LIVING WITH VOLATILITIES: CAPITAL FLOWS AND POLICY IMPLICATIONS FOR SEACEN CENTRAL BANKS

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Chris Becker
(Project Leader)

Foreword

SEACEN economies have been experiencing cycles of capital inflows and outflows of increased magnitude as a consequence of intensified financial globalization and reductions in obstacles to international capital flows. Financial integration brings benefits in the form of expanded opportunities for risk sharing and external financing of domestic investment in support of economic growth. But it also brings challenges for central banks and financial regulators due to the potential impact of volatile capital flows on macroeconomic and financial stability.

The collaborative research project on "Living with Volatilities: Capital Flows and Their Implications for Central Bank Policies in SEACEN Economies" looked at various aspects of capital flows and their implications on the economy, including bank and money market flows and the relationship between investment returns and capital flows. The potential impact of normalization of US monetary policy interest rates might have on capital flows was also reviewed. Finally, the project paper made various suggested policy responses which might be helpful to policy makers on capital flow concerns.

The project was led by Mr. Chris Becker, Head, Domestic Portfolio & Liquidity Analysis, Domestic Markets Department at Reserve Bank of Australia and Visiting Research Economist at SEACEN during FY 2015. In addition to Mr. Becker, the project team consisted of representatives from the National Bank of Cambodia; Bank Indonesia; Bank of Korea; Bank Negara Malaysia; Bank of Mongolia; Bangko Sentral ng Pilipinas; Central Bank of Sri Lanka; Central Bank, Chinese Taipei; and, Bank of Thailand.

SEACEN wishes to express it sincere gratitude to Mr. Becker for his efforts as the Project Leader, and to the participating central banks for their support.

The assistance of SEACEN staff members, in particular Dr. Vincent Lim and Ms. Nurulhuda Mohd Hussain, are also grateful acknowledged. SEACEN is pleased to have been able to provide input for the project at a research workshop and seminar held at the SEACEN Centre where the findings of the project were presented and discussed. We would also like acknowledge the helpful

comments and suggestions from Mr. Ray Brooks, Division Chief, Institute for Capacity Development, International Monetary Fund on the integrative report prepared by Mr. Becker.

The view expressed in this study are those of the authors and do not necessarily reflect those of The SEACEN Centre or the SEACEN member central banks/monetary authorities.

April 2016

Dr. Hans Genberg
Executive Director
The SEACEN Centre
Kuala Lumpur

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EXECUTIVE SUMMARY

Economies with less developed financial markets might find their integration into global financial markets associated with volatility in capital flows. Such variability can prove to be disruptive to domestic economic and financial conditions, raising policy questions about how to realize the benefits from financial integration while minimizing adverse spillovers. In the first instance, policy makers need to understand the dynamics of capital flows and the underlying sources of potential instabilities before enacting a response. We dissect the capital accounts of Asia-Pacific economies associated with SEACEN and explore some important trends and exposures.

The region has been subject to several financial shocks mainly reflected in bank-related capital flows. This is useful in understanding past crises but not necessarily helpful in looking out for the next bout of instability. We discuss the possible implications of monetary policy normalization in the United States but based on past cycles, see little cause for concern. Having said that, this is a unique juncture for the global financial system and uncertainty is higher than usual.

The hierarchy of policy responses to concerns about capital movements ranges from longer-term structural economic and financial reforms to allow economies to accommodate volatility, to crisis responses which are more temporary in nature. All policy reactions have costs and benefits. Importantly, even in Asia Pacific, there appear to be few regularities that would allow generalized policy advice other than to do what this paper attempts to do – dissect the capital account and exposures to make policy makers aware of looming vulnerabilities and appropriate responses.

Chapter 1

INTEGRATIVE REPORT
LIVING WITH VOLATILITIES: CAPITAL FLOWS AND POLICY IMPLICATIONS FOR SEACEN CENTRAL BANKS[1]

By
Chris Becker[2]

> "…financial integration is a choice. Countries decide to become financially integrated because the perceived benefits of doing so outweigh the costs. Moving forward sustainably requires going beyond *coping* with capital flows to *living* with them."

> Dr. P. Trairatvorakul, Governor of the Bank of Thailand (2015)

1. Introduction

International capital flows confer substantial benefits. They assist in the efficient allocation of resources to their most productive employment, thereby allowing investment opportunities to be realized and economic growth to be higher than would otherwise be the case. In the right context, higher growth is consistent with enhancing the overall economic welfare and prosperity of both the economies that are recipients and those that are the sources of capital flows. This is a simple extension of the well understood gains from trade in goods and services,

to the trade in financial capital.[3] Financial markets can also benefit from the participation of international investors. The process of price discovery can be enhanced significantly in economies where domestic participation is hindered by size or a lack of well-diversified participants.

However, with capital flows and financial integration come potential disadvantages or vulnerabilities. Economies that are financially connected are by definition exposed to the potential spillover of financial shocks that occur not only beyond their own borders but also outside the direct influence of domestic policy makers. For smaller economies, the sheer size of international financial markets is at times difficult to accommodate. Large inflows of foreign capital in reality might not aid the process of price discovery but, in fact, drive smaller economies away from fundamentals, resulting in misalignments in credit, debt, equity, and foreign exchange markets. This, in turn, might create vulnerabilities for financial and macroeconomic stability. Difficult questions arise about how best to transition toward integration with global financial markets, and how best to live with the inevitable bouts of volatility that originate, not only domestically, but also abroad.

All economies are subject to bouts of potentially destabilizing gross international capital flows. However, volatility in net flows and the overall capital account balance can be contained if a number of important prerequisites can be cultivated so that economies are able to accommodate even sudden adjustments. An important distinction between industrialized economies and emerging markets is that the former are in a much better position to deal with volatility. This has important policy implications in the context of the finding that while the sub-components of capital flows for industrialized economies are considerably more volatile than they are in emerging markets, they tend to be substitutable and hence smooth out net flows (Becker and Noone, 2009). The characteristics that help deliver such outcomes often stem from the implementation of sound macroeconomic and financial policies, deep and liquid domestic markets, a diversified investor base, as well as appropriate incentive structures and market signals. Once in place, these prerequisites more often than not ensure that volatile

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3. Acceