scenarios shed some light on the capital management policies of the different countries in the dataset. While these countries have experienced economic success in the last decades, they did so via adopting a divergent range of policies. Capital control policy is the focus of this thesis and figure 2 attests to the seemingly stark differences among the countries. This is somewhat expected as the countries are also in different stages of economic development – Hong Kong and Singapore are far more advanced than Bangladesh and Vietnam. The differences in the policy stance are more apparent when we look into the statistics for controls based on asset type and direction of flow.

The average capital control index hides the differences between the restrictions imposed based on asset types. Figure 3 shows the controls according to three different types of assets –

[2] LERS maintains a peg with the US dollar.

direct investment, equity, and financial credit. Since the Asian financial crisis, restrictions on equity increased exponentially. Controls on financial credit have followed a similar trend, albeit much less dramatically. Capital controls on direct investment have remained relatively stable and appears to only have been loosened after the 2008 crisis. This reflects the tradition of long-standing capital controls in some of the Asian economies such as India and China.

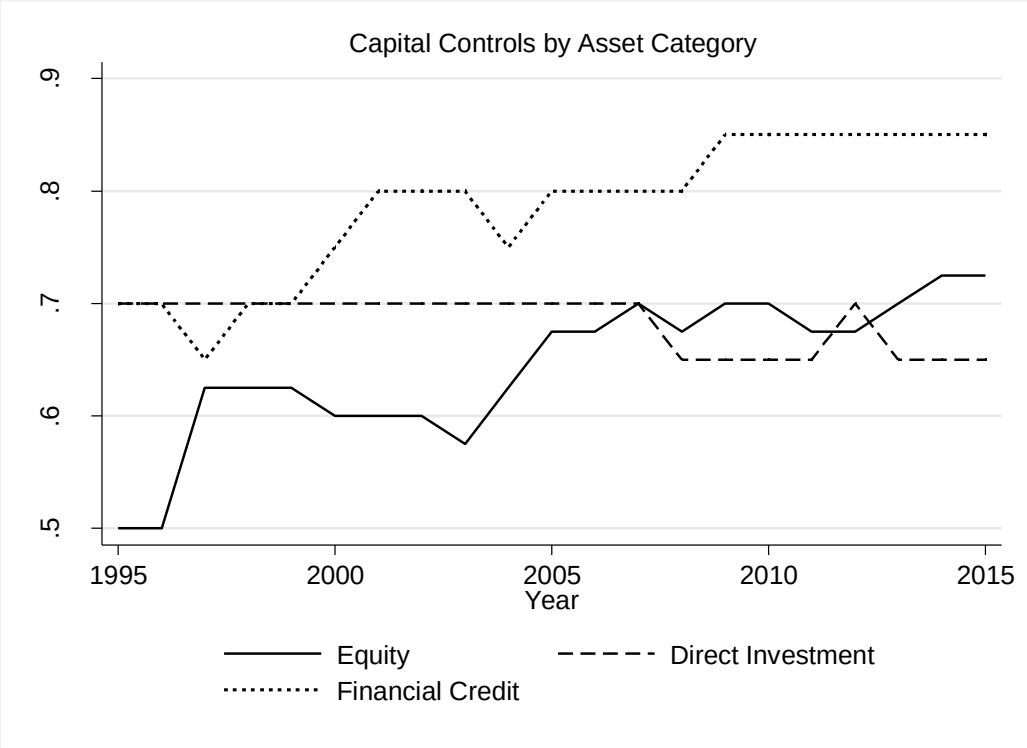

Figure 4 Total Capital Control Indexes by Asset Category
Source: Fernandez, et al. (2016). Author's own computations.

Figure 4 shows the steep increase in controls on both inflows and outflows after the Asian financial crisis. On average, the dataset shows that the emerging Asian economies preferred higher controls on capital outflows than inflows. This fits with the theory as the economies did not want capital to be easily pulled out in times of uncertainty. But at the same wanted to attract investments and thus tried to keep controls on inflows as low as possible. However, it should be noted that both controls on inflows and outflows are lower than they were right before the financial crises in 2008.

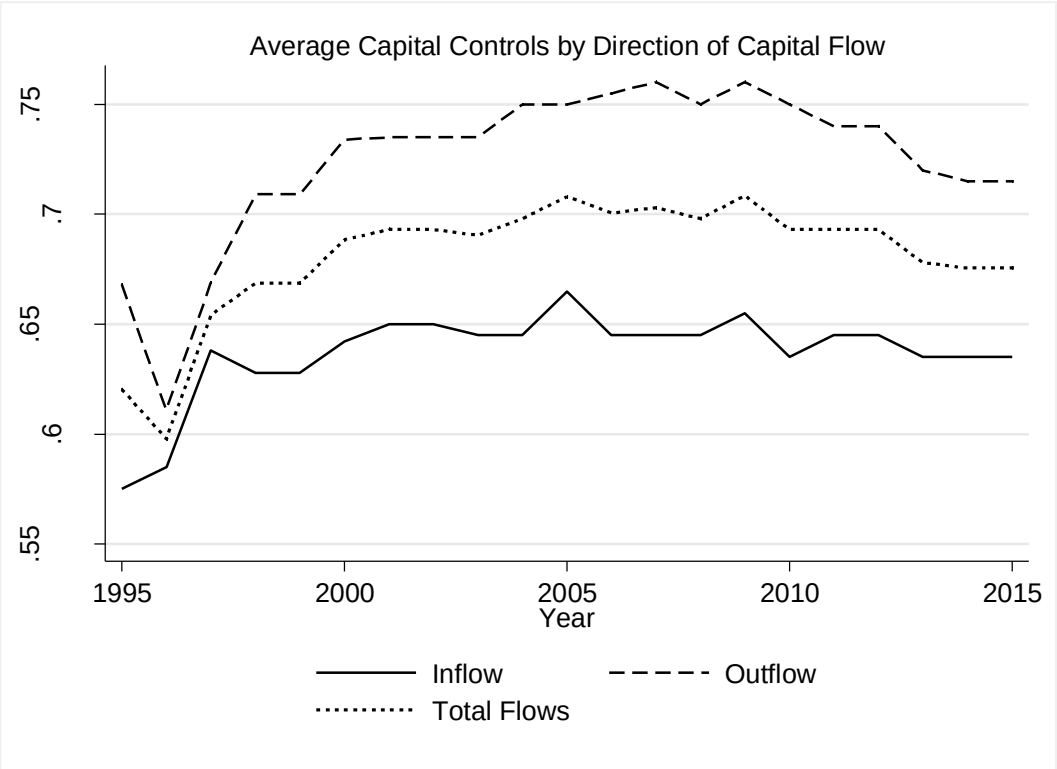

Figure 5 Average Total Capital Restrictions Index by Direction of Flow
Source: Fernandez, et al. (2016). Author's own computations.

Figure 5 depicts the country level scenario with regards to controls on inflows and outflows. Most of the countries had higher capital controls on outflows than inflows. Only Indonesia had more controls on inflows throughout the time period under study. Vietnam's outflow controls rose dramatically since the Asian financial crisis in 1997. As briefly mentioned earlier, none of the countries drastically increased or decreased their controls on inflows and outflows following the financial crisis in 2007. Additionally, both Hong Kong and Singapore have maintained a relatively low level of capital control on both inflow and outflow. As with most other Asian countries, Singapore opted for higher controls on outflows compared to inflows. However, figure 1 shows that there was a significant drop in capital flows in 2008 and further deteriorated in 2009. The portfolio equity flows for emerging Asia shrunk vividly from 2008 to 2009, denoting how quickly investors can relocate their funds. But the direct investments stayed relatively constant because these are more long-term and cannot be moved easily. Overall, data shows that the Asian economies have followed the liberalizing policies by

lifting controls on inflows whereby inviting foreign investment but at the same time restricted outflows so as to prevent financial instability.

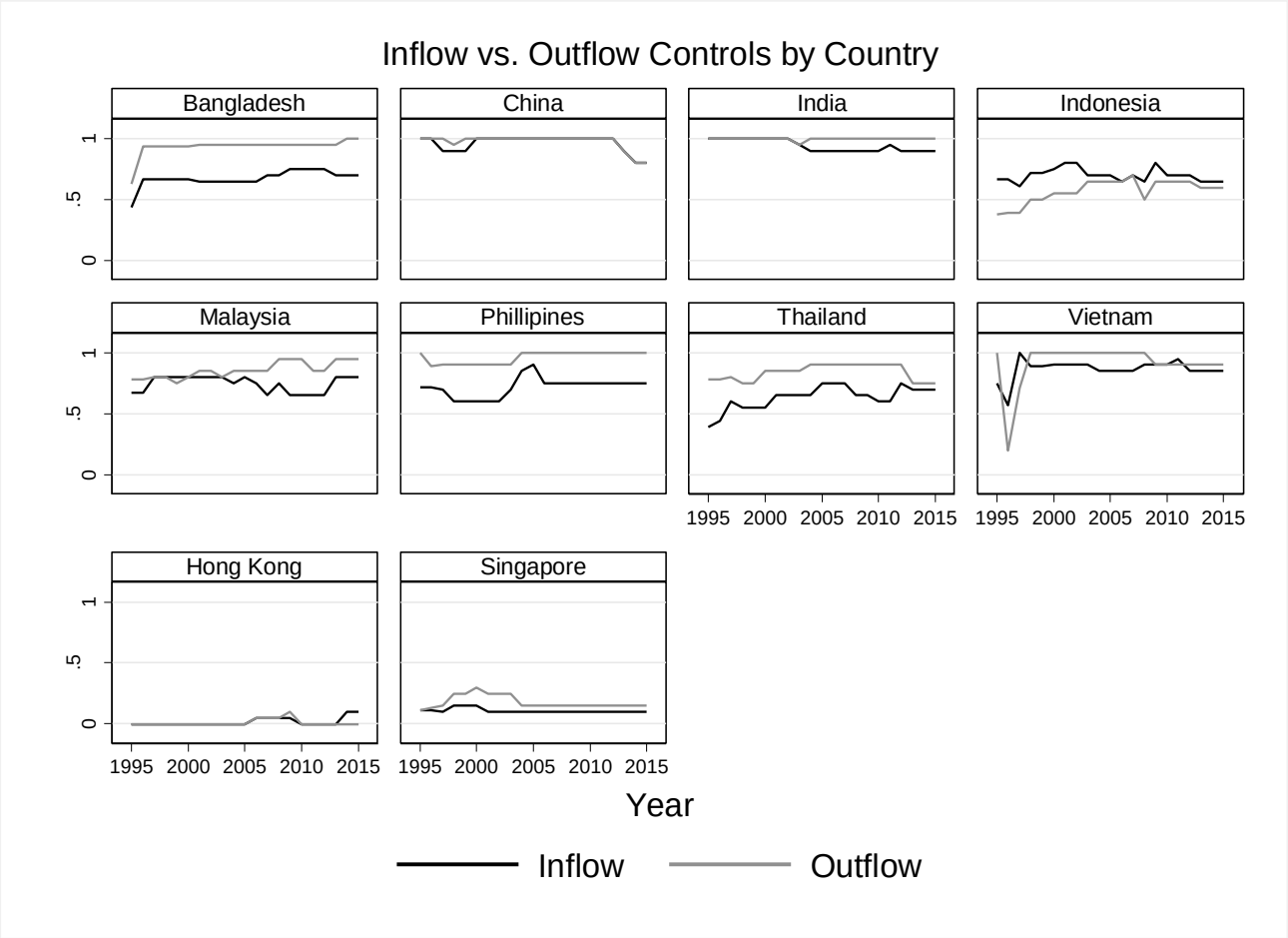

Figure 6 Average Total Inflow vs. Outflow Restrictions Index by Economy
Source: Fernandez, et al. (2016). Author's own computations.

The capital control measures implemented in Thailand were mainly focused on stopping the outflows. It tried to prevent the speculators from getting access to funds so that they do not have the chance to create a speculative market. But the controls were not able to stop the capital outflows and the outflows steadily increased despite the capital controls through 1997. Similar to Thailand, Malaysia's controls targeted the capital outflows from the economy. Furthermore, they fixed the exchange rate, stopped favorable credit terms foreign investors, and deferred returns on investment for a year. In 1999, the government decided to change the ban on returns with a tax on outflows instead. The main of these policies was to deter short-term capital inflows but encourage long-term foreign investment in the country.

Figure 6 shows the data on equity controls and financial credit and it appears that most countries had higher controls on the latter. While China and India both maintained absolute control on both the asset types, Bangladesh and Indonesia gradually increased the regulations on equity. Vietnam, once again, dramatically increased the restrictions on equity after 1997 as a response to the crisis. Hong Kong has kept controls at the zero bound, while Singapore has increased controls on financial credit after the Asian financial crisis and maintained it at that level. Interestingly, it has increased (but again lifted) controls on equity after the crises in both 1997 and 2007. This signifies the use of gate-like capital controls rather than opting for walls.

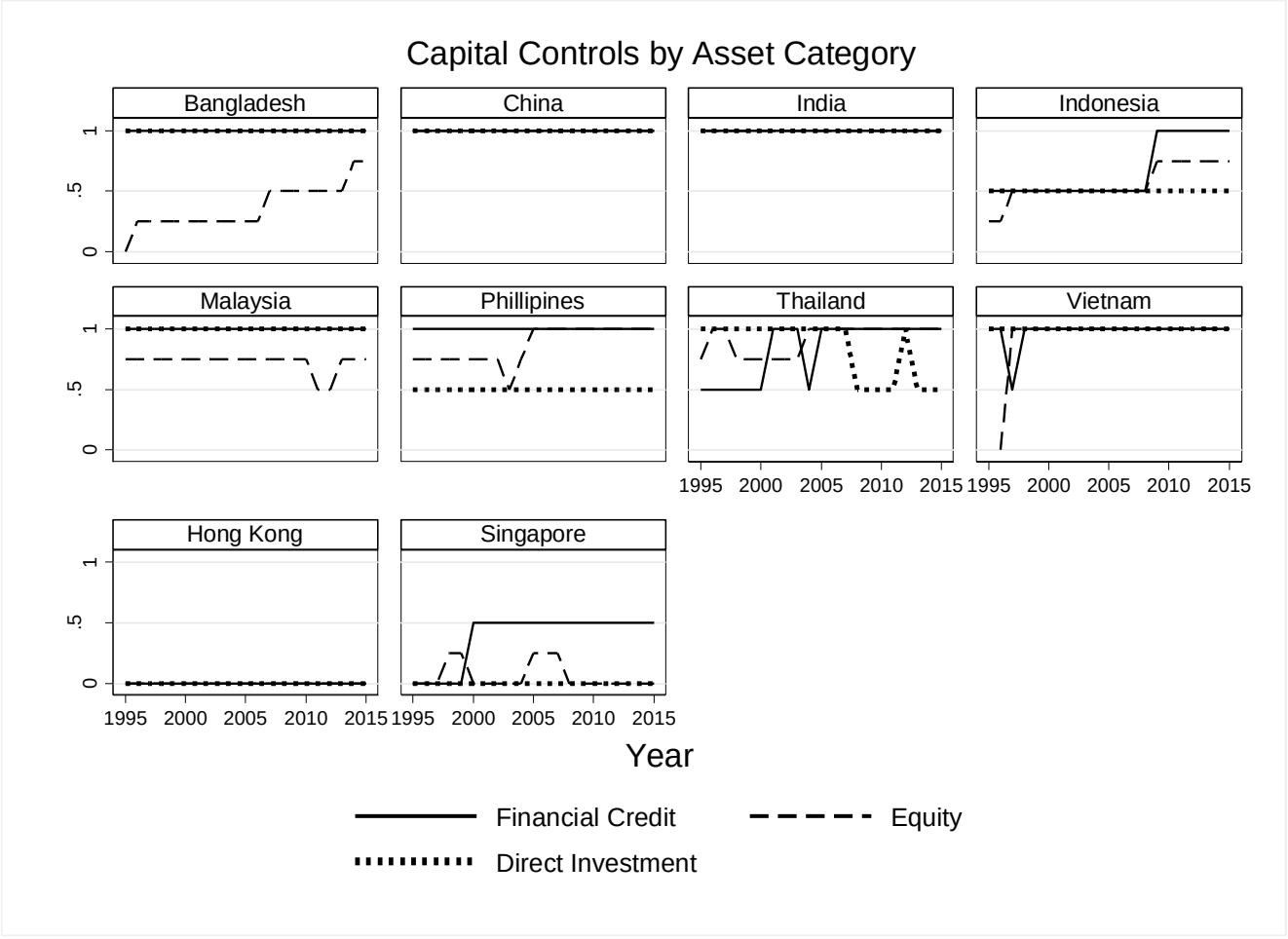

Figure 7 Capital Control Index by Asset Category for each country
Source: Fernandez, et al. (2016). Author's own computations.

Recent trends in output volatility among the countries of interest should also be looked into as that is the dependent variable of interest in this study. This study uses five-year rolling

standard deviation of GDP per person employed as the instrument for output volatility. More precisely, in order to have more comprehensive results, the GDP per person employed was transformed into logarithms and the standard deviation of this variable was taken. The final variable for volatility is the log-transformed standard deviations, and the results for each of the countries in the dataset are displayed in figure 7.

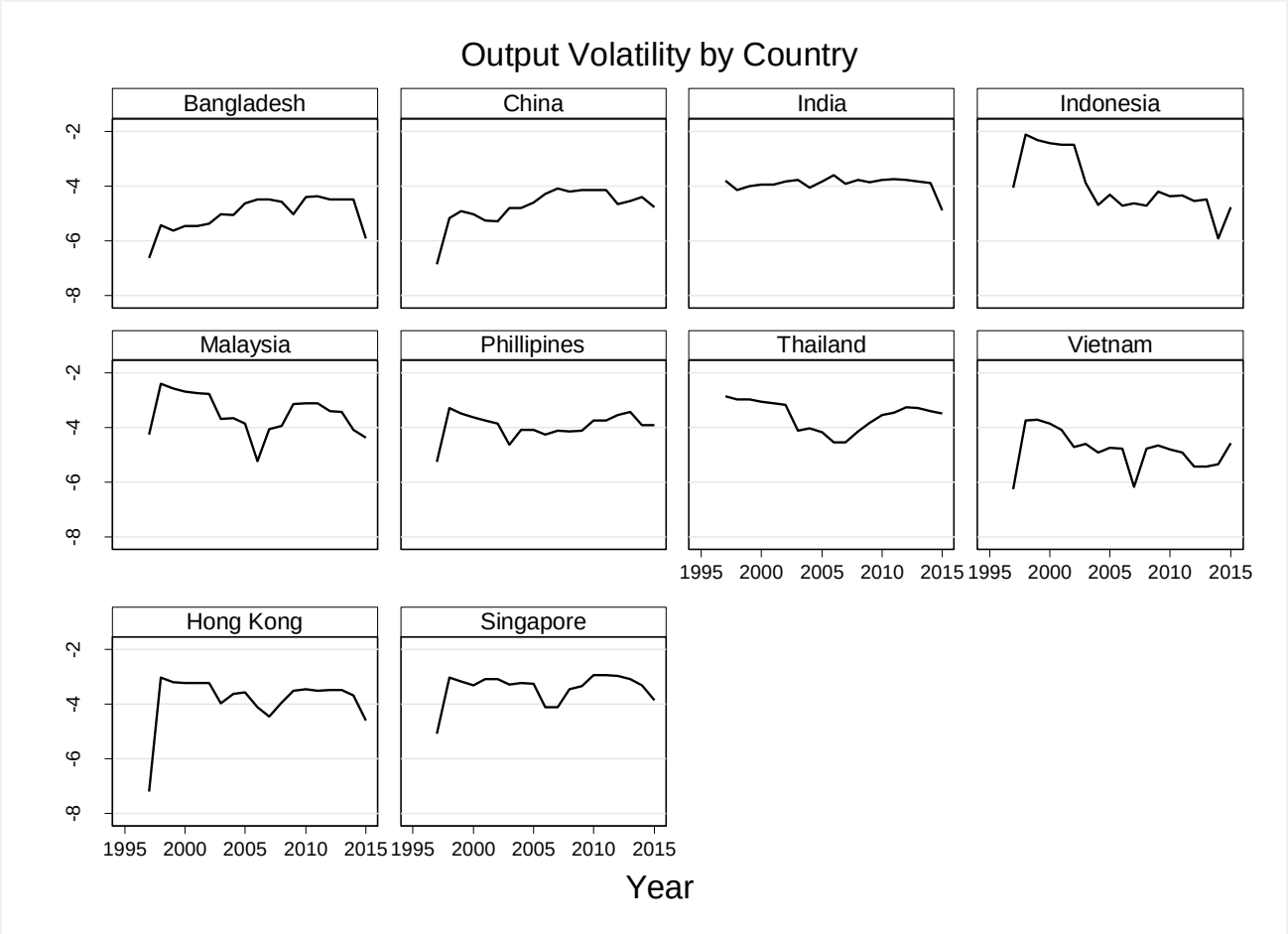

Figure 8 Output Volatility by Country
Source: World Bank WDI (2018). Author's own computations.

China, India, and Bangladesh show somewhat similar trends over the period of 1995 – 2015. In the late 1990s, there was a sharp increase in volatility among most of the countries in the set except for India and Thailand, both of which had relatively high volatility, to begin with. Apart from China, India, Bangladesh, and to some extent the Philippines, all the other six

countries felt the negative shock from the financial crisis in 2007. However, it is interesting to note that all the countries recovered fast from the dip. Both China and India have maintained strict controls on inflows and outflows of all asset types, and this policy coincides with the countries' relatively stable growth path over the last two decades. But this success can be attributed to a number of other factors as well and therefore merits further examination.

CHAPTER 3 – EFFECTS OF CAPITAL CONTROLS: PANEL DATA ANALYSIS

3.1. Data, Variables, and Methodology

The dataset on capital controls from IMF's AREAER report is publicly available and the most recent version by Fernandez, et al. (2016) was used for the analysis in this paper. The dataset covers 100 countries from 1995 to 2015. The variable for capital control is the average for inflow and outflow controls of all asset categories. For preliminary analyses, the average controls on direct investment, equity, and financial credit were analysed separately. The rest of the data was collected from World Bank's *World Development Indicators* and *Global Development Finance* databases, and from the IMF's *Balance of Payments* data.

The primary question of this study is the effect of capital control of output volatility, and as such the thesis uses the fixed effects model to capture this effect. The following empirical model is estimated:

$$volatility_{it} = \beta_0 + \beta_1 avgCC_{it} + \beta_2 inst_{it} + \beta_3 smcap_{it} + \beta_4 investment_{it} + \beta_5 dcred_{it} + \beta_6 inflation_{it} + \beta_7 openness_{it} + \alpha_i + \delta_t + \varepsilon_{it} \quad (1)$$

The first sub-question of research interest deals with the direction and structure of capital flows. In order to determine the effect of the inflow and outflow restrictions on output volatility, the following model is estimated:

$$volatility_{it} = \beta_0 + \beta_1 kai_{it} + \beta_2 inst_{it} + \beta_3 smcap_{it} + \beta_4 investment_{it} + \beta_5 dcred_{it} + \beta_6 inflation_{it} + \beta_7 openness_{it} + \alpha_i + \delta_t + \varepsilon_{it} \quad (2)$$

Similarly, the effect of the two different asset categories, which are FDI and portfolio equity, in this case, is given is estimated by the equation:

$$volatility_{it} = \beta_0 + \beta_1 kao_{it} + \beta_2 inst_{it} + \beta_3 smcap_{it} + \beta_4 investment_{it} + \beta_5 dcred_{it} + \beta_6 inflation_{it} + \beta_7 openness_{it} + \alpha_i + \delta_t + \varepsilon_{it} \quad (3)$$

The thesis also seeks to understand how restrictions on specific types of assets affect output volatility. The effect of restrictions on FDI on volatility is estimated by the following equation:

$$volatility_{it} = \beta_0 + \beta_1 avgDI_{it} + \beta_2 inst_{it} + \beta_3 smcap_{it} + \beta_4 investment_{it} + \beta_5 dcred_{it} + \beta_6 inflation_{it} + \beta_7 openness_{it} + \alpha_i + \delta_t + \varepsilon_{it} \quad (4)$$

Similarly, the effect of controls on portfolio equity flows on volatility is estimated by the following equation:

$$volatility_{it} = \beta_0 + \beta_1 avgEQ_{it} + \beta_2 inst_{it} + \beta_3 smcap_{it} + \beta_4 investment_{it} + \beta_5 dcred_{it} + \beta_6 inflation_{it} + \beta_7 openness_{it} + \alpha_i + \delta_t + \varepsilon_{it} \quad (5)$$

For equation (1) to (5), the following applies:

i = index for each country in the dataset (i = 1, 2, …, 10)

t = index for time periods represented by years (t = 1, 2, …, 21)

α_i = intercept for each country; country fixed effects (i = 1, 2,…, 10)

δ_t = year fixed effects

ε_{it} = error term capturing the idiosyncratic errors

Additionally, in equation (1) *avgCC* variable measures the overall restrictions on all inflows and outflows from all asset categories. In equation (2), *kai* variable measures the overall controls imposed on inflows from all categories, while in equation (3) the *kao* variable

measures the outflow restrictions from all asset categories. Similarly, *avgDI* variable in equation (4) measures the average inflow and outflow restriction on direct investment only. While the *avgEQ* variable in equation (5) measures the inflow and outflow restrictions on equity investment.

This analysis uses GDP per worker as an indicator of output, and therefore uses the standard deviation of GDP per person employed as a measure of output volatility. More specifically, the *volatility* variable is estimated using the five-year rolling standard deviations of the log-transformed figures for the growth rate[3] of GDP per person employed. For a better understanding of the point estimates log transformed output volatility is used for further analysis. The analysis uses several control variables that affect the GDP as well as capital flows for a country. First, to account for the level of financial development, the study uses the percentage share of stock market capitalization in GDP (*smcap*) as a proxy. Domestic credit to the private sector as a percentage of GDP (*dcred*) is also an indicator of the internal financial development of the economy and thus is used as a third control variable. Output volatility can result from a number of other reasons and research varies on the drivers of economic growth. But some variables are commonly found in literature as affecting GDP – inflation, trade openness of the economy, and investment. So, the third control variable used is annual inflation rate measured by changes in consumer prices (*inflation*). Fourth, trade as a percentage of total GDP (*openness*) is used as a proxy for the openness of the economy. Finally, gross capital formation as a percentage of GDP (*investment*) is used to gauge the level of domestic investment in the economy.

[3] The first-differenced log (GDP per worker) is taken as a proxy for the growth rate. The standard deviation of this growth rate is used as the output volatility variable.

In order to assess the role of institutions in the second sub-question, the study uses the Government Effectiveness Index from the World Bank and the index values range from – 2.5 (weak institutions) to 2.5 (strong institutions). This index is stated as *inst* in the equations. One of the motivations behind adding institutional quality in the list of explanatory variables is that it is often conjectured that strong institutions are essential for maintaining capital management policies. The case of Malaysia illustrates this point, whereby the country's capital control policy was successful in the aftermath of the Asian financial crisis due to its strong institutions.

Table 1 Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	Obs.
Average Capital Control	0.68	0.32	0.00	1.00	210
Average Equity Control	0.64	0.38	0.00	1.00	209
Average FDI Control	0.68	0.40	0.00	1.00	210
Stock Market Capitalisation	129.76	214.72	0.41	1086.34	198
Average Inflow Control	0.64	0.31	0.00	1.00	210
Average Outflow Control	0.72	0.35	0.00	1.00	210
Domestic Credit to Private Sector	82.92	49.97	18.48	233.21	210
GDP per person Employed ($)	33180.78	37443.03	3996.26	144485.40	210
Openness (Trade % of GDP)	138.97	118.22	22.17	442.62	210
Domestic Investment	28.56	7.42	10.68	47.69	210
Inflation Rate	4.80	5.41	-4.01	58.39	209
Volatility	0.02	0.02	0.00	0.12	190
Institutional Quality	0.37	0.90	-0.91	2.44	170

Summary statistics of the variables are listed in Table 1. Overall the panel appears to be quite well balanced, but there are minor gaps in data for some control variables. Compared to the other countries in the dataset, Vietnam seems to have a more data points lacking. Another issue can be the large range for many of the variables, and this can introduce heteroskedasticity in the model specified. It should also be noted that the minimum for inflation is a negative figure which means that the log transformation has omitted some of the data for inflation.

Panel dataset is advantageous because of its multidimensional nature whereby it allows the analyses to include many observations for several countries over a period of time. The fixed

effects model decreases the bias created through omitted variables through accounting for the unobserved country and time effects. While omitted variables are not in the dataset, they can have an effect on the dependent variable, which is output volatility in this case. This volatility is estimated by the GDP per worker which is determined by a multitude of factors and it would be very difficult to represent them all in a single dataset. Thus, this study accepts there will be unobserved effects.

The fixed effects approach is appropriate because it can capture the relationship between the dependent and independent variables of the various countries over a period of time. There are crucial differences among countries, even if they are from the same geographical region and share some other similar macroeconomic characteristics. The fixed effects model accounts for the time-invariant characteristics of the countries and thus absorbs the differences between the different countries. This analysis is concerned with the level of capital controls and output volatility, and both of these vary over time. So does the variables for capital inflow, outflow, FDI flows, and equity flows. It should be noted that fixed effects model assumes that the time-invariant characteristics are not correlated with that of other countries. This means that each country's error term and the constant should not be correlated with the rest of the group's. Additionally,

3.2. Unit Root Test and Multicollinearity

Stationarity is a key assumption when evaluating time series data because it ensures that the estimates are not biased due to trends over time. The most popular unit root test for stationarity is the Dickey-Fuller test for time series data. However, panel unit root tests are more applicable in case of macroeconomic variables and capable of detecting nonstationarity more effectively (Hadri, 2000). The disadvantage of using panel unit root tests is that they give rise to more unobserved heterogeneity, and the assumptions of cross-dependence may be problematic

(Breitung and Pesaran, 2005). There are several panel unit root tests available based on the characteristics of the panel dataset. This study uses the Im-Pesaran-Shin unit root test which allows for more heterogeneous panels which is useful for cross-country studies such as this (Im, Pesaran, and Shin, 2003). Furthermore, this test does not assume a balanced panel which is useful as data is missing for several variables across the panel.

Table 2 shows the result of the Im-Pesaran-Shin unit root test for all the variables used in the model, both including and excluding the time-trend. Allowing the 'trend' means that the model now includes a linear time trend. The null hypothesis of the test states that the all the panels in the data are stationary while the alternative hypothesis is that only some panels are stationary. According to the test, domestic credit to private sector, openness to trade, and domestic investment are not significant indicating that they do contain a unit root and thus are not stationary. Stock market capitalisation and inflation variables do not have any results as the panels for these variables were incomplete. The variables that are without unit roots are deemed to be stationary I(0) and safe to be used for further analysis in their current form. However, the rest of the variables which have turned out to be non-stationary I(1) are deemed non-stationary which can be a serious problem for time-series data. But in a panel data set such as the current one, there is a leeway of analysis using non-stationary data. Assuming that the observations in the cross-sectional units are independent, we can refer to the central limit theorem for the cross-sectional units and argue that the limit distributions of estimators are asymptotically normal (Hsiao, 2007)[4]. Additionally, the pressing concern regarding unit roots is the spurious regression problem, but in panel data, this is reduced by averaging (Smith and Fuertes, 2016).

[4] See more at Binder et al. (2005); Im et al. (2003); Levin et al. (2002); Phillips and Moon (1999).

Table 2 Im-Pesaran-Shin unit root test

Variables	*t-bar statistic*	*t-bar statistic including time-trend*
Average Capital Control Index	-3.0900**	-3.9675**
Capital Control Inflow	-2.5299**	-2.7846 **
Capital Control Outflow	-3.6385**	-4.5381**
Output Volatility	-3.8471**	-3.9162**
Institutional Quality	-1.8593*	-2.6303*
Stock Market Capitalization	Not Available	Not Available
Domestic Credit to Private Sector	-1.0365	-1.3367
Openness	-1.2235	-2.1997
Investment	-1.9915*	-2.2119
Log Inflation	Not Available	Not Available
H_0: All panels contain unit roots		**significant at 1% critical value
H_a: some panels are stationary		*significant at 5% critical value

In a study such as this, it is important to check for any issues with multicollinearity and collinearity which tells us about the relationship between the all or some of the independent variables. The problem is that if independent variables themselves are highly correlated then it might make it very difficult to isolate the effect of the main independent variable(s) on the outcome variable. Therefore, robustness checks regarding multicollinearity are relevant in this analysis. In the presence of multicollinearity, the standard errors are inflated and the Variance Inflation Factor (VIF) captures how much variance (i.e. standard errors) are inflated because of multicollinearity. Table 3 shows the results for the five main independent variables with regards to the set of the control variables. However, multicollinearity is a matter of degree and judgement and there is no optimal cut-off point of VIF. As a general rule of thumb, if the VIF of a variable exceeds 10 which is the case when R^2 surpasses 0.90, there is a serious problem of multicollinearity. The results in table 3 are well below this cut-off value of 10, but still, the *Openness* variable appears to have higher than average VIF. However, the level is not deemed to be worrisome and therefore the variable is left in the model.

Table 3 Variance Inflation Factor (VIF) Test for Multicollinearity

Main Independent Variables (X)	Average CC		Inflow Control		Outflow Control		FDI Restrictions		Equity Restrictions	
	VIF	*1/VIF*	*VIF*	*1/VIF*	*VIF*	*1/VIF*	*VIF*	*1/VIF*	*VIF*	*1/VIF*
Openness	5.85	0.171	5.87	0.170	5.33	0.188	5.2	0.192	4.62	0.217
X	4.4	0.228	4.46	0.224	3.76	0.266	3.01	0.333	2.84	0.353
Log (Domestic Credit)	2.52	0.396	2.51	0.398	2.49	0.401	2.92	0.343	2.64	0.378
Stock Market Cap.	2.29	0.437	2.2	0.454	2.32	0.430	2.18	0.458	2.21	0.452
Investment	1.39	0.717	1.43	0.700	1.4	0.713	1.39	0.718	1.39	0.717
Log (Inflation)	1.21	0.825	1.26	0.795	1.2	0.836	1.22	0.820	1.21	0.828
Mean VIF	2.94		2.96		2.75		2.65		2.48	

3.3. Naïve Regressions

Before moving on to the fixed effects model, it is useful to look at the estimates from the naïve regressions. The simple Ordinary Least Squares (OLS) estimates are reported in table 2. The first column shows the results for the effect of overall capital controls on output volatility. The estimates in columns 2 and 3 show the regression results for the effect of controls on inflows and outflows respectively. Similarly, the columns 4 and 5 depict the results for restrictions on FDI and equity respectively.

It is interesting to note that not all the control variables have a statistically significant effect on output volatility. In general, the OLS shows that domestic investment has a significant positive impact on output volatility. This indicates that a percentage increase in domestic investment is likely to lead to higher the output volatility. Stock market capitalization only has a significant effect on output volatility when considering the average capital control, outflow control, and FDI restrictions. The openness of the economy does not have any significant effect on volatility. Finally, and quite unexpectedly, changes in the inflation rate in the economies has no significant effect on output volatility. Furthermore, none of the five the capital control variables has a significant effect on volatility.

Table 4 Estimation Results of "Naive" Regressions

Dependent Variable: Log (Output Volatility)					
Independent Variables	Avg. Capital Control	Inflow Control	Outflow Control	FDI Restrictions	Portfolio Equity Restrictions
Average CC[5]	-0.2290				
	(0.5497)				
Log (Domestic Credit)	0.2987	0.2616	0.3242	0.3894	0.1863
	(0.1522)	(0.1545)	(0.1469)*	(0.1694)*	(0.1565)
Stock Market Cap.	-0.0007	-0.0006	-0.0008	-0.0007	-0.0005
	(0.0003)*	(0.0003)	(0.0003)*	(0.0003)*	(0.0003)
Openness	0.0014	0.0022	0.0009	0.0007	0.0028
	(0.0013)	(0.0014)	(0.0012)	(0.0011)	(0.0011)**
Investment	-0.0374	-0.0381	-0.0386	-0.0375	-0.0380
	(0.0084)**	(0.0091)**	(0.0083)**	(0.0084)**	(0.0085)**
Log (Inflation)	1.9101	1.7056	1.8443	2.1381	1.6184
	(1.5208)	(1.6872)	(1.3692)	(1.3985)	(1.7095)
Inflow Control		0.1399			
		(0.5798)			
Outflow Control			-0.4441		
			(0.4481)		
FDI Restrictions				-0.4372	
				(0.3265)	
Equity Restrictions					0.3609
					(0.3106)
Constant	-4.3078	-4.4925	-4.1258	-4.4472	-4.4156
	(0.5976)**	(0.5708)**	(0.5966)**	(0.5465)**	(0.5520)**
R^2	0.22	0.21	0.22	0.23	0.22
N	180	180	180	180	180

* $p<0.05$; ** $p<0.01$

All the OLS model indicates that capital controls, regardless of whether imposed on direction or different asset type, has no significant effect on reducing output volatility. However, the OLS estimates were computed using the Huber-White standard errors which should control for heteroskedasticity but it does not address the autocorrelation issue in the dataset. The OLS model also does not account for the country level heterogeneity in the dataset. It also does not account for the differences from one time period to the next. Thus, while the OLS model is informative about the direction and nature of the relationship between capital controls and output volatility, it does not account for the panel characteristics for the dataset.

[5] CC is used in the regression tables as abbreviation for capital controls.

3.4. Fixed Effects Models

Table 3 shows the results of the fixed effects model with Driscoll and Kraay standard errors. Firstly, it must be noted that autocorrelation is a danger in a dataset such as this because capital controls are often tightened or loosed after shifts in economic performance which inherently implies volatility. This is confirmed by the Wooldridge test for autocorrelation in the five model (reported in table 5). For all five models that are to be estimated, the null hypothesis of no first-order autocorrelation can be rejected as the p-values are less than 0.01. This confirms that there is at least first-order autocorrelation in among the residuals. Furthermore, we can say that the OLS estimates are likely to be biased and inconsistent given the presence of autocorrelation in the variables.

Table 5 Wooldridge Test for Autocorrelation

Wooldridge test for autocorrelation					
H0: no first-order autocorrelation					
	Avg. CC	Inflow Control	Outflow Control	FDI Restrictions	Equity Restrictions
F(1, 9)	101.631	98.456	120.665	104.302	96.978
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000

While clustered standard errors may have been a solution to this problem for any other dataset, due to the relatively small country set (i.e. a small *N*) in this case the clustered standard errors were not the best fit. Driscoll and Kraay (1998) developed a covariance matrix which not only addressed the heteroskedasticity and autocorrelation problems but also the issue of cross-sectional dependence within the dataset. The authors argued that in international economics or regional science, the cross-sectional units of the panel are not random which gives rise to observable and unobservable disturbances. Such spatial dependencies do not generally affect the computation of the point estimates but the standard error estimates will be inconsistent in the presence of such disturbances. The current dataset is characteristic of this as the countries were not chosen randomly but rather due to their shared regional and economic proximity. Therefore to account for heteroskedasticity, the autocorrelation of moving average

type, and cross-sectional dependence, this analysis uses the Driscoll and Kraay standard errors. However, it must be noted that the clustered standard errors were also computed for the fixed effects model (see Appendix 1) but the standard errors were similar to the ones generated by the Driscoll and Kraay method. For this analysis, the study uses the computational method developed by Hoechle (2007) for Stata. Table 3 shows the estimation results for the equations (1) to (5) with country fixed effects in the corresponding columns respectively. The results are reported for first-order autocorrelation disturbances.

Table 6 Estimation Results with Country Fixed Effects Models with AR (1)

Dependent Variable: Log (Output Volatility)

	Avg. Capital Control	Inflow Control	Outflow Control	FDI Restrictions	Portfolio Equity Restrictions
Average CC	-0.1542				
	(1.1144)				
Log (Domestic Credit)	0.5990	0.6772	0.4401	0.6243	0.6279
	(0.4290)	(0.3926)	(0.4403)	(0.3623)	(0.3457)
Stock Market Cap.	-0.0007	-0.0007	-0.0004	-0.0007	-0.0007
	(0.0010)	(0.0011)	(0.0009)	(0.0011)	(0.0010)
Openness	0.0015	0.0014	0.0007	0.0016	0.0015
	(0.0033)	(0.0034)	(0.0032)	(0.0033)	(0.0032)
Investment	-0.0372	-0.0380	-0.0338	-0.0377	-0.0362
	(0.0134)*	(0.0134)*	(0.0145)*	(0.0126)**	(0.0136)*
Log (Inflation)	2.7249	2.5648	2.7288	2.6764	2.6108
	(1.3670)	(1.3698)	(1.2960)*	(1.3581)	(1.2464)
Inflow Control		0.9425			
		(0.6967)			
Outflow Control			-1.5062		
			(1.2057)		
FDI Restrictions				0.2016	
				(0.4697)	
Equity Restrictions					-0.3958
					(0.6244)
Constant	-5.6841	-6.6652	-4.0397	-6.0210	-5.6826
	(2.1019)*	(1.5118)**	(2.3165)	(1.2666)**	(1.2434)**
N	180	180	180	180	180

* $p<0.05$; ** $p<0.01$

The first column shows that similar to results from the OLS, average capital controls have no significant effect on output volatility. Among the control variables, only domestic investment and inflation have any tangible impact on volatility. Similarly, in column two we

can see that higher capital inflow control has no significant effect on volatility, and only higher than average change in domestic investment significantly increases output volatility. For column three, capital restrictions on outflows also do not have any significant effect on output volatility, only inflation and domestic investment has the same effect as in inflow controls. Neither restrictions on FDI not equity controls has any significant effect on volatility. With reference to the main variables of interest, these results are oddly similar to the predictions of the OLS models.

The results in table 6 are challenged when the model uses time fixed effects (i.e. year dummies) for the estimation and the results are summarized in table 7 (see Appendix 2 for full table). Without taking into account the year fixed effects, the estimates are in danger of being influenced by any aggregate trends over the years.

While the results in table 5 are not informative regarding the exact magnitude of effects, but it does help in understanding the relationship between capital controls over time. The models on table 6 allow for fourth-order autocorrelation as the maximum lag. The first column shows that average capital controls do have a significant negative effect on output volatility when we control for time trends. More formally, comparing two countries with the same level and changes in the control variables, the country with higher than long-run average increase in average capital control are likely to experience lower than long-run average volatility. A one unit increase in average capital controls is associated with a 1 percent decline in the standard deviation of growth rate (i.e. volatility). However, the table shows the heterogeneous effect of capital controls on volatility depending on restrictions on the direction of flow and asset type. Restrictions on capital inflows, FDI and portfolio equity all have no significant effect on output volatility. Other than the average capital control variable, only outflow control has a significant negative effect on output volatility. A one unit increase in the outflow control index is associated with a 3 percent in standard deviation of the growth rate. In case of outflow control, only inflation has a significant positive effect on output volatility. This result is starkly different from the estimations of only country fixed effects (table 5). This shows that once we account for the year effects and autocorrelation, average capital controls do decrease output volatility. The significant relationship with the fourth-order autocorrelation or AR (4) denotes that the

relationship between capital controls and output volatility may be a complex one and potentially follows a pattern akin to a financial cycle.

Table 7 Estimation Results with Time and Country Fixed Effects with AR (4)

Dependent Variable: Log (Output Volatility)

Independent Variables	Avg. Capital Controls	Inflow Control	Outflow Control	FDI Restrictions	Portfolio Equity Restrictions
Average CC	-1.0280				
	(0.4769)*				
Log (Domestic Credit)	0.7615	0.9036	0.6165	0.8399	0.8403
	(0.4046)	(0.4300)*	(0.3567)	(0.4185)	(0.4121)
Stock Market Cap.	0.0002	0.0001	0.0008	0.0001	0.0001
	(0.0011)	(0.0011)	(0.0010)	(0.0011)	(0.0011)
Openness	-0.0011	-0.0008	-0.0036	-0.0006	-0.0006
	(0.0030)	(0.0033)	(0.0023)	(0.0033)	(0.0032)
Investment	-0.0187	-0.0203	-0.0162	-0.0197	-0.0194
	(0.0081)*	(0.0081)*	(0.0089)	(0.0080)*	(0.0078)*
Log (Inflation)	3.1990	2.8307	3.0955	3.0436	2.9759
	(1.2460)*	(1.3270)*	(1.1117)*	(1.3120)*	(1.1683)*
Inflow Control		0.7997			
		(0.6385)			
Outflow Control			-3.0644		
			(1.1231)*		
FDI Restrictions				0.0174	
				(0.5610)	
Equity Restrictions					-0.1657
					(0.4040)
Constant	0.0000	-8.3604	-4.2931	0.0000	-7.5141
	(0.0000)	(1.7513)**	(1.8228)*	(0.0000)	(1.6583)**
R^2	0.40	0.40	0.43	0.39	0.39
N	180	180	180	180	180

* $p<0.05$; ** $p<0.01$

The final research question sought the effect of institutional capacity in determining the effectiveness of capital controls in reducing output volatility. As mentioned before, the government effectiveness index is used as a proxy for institutional capacity and added to the list of independent variables. Once again, the Driscoll-Kraay standard errors are computed and this model accounts for the first-order autocorrelation. Table 8 summarizes the results of the fixed effects model (see Appendix 3 for full table). Column one shows that average capital controls have no significant effect on output volatility and institutional quality does have a

significant negative effect on volatility. Interestingly, when we add the institutional quality variable to the model then outflow restrictions does have a significant negative effect on output volatility. However, it is worth mentioning that the same model with a fourth-order autocorrelation nulls the effect of outflow controls on volatility. In turn, once again the average capital controls measure turns significant (see Appendix 5 for the results).

Table 8 Estimation Results with Institutional Quality AR (1)

Dependent Variable: Log (Output Volatility)					
Independent Variables	Avg. Capital Control	Inflow Control	Outflow Control	FDI Restrictions	Portfolio Equity Restrictions
Avg. CC	-1.0021				
	(0.6273)				
Institutional Quality	-0.7385	-0.6701	-0.8633	-0.6289	-0.6542
	(0.3425)*	(0.3734)	(0.3480)*	(0.3812)	(0.3556)
Log (Domestic Credit)	0.3541	0.4403	0.2569	0.4433	0.4440
	(0.5595)	(0.5713)	(0.5573)	(0.6010)	(0.5725)
Stock Market Cap.	-0.0004	-0.0006	-0.0001	-0.0005	-0.0006
	(0.0008)	(0.0009)	(0.0007)	(0.0009)	(0.0008)
Openness	0.0008	0.0011	-0.0006	0.0009	0.0013
	(0.0036)	(0.0037)	(0.0028)	(0.0039)	(0.0036)
Investment	-0.0058	-0.0067	-0.0035	-0.0064	-0.0069
	(0.0129)	(0.0123)	(0.0138)	(0.0121)	(0.0123)
Log (Inflation)	3.3508	3.1829	3.1874	3.3068	3.0476
	(1.1331)**	(1.0555)**	(1.1686)*	(1.0956)**	(1.2904)*
Inflow Control		0.2145			
		(0.7133)			
Outflow Control			-2.1698		
			(1.0061)*		
FDI Restrictions				-0.2461	
				(0.4996)	
Equity Restrictions					-0.3750
					(0.4870)
Constant	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R^2	0.37	0.37	0.39	0.37	0.37
N	153	153	153	153	153

* $p<0.05$; ** $p<0.01$

3.5. Endogeneity of Capital Controls

Capital controls can be endogenous in the sense that they are responses of policymakers to changes in economic circumstances which creates output volatility. For instance, a financial crisis is likely to have an effect on the economy's output leading to increased volatility. Cardoso

and Goldfajn (1997) studied the endogeneity of capital controls in the case of Brazil, and concluded that policymakers were setting controls in response to capital flows into the country. Controls were tightened during economic booms but loosened during downturns in hopes of improving other macroeconomic variables. In a similar vein, policymakers may seek to use capital controls to curb part of the output volatility problem which may arise during economic turmoil. This means that its volatility that has an effect on capital controls and not the other way around. This study uses a panel instrumental variable (IV) estimation to test for the reverse causality or endogeneity problem. The model estimated is the follow:

$$\Delta CC_{it} = \beta_0 + \beta_1 L2.volatility_{it} + \beta_2 inst_{it} + \beta_3 smcap_{it} + \beta_4 investment_{it} + \beta_5 lndred_{it} + \beta_6 lninf_{it} + \beta_7 openness_{it} + \varepsilon_{it} \quad (6)$$

In equation 6, changes in the capital control variables depend on the two-period lag and the same set of control variables. In table 5, a two-period lag of output volatility is taken as the instrumental variable. This will test whether the policymakers are responding to the previous output volatility by increasing or decreasing the capital controls. The summary of the estimation results are reported below and the full regression results with the year dummy variables are presented in appendix 4. The results show that none of the coefficients are statistically significant Thus, we can conclude that there is no evidence of endogeneity in this case, and reverse causality is not present in this model.

Table 9 Test for Endogeneity

Dependent Variable: Δ Avg. CC/ Inflow Control/ Outflow Control/ FDI Restrictions / Equity Restrictions					
Independent Variables	Avg. Capital Control	Inflow Control	Outflow Control	FDI Restrictions	Portfolio Equity Restrictions
L2 Log (Output Volatility)	0.0005	-0.0047	0.0059	0.0061	0.0017
	(0.0031)	(0.0071)	(0.0028)	(0.0073)	(0.0049)
Institutional Quality	0.0054	0.0214	-0.0125	0.0728	-0.0749
	(0.0179)	(0.0394)	(0.0195)	(0.0759)	(0.0393)
Log (Domestic Credit)	0.0041	0.0474	-0.0395	0.0435	0.0005
	(0.0262)	(0.0174)*	(0.0411)	(0.0477)	(0.0343)
Stock Market Cap.	0.0000	0.0000	-0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Openness	-0.0000	-0.0002	0.0001	-0.0003	-0.0001
	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0004)
Investment	0.0003	0.0001	0.0005	-0.0017	-0.0022
	(0.0009)	(0.0012)	(0.0010)	(0.0017)	(0.0020)
Log (Inflation)	0.2011	0.2812	0.1122	0.1726	0.1248
	(0.0805)*	(0.0978)*	(0.0856)	(0.0574)**	(0.1193)
Constant	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R^2	0.08	0.08	0.10	0.11	0.17
N	144	144	144	144	144

* $p<0.05$; ** $p<0.01$

CHAPTER 4 – DISCUSSION AND LIMITATIONS

The main research question in this thesis sought to determine if capital controls on average, successful in reducing output volatility in emerging Asian economies. The fixed effects model provided no evidence in support of using capital controls for curbing output volatility. However, the time fixed effects estimator with a fourth-order lag completely shifted the results for the average capital controls and the outflow controls model. It tells us that there are significant differences from one year to the next when it comes to assessing the effect of capital controls on output volatility. Capital controls on average do have a negative effect on output volatility, and restrictions on capital outflows seem to have a negative effect as well. This is in line with the theory of capital controls which posit that sudden outflows of capital create the uncertain economic situation. Therefore controls on outflows can mitigate this effect and reduce volatility.

The fact that only after allowing for a higher order autocorrelation captured the effect of capital controls on output volatility is intriguing. One possible explanation for this that the macroeconomic variables used in the analysis are not fully capturing the different factors that affect output volatility. The four-year lag could potentially suggest that there is an economic cycle effect whereby the effects of economic policies are only apparent after a certain period of time. One explanation of this is that capital inflows amplify the financial cycle and at the same time is likely to result in higher than average growth in the economy. But in the event of an external shock, there is a reversal of flows which results in deceleration of growth rate (even negative growth rate), especially in the case where there are no domestic savings to offset the loss in external financing. Thus, without the initial inflows in the first place, GDP growth would have been slower but much less volatile. Capital controls end up functioning as the smoothers throughout this financial cycle process. This may explain why the negative effect of controls appears only after a lagged period of four years.

The first sub-question was addressed to the importance of applying controls based on the direction of capital flows and the asset type. The results from all of the models have indicated that there is no effect of imposing restrictions on different asset categories. This finding contradicts theory because some asset types such as portfolio flows and derivatives are supposed to be more volatile due to their short-term nature. Therefore, it is reasonable to assume that policymakers should impose higher restrictions on these type of flows. Long-term flows such as FDI, on the other hand, should have lower restrictions as they should boost output. But the empirical evidence from the emerging Asian countries speak otherwise and conclude that there is no distinction I the effects of these two types of assets. However, controls based on the direction of flows is indeed important. The Asian economies have maintained higher outflow controls than inflow controls to promote stability. According to the analysis, this policy seems to be working and output volatility is indeed reduced as a consequence of capital controls on outflows.

The second sub-question addressed the issue of institutional quality in determining the effectiveness of capital controls in reducing volatility. Epstein et al. (2003) argued that it is a fallacy to assume that capital controls require a sophisticated bureaucracy in order to be effective. He posits the example of Malaysia, a country with almost no experience in capital management techniques that had implemented a successful capital control policy. The current analysis contradicts this view, as the institutional quality seems to be critical when imposing controls on outflows for attaining growth stability. This finding is in line with that of Saborowski, et al. (2014) who looked into the short-term effectiveness of outflow restrictions. Their vector autoregression model found that countries with strong macroeconomic fundamentals and institutional quality are likely to have more success with using outflow controls when it comes to managing capital outflows. This is crucial as some of the countries in the dataset such as Bangladesh or Vietnam have a long way to go before attaining stable

government effectiveness. Thus, future research can look into whether countries with weaker institutions should engage in active capital controls policy. However, controlling capital outflows may discourage investors to put money in the economy in the first place because they will be wary of whether they can recover their investments. Therefore, capital controls on outflows may discourage foreign investments altogether.

One weakness of this model is that it does not address the effect of capital controls on exchange rate volatility which may, in turn, have an overall effect on output volatility. On the same note, world volatility can also have an effect which is not accounted for in this analysis. Additionally, this dataset only contains ten countries that are in different stages of development even though they are all grouped within emerging and frontier markets in Asia. While this study is aimed at finding whether capital controls are still appropriate for this region, the results cannot be generalized to other regions that have different characteristics.

Endogeneity of capital controls is also a potential concern in this study. While the reverse causality test through the instrumental variables regression showed no evidence of endogeneity, further tests should be administered. Controls are often responses to shocks such as sudden increase in capital inflows or outflows. These can have an adverse effect on the real economy and increase output volatility. Therefore, it is not surprising to assume that capital controls are increased or decreased as result of greater output volatility rather than the other way around.

CONCLUSION AND POLICY IMPLICATIONS

Capital controls have been and still remain a controversial policy tool for managing cross-border capital flows. For decades, the multilateral institutions deemed them as unnecessary and fraught with administrative costs. Yet, the cyclic nature of capital inflows into emerging markets is still an acute problem with potentially destabilizing effects. Emerging and frontier markets worldwide need to establish whether their domestic markets can handle the large inflows and sharp reversals of flows on their own. This means determining whether the domestic financial markets are equipped to absorb both the positive and negative external shocks without crashing. A parallel concern is that the real economy should be able to adjust to changes that are brought about by the financial cycles. In such a situation, capital-importing emerging countries do not have any clear path to the optimal capital management policy.

This study set out to analyse the effectiveness in reducing output volatility in emerging Asian economies. Capital controls are mandated to directly affect the capital flows in an economy and thereby only have an indirect effect on the country's growth path. Yet, Asian economies have pursued both episodic and long-term capital controls to shield their economies from external shocks so that the real economy can continue on a less volatile growth path. The preliminary analysis has shown that there has been a surge in capital inflows for the aggregate of the ten economies in the study. This is akin to the first stage of the financial cycle when large capital inflows saturate the economy. Therefore, it is reasonable to analyse what prudential measures these countries can opt for to prevent externally generated shocks. The fixed effects model with fourth-order autocorrelation finds evidence in support of maintaining some level of capital controls. Capital flows amplify the financial cycle and therefore controls over a period of time helps lowering future output volatility. The analysis also concludes that controls on outflows are especially effective in reducing output volatility.

Based on this analysis and the country-specific insights, this study proposes the following policy implications:

i. **Capital controls on outflows are more effective than controls on inflows.** Reversals in capital flows may have a greater negative impact on output volatility. Economies that depend on external capital must ensure that there are mechanisms in place should a shock induce investors to pull out their funds. This explains why controls on outflows are more effective in reducing output volatility than restrictions on inflows. Capital-importing economies should focus on creating capital management policy that has a comprehensive outflow control in place.

ii. **Institutional quality improves the effectiveness of capital controls in curbing output volatility.** Economies should also seek to strengthen their respective institutional quality because it seems to increase the effectiveness of capital controls in dampening volatility. Stronger governance can implement, monitor, and maintain controls in an effective manner and therefore is critical to its success.

iii. **Investor expectations matter.** Capital controls do not automatically mean that investors will lose confidence in the economy. This is especially true for outflow restrictions which are expected to deter investors. China has steadily maintained absolute control on outflows and still managed to attract ample investments. Therefore, investors' expectations supersede capital restrictions as long as they have confidence that will get their due returns.

iv. **Long-standing controls reduce output volatility, albeit at some costs.** While such wall-like controls have been criticised, countries in this dataset can benefit from some level of control in the long-run. Average capital controls reduce output volatility in the medium to long run according to this study. However, this may stunt the growth of the financial sector for these countries.

v. **Capital controls should change in accordance with the financial cycle.** The financial cycle appears to follow a pattern and the controls should be adjusted accordingly. For instance, during the boom phases of the economy with surge in inflows, the outflow controls should already be increased in anticipation of the eventual reversal in flows.

Emerging Asia needs to devise capital controls that will reduce volatility and help the countries maintain the steady growth path. While the empirical evidence suggests that average capital controls and outflow controls, in particular, are effective measures, the heterogeneity among the country-specific factors makes it difficult to generalize. Each country needs to assess its endowments, macroeconomic indicators, the composition of capital flows, and the array of policy tools available in order to come up with the optimal policy mix. The duration of such measures should also be accounted for. But most importantly, it is crucial to anticipate how capital controls will interact with the overall macroeconomic policies and the monetary stance of the country. Understanding how these policies complement each other is a major area of potential research, especially in the emerging markets context where the financial markets are developing quickly.

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APPENDICES

Appendix 1. FE with Clustered Standard Errors

Dependent Variable: Log (Output Volatility)					
Independent Variables	FDI Restrictions	Portfolio Equity Restrictions	Avg. Capital Control	Inflow Control	Outflow Control
FDI Restrictions	0.0174				
	(0.3255)				
Log (Domestic Credit)	0.8399	0.8403	0.7615	0.9036	0.6165
	(0.6029)	(0.6066)	(0.6360)	(0.5931)	(0.6282)
Stock Market Cap.	0.0001	0.0001	0.0002	0.0001	0.0008
	(0.0009)	(0.0010)	(0.0007)	(0.0009)	(0.0005)
Openness	-0.0006	-0.0006	-0.0011	-0.0008	-0.0036
	(0.0039)	(0.0041)	(0.0036)	(0.0038)	(0.0027)
Investment	-0.0197	-0.0194	-0.0187	-0.0203	-0.0162
	(0.0254)	(0.0259)	(0.0254)	(0.0264)	(0.0212)
Log (Inflation)	3.0436	2.9759	3.1990	2.8307	3.0955
	(2.0223)	(1.8896)	(2.0460)	(1.9815)	(1.9083)
1998bn.year	1.3382	1.3426	1.3445	1.3465	1.4115
	(0.5806)*	(0.5837)*	(0.5815)*	(0.5749)*	(0.5594)*
1999.year	1.5450	1.5461	1.5485	1.5484	1.5796
	(0.4671)**	(0.4736)**	(0.4754)**	(0.4632)**	(0.4684)**
2000.year	1.6325	1.6267	1.6607	1.6250	1.7691
	(0.4245)**	(0.4262)**	(0.4373)**	(0.4183)**	(0.4340)**
2001.year	1.5362	1.5313	1.5689	1.5219	1.6736
	(0.4161)**	(0.4182)**	(0.4262)**	(0.4160)**	(0.4184)**
2002.year	1.5392	1.5337	1.5750	1.5229	1.6868
	(0.4158)**	(0.4181)**	(0.4272)**	(0.4173)**	(0.4230)**
2003.year	1.0787	1.0686	1.1135	1.0676	1.2400
	(0.4458)*	(0.4450)*	(0.4654)*	(0.4459)*	(0.4580)*
2004.year	1.1156	1.1162	1.1593	1.1084	1.3468
	(0.5313)	(0.5382)	(0.5404)	(0.5267)	(0.4831)*
2005.year	1.2214	1.2307	1.2743	1.2014	1.4578
	(0.5450)	(0.5540)	(0.5533)*	(0.5469)	(0.5012)*
2006.year	0.9022	0.9124	0.9441	0.9001	1.1437
	(0.6110)	(0.6204)	(0.6243)	(0.6008)	(0.5780)
2007.year	0.8337	0.8493	0.8743	0.8284	1.0562
	(0.5751)	(0.5933)	(0.5759)	(0.5679)	(0.5299)
2008.year	1.0095	1.0214	1.0447	1.0101	1.2312
	(0.5902)	(0.5871)	(0.5865)	(0.5623)	(0.5375)*
2009.year	1.2581	1.2715	1.3113	1.2320	1.4804
	(0.5615)	(0.5749)	(0.5614)*	(0.5527)	(0.5223)*
2010.year	1.3534	1.3683	1.3892	1.3472	1.5526
	(0.5544)*	(0.5595)*	(0.5389)*	(0.5333)*	(0.4863)*
2011.year	1.2623	1.2738	1.3027	1.2497	1.4647
	(0.5405)*	(0.5395)*	(0.5244)*	(0.5256)*	(0.4783)*
2012.year	1.1800	1.1907	1.2267	1.1617	1.3890
	(0.5082)*	(0.5173)*	(0.5050)*	(0.5107)*	(0.4661)*
2013.year	1.1005	1.1133	1.1288	1.0888	1.2336

	(0.5600)	(0.5588)	(0.5343)	(0.5504)	(0.4878)*
2014.year	0.7560	0.7686	0.7813	0.7400	0.8551
	(0.6335)	(0.6308)	(0.5990)	(0.6320)	(0.5090)
2015.year	0.6141	0.6262	0.6416	0.5911	0.6984
	(0.6087)	(0.6152)	(0.5748)	(0.6139)	(0.4978)
Equity Restrictions		-0.1657			
		(0.7433)			
Average CC			-1.0280		
			(1.0553)		
Inflow Control				0.7997	
				(0.8492)	
Outflow Control					-3.0644
					(1.3363)*
Constant	-8.2436	-8.1403	-7.2244	-8.9515	-4.9916
	(2.2175)**	(2.3192)**	(2.5414)*	(1.8188)**	(3.0141)
R^2	0.40	0.40	0.40	0.40	0.43
N	180	180	180	180	180

* $p<0.05$; ** $p<0.01$

Appendix 2. Time and Country FE with Year Dummies

Dependent Variable: Log (Output Volatility)

Independent Variables	Avg. Capital Control	Inflow Control	Outflow Control	FDI Restrictions	Portfolio Equity Restrictions
Average CC	-1.0280				
	(0.4769)*				
Log (Domestic Credit)	0.7615	0.9036	0.6165	0.8399	0.8403
	(0.4046)	(0.4300)*	(0.3567)	(0.4185)	(0.4121)
Stock Market Cap.	0.0002	0.0001	0.0008	0.0001	0.0001
	(0.0011)	(0.0011)	(0.0010)	(0.0011)	(0.0011)
Openness	-0.0011	-0.0008	-0.0036	-0.0006	-0.0006
	(0.0030)	(0.0033)	(0.0023)	(0.0033)	(0.0032)
Investment	-0.0187	-0.0203	-0.0162	-0.0197	-0.0194
	(0.0081)*	(0.0081)*	(0.0089)	(0.0080)*	(0.0078)*
Log (Inflation)	3.1990	2.8307	3.0955	3.0436	2.9759
	(1.2460)*	(1.3270)*	(1.1117)*	(1.3120)*	(1.1683)*
1996bn.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
1997.year	-7.2244	-0.5911	-0.6984	-8.2436	-0.6262
	(1.5063)**	(0.2039)**	(0.1653)**	(1.4698)**	(0.2101)**
1998.year	-5.8798	0.7554	0.7131	-6.9054	0.7164
	(1.4441)**	(0.2688)*	(0.2211)**	(1.4052)**	(0.2730)*
1999.year	-5.6759	0.9573	0.8811	-6.6986	0.9199
	(1.4599)**	(0.2219)**	(0.1773)**	(1.4407)**	(0.2322)**
2000.year	-5.5636	1.0340	1.0707	-6.6112	1.0005
	(1.4451)**	(0.2453)**	(0.1941)**	(1.4247)**	(0.2609)**
2001.year	-5.6555	0.9308	0.9751	-6.7074	0.9051
	(1.4460)**	(0.2454)**	(0.1972)**	(1.4210)**	(0.2627)**
2002.year	-5.6494	0.9318	0.9884	-6.7044	0.9075

	(1.4463)**	(0.2449)**	(0.1977)**	(1.4233)**	(0.2633)**
2003.year	-6.1109	0.4765	0.5416	-7.1649	0.4424
	(1.4440)**	(0.2470)	(0.1980)*	(1.4241)**	(0.2701)
2004.year	-6.0650	0.5174	0.6484	-7.1280	0.4900
	(1.4266)**	(0.2780)	(0.2181)**	(1.3990)**	(0.2817)
2005.year	-5.9501	0.6103	0.7594	-7.0222	0.6045
	(1.4151)**	(0.2951)	(0.2309)**	(1.3841)**	(0.2899)
2006.year	-6.2802	0.3091	0.4452	-7.3415	0.2862
	(1.4238)**	(0.2798)	(0.2174)	(1.3953)**	(0.2733)
2007.year	-6.3500	0.2373	0.3578	-7.4099	0.2231
	(1.4951)**	(0.1949)	(0.1502)*	(1.4666)**	(0.1846)
2008.year	-6.1797	0.4191	0.5328	-7.2341	0.3952
	(1.4432)**	(0.2649)	(0.2091)*	(1.3954)**	(0.2548)
2009.year	-5.9131	0.6410	0.7820	-6.9856	0.6453
	(1.5469)**	(0.1369)**	(0.1184)**	(1.5075)**	(0.1315)**
2010.year	-5.8351	0.7561	0.8542	-6.8902	0.7421
	(1.5585)**	(0.1315)**	(0.1085)**	(1.5179)**	(0.1206)**
2011.year	-5.9217	0.6586	0.7662	-6.9814	0.6475
	(1.5380)**	(0.1562)**	(0.1304)**	(1.4949)**	(0.1498)**
2012.year	-5.9976	0.5706	0.6906	-7.0636	0.5645
	(1.5643)**	(0.1249)**	(0.1069)**	(1.5349)**	(0.1211)**
2013.year	-6.0956	0.4978	0.5352	-7.1431	0.4871
	(1.5860)**	(0.0879)**	(0.0693)**	(1.5577)**	(0.0841)**
2014.year	-6.4431	0.1489	0.1566	-7.4877	0.1424
	(1.6122)**	(0.0537)*	(0.0428)**	(1.5876)**	(0.0514)*
2015.year	-6.5828	0.0000	0.0000	-7.6295	0.0000
	(1.6543)**	(0.0000)	(0.0000)	(1.6338)**	(0.0000)
Inflow Control		0.7997			
		(0.6385)			
Outflow Control			-3.0644		
			(1.1231)*		
FDI Restrictions				0.0174	
				(0.5610)	
Equity Restrictions					-0.1657
					(0.4040)
Constant	0.0000	-8.3604	-4.2931	0.0000	-7.5141
	(0.0000)	(1.7513)**	(1.8228)*	(0.0000)	(1.6583)**
R^2	0.40	0.40	0.43	0.39	0.39
N	180	180	180	180	180

* $p<0.05$; ** $p<0.01$

Appendix 3. FE with Institutional Quality and Year Dummies

Dependent Variable: Log (Output Volatility)					
Independent Variables	Avg. Capital Controls	Inflow Control	Outflow Control	FDI Restrictions	Portfolio Equity Restrictions
Average CC	-1.0021				
	(0.6273)				
Institutional Quality	-0.7385	-0.6701	-0.8633	-0.6289	-0.6542
	(0.3425)*	(0.3734)	(0.3480)*	(0.3812)	(0.3556)
Log (Domestic Credit)	0.3541	0.4403	0.2569	0.4433	0.4440
	(0.5595)	(0.5713)	(0.5573)	(0.6010)	(0.5725)
Stock Market Cap.	-0.0004	-0.0006	-0.0001	-0.0005	-0.0006
	(0.0008)	(0.0009)	(0.0007)	(0.0009)	(0.0008)
Openness	0.0008	0.0011	-0.0006	0.0009	0.0013
	(0.0036)	(0.0037)	(0.0028)	(0.0039)	(0.0036)
Investment	-0.0058	-0.0067	-0.0035	-0.0064	-0.0069
	(0.0129)	(0.0123)	(0.0138)	(0.0121)	(0.0123)
Log (Inflation)	3.3508	3.1829	3.1874	3.3068	3.0476
	(1.1331)**	(1.0555)**	(1.1686)*	(1.0956)**	(1.2904)*
1996bn.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
1997.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
1998.year	-4.4919	-5.6641	-3.0804	-5.3790	-5.3215
	(2.1986)	(2.0727)*	(2.6223)	(2.1209)*	(2.0661)*
1999.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
2000.year	-4.2004	-5.3993	-2.7682	-5.1019	-5.0754
	(2.1478)	(2.0181)*	(2.5880)	(2.0697)*	(2.0189)*
2001.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
2002.year	-4.2996	-5.5060	-2.8692	-5.2056	-5.1799
	(2.1580)	(2.0274)*	(2.5981)	(2.0798)*	(2.0294)*
2003.year	-4.7208	-5.9279	-3.2745	-5.6301	-5.6146
	(2.1608)*	(2.0340)*	(2.6048)	(2.0841)*	(2.0352)*
2004.year	-4.7392	-5.9516	-3.2609	-5.6536	-5.6116
	(2.1312)*	(2.0039)**	(2.5837)	(2.0500)*	(1.9951)*
2005.year	-4.6234	-5.8494	-3.1495	-5.5480	-5.4859
	(2.1210)*	(1.9931)*	(2.5715)	(2.0357)*	(1.9766)*
2006.year	-4.8587	-6.0764	-3.3570	-5.7854	-5.7168
	(2.1307)*	(2.0040)**	(2.5918)	(2.0473)*	(1.9865)*
2007.year	-4.8229	-6.0443	-3.3234	-5.7601	-5.6724
	(2.1829)*	(2.0469)**	(2.6477)	(2.1017)*	(2.0368)*
2008.year	-4.7121	-5.9259	-3.2131	-5.6544	-5.5605
	(2.1589)*	(2.0290)*	(2.6155)	(2.0771)*	(2.0102)*
2009.year	-4.4152	-5.6483	-2.9358	-5.3702	-5.2749
	(2.2431)	(2.1005)*	(2.7030)	(2.1721)*	(2.1017)*
2010.year	-4.3239	-5.5354	-2.8450	-5.2653	-5.1624
	(2.2520)	(2.1125)*	(2.7045)	(2.1809)*	(2.1093)*
2011.year	-4.4208	-5.6374	-2.9458	-5.3646	-5.2711
	(2.2516)	(2.1168)*	(2.6985)	(2.1795)*	(2.1100)*

2012.year	-4.5028	-5.7244	-3.0322	-5.4360	-5.3608
	(2.2761)	(2.1404)*	(2.7221)	(2.2030)*	(2.1381)*
2013.year	-4.5418	-5.7447	-3.1053	-5.4739	-5.3765
	(2.2955)	(2.1648)*	(2.7262)	(2.2357)*	(2.1621)*
2014.year	-4.7703	-5.9794	-3.3383	-5.7136	-5.6137
	(2.3371)	(2.2076)*	(2.7678)	(2.2840)*	(2.2071)*
2015.year	-4.8531	-6.0674	-3.4276	-5.8024	-5.7032
	(2.3776)	(2.2449)*	(2.8097)	(2.3307)*	(2.2520)*
Inflow Control		0.2145			
		(0.7133)			
Outflow Control			-2.1698		
			(1.0061)*		
FDI Restrictions				-0.2461	
				(0.4996)	
Equity Restrictions					-0.3750
					(0.4870)
Constant	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R^2	0.37	0.37	0.39	0.37	0.37
N	153	153	153	153	153

* $p<0.05$; ** $p<0.01$

Appendix 4. Reverse Causality Test

Dependent Variable: Δ Avg. CC/ Inflow Control/ Outflow Control/ FDI Restrictions / Equity Restrictions

Independent Variables	Avg. Capital Control	Inflow Control	Outflow Control	FDI Restrictions	Portfolio Equity Restrictions
L2 Log (Output Volatility)	0.0005	-0.0047	0.0059	0.0061	0.0017
	(0.0031)	(0.0071)	(0.0028)	(0.0073)	(0.0049)
Institutional Quality	0.0054	0.0214	-0.0125	0.0728	-0.0749
	(0.0179)	(0.0394)	(0.0195)	(0.0759)	(0.0393)
Log (Domestic Credit)	0.0041	0.0474	-0.0395	0.0435	0.0005
	(0.0262)	(0.0174)*	(0.0411)	(0.0477)	(0.0343)
Stock Market Cap.	0.0000	0.0000	-0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Openness	-0.0000	-0.0002	0.0001	-0.0003	-0.0001
	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0004)
Investment	0.0003	0.0001	0.0005	-0.0017	-0.0022
	(0.0009)	(0.0012)	(0.0010)	(0.0017)	(0.0020)
Log (Inflation)	0.2011	0.2812	0.1122	0.1726	0.1248
	(0.0805)*	(0.0978)*	(0.0856)	(0.0574)**	(0.1193)
1996bn.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
1997.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
1998.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
1999.year	0.0000	0.0000	0.0000	0.0000	0.0000

	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
2000.year	-0.0060	-0.1945	0.1843	-0.1004	0.0696
	(0.0887)	(0.0959)	(0.1256)	(0.1196)	(0.1053)
2001.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
2002.year	-0.0283	-0.2116	0.1577	-0.1007	0.0923
	(0.0899)	(0.0968)*	(0.1263)	(0.1191)	(0.1059)
2003.year	-0.0312	-0.2180	0.1583	-0.1032	0.0691
	(0.0894)	(0.0976)*	(0.1262)	(0.1215)	(0.1060)
2004.year	-0.0232	-0.2134	0.1698	-0.0970	0.1488
	(0.0889)	(0.0980)*	(0.1243)	(0.1134)	(0.1046)
2005.year	-0.0219	-0.1965	0.1556	-0.0950	0.1506
	(0.0891)	(0.1004)	(0.1227)	(0.1101)	(0.1046)
2006.year	-0.0408	-0.2403	0.1618	-0.1041	0.1079
	(0.0883)	(0.1005)*	(0.1239)	(0.1175)	(0.1073)
2007.year	-0.0309	-0.2244	0.1658	-0.1136	0.1393
	(0.0900)	(0.0993)*	(0.1297)	(0.1271)	(0.1132)
2008.year	-0.0455	-0.2349	0.1474	-0.1623	0.0844
	(0.0898)	(0.1028)*	(0.1268)	(0.1203)	(0.1129)
2009.year	-0.0201	-0.2162	0.1781	-0.1094	0.1330
	(0.0945)	(0.1013)	(0.1340)	(0.1255)	(0.1163)
2010.year	-0.0508	-0.2526	0.1553	-0.1128	0.1115
	(0.0945)	(0.1012)*	(0.1355)	(0.1265)	(0.1181)
2011.year	-0.0388	-0.2270	0.1527	-0.1161	0.0820
	(0.0944)	(0.1018)*	(0.1354)	(0.1273)	(0.1174)
2012.year	-0.0347	-0.2315	0.1651	-0.0628	0.1086
	(0.0952)	(0.1012)*	(0.1369)	(0.1280)	(0.1170)
2013.year	-0.0483	-0.2391	0.1455	-0.1726	0.1372
	(0.0976)	(0.1016)*	(0.1404)	(0.1315)	(0.1194)
2014.year	-0.0392	-0.2368	0.1617	-0.1273	0.1182
	(0.0978)	(0.1027)*	(0.1433)	(0.1423)	(0.1237)
2015.year	-0.0305	-0.2353	0.1775	-0.1318	0.1193
	(0.0994)	(0.1020)*	(0.1470)	(0.1491)	(0.1266)
Constant	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R^2	0.08	0.08	0.10	0.11	0.17
N	144	144	144	144	144

* $p<0.05$; ** $p<0.01$

Appendix 5. FE with Institutional Quality and Year Dummies AR (4)

Dependent Variable: Log (Output Volatility)					
Independent Variables	Avg. Capital Control	Inflow Control	Outflow Control	FDI Restrictions	Portfolio Equity Restrictions
Average CC	-1.0021				
	(0.4555)*				
Institutional Quality	-0.7385	-0.6701	-0.8633	-0.6289	-0.6542
	(0.3112)*	(0.3421)	(0.3139)*	(0.3760)	(0.3522)
Log (Domestic Credit)	0.3541	0.4403	0.2569	0.4433	0.4440
	(0.4886)	(0.4814)	(0.4756)	(0.5122)	(0.5019)
Stock Market Cap.	-0.0004	-0.0006	-0.0001	-0.0005	-0.0006
	(0.0007)	(0.0008)	(0.0005)	(0.0008)	(0.0007)
Openness	0.0008	0.0011	-0.0006	0.0009	0.0013
	(0.0036)	(0.0037)	(0.0025)	(0.0039)	(0.0035)
Investment	-0.0058	-0.0067	-0.0035	-0.0064	-0.0069
	(0.0132)	(0.0129)	(0.0137)	(0.0125)	(0.0127)
Log (Inflation)	3.3508	3.1829	3.1874	3.3068	3.0476
	(0.9978)**	(0.9075)**	(1.0345)**	(0.8888)**	(1.1353)*
1996bn.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
1997.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
1998.year	-4.4919	-5.6641	-3.0804	-5.3790	-5.3215
	(1.7974)*	(1.6687)**	(2.2405)	(1.6817)**	(1.5930)**
1999.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
2000.year	-4.2004	-5.3993	-2.7682	-5.1019	-5.0754
	(1.7629)*	(1.6347)**	(2.2276)	(1.6423)**	(1.5736)**
2001.year	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
2002.year	-4.2996	-5.5060	-2.8692	-5.2056	-5.1799
	(1.7716)*	(1.6417)**	(2.2373)	(1.6505)**	(1.5818)**
2003.year	-4.7208	-5.9279	-3.2745	-5.6301	-5.6146
	(1.7763)*	(1.6512)**	(2.2442)	(1.6570)**	(1.5958)**
2004.year	-4.7392	-5.9516	-3.2609	-5.6536	-5.6116
	(1.7362)*	(1.6173)**	(2.2125)	(1.6134)**	(1.5335)**
2005.year	-4.6234	-5.8494	-3.1495	-5.5480	-5.4859
	(1.7266)*	(1.6112)**	(2.2002)	(1.6015)**	(1.5092)**
2006.year	-4.8587	-6.0764	-3.3570	-5.7854	-5.7168
	(1.7414)*	(1.6244)**	(2.2234)	(1.6192)**	(1.5251)**
2007.year	-4.8229	-6.0443	-3.3234	-5.7601	-5.6724
	(1.7913)*	(1.6575)**	(2.2762)	(1.6698)**	(1.5656)**
2008.year	-4.7121	-5.9259	-3.2131	-5.6544	-5.5605
	(1.7605)*	(1.6396)**	(2.2349)	(1.6411)**	(1.5364)**

2009.year	-4.4152	-5.6483	-2.9358	-5.3702	-5.2749
	(1.8414)*	(1.6946)**	(2.3239)	(1.7238)**	(1.6175)**
2010.year	-4.3239	-5.5354	-2.8450	-5.2653	-5.1624
	(1.8403)*	(1.6973)**	(2.3121)	(1.7239)**	(1.6129)**
2011.year	-4.4208	-5.6374	-2.9458	-5.3646	-5.2711
	(1.8370)*	(1.7021)**	(2.3017)	(1.7208)**	(1.6155)**
2012.year	-4.5028	-5.7244	-3.0322	-5.4360	-5.3608
	(1.8581)*	(1.7201)**	(2.3226)	(1.7389)**	(1.6408)**
2013.year	-4.5418	-5.7447	-3.1053	-5.4739	-5.3765
	(1.8759)*	(1.7402)**	(2.3211)	(1.7670)**	(1.6586)**
2014.year	-4.7703	-5.9794	-3.3383	-5.7136	-5.6137
	(1.9223)*	(1.7844)**	(2.3635)	(1.8194)**	(1.7108)**
2015.year	-4.8531	-6.0674	-3.4276	-5.8024	-5.7032
	(1.9661)*	(1.8190)**	(2.4084)	(1.8667)**	(1.7584)**
Inflow Control		0.2145			
		(0.6041)			
Outflow Control			-2.1698		
			(1.0604)		
FDI Restrictions				-0.2461	
				(0.4990)	
Equity Restrictions					-0.3750
					(0.3765)
Constant	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R^2	0.37	0.37	0.39	0.37	0.37
N	153	153	153	153	153

* $p<0.05$; ** $p<0.01$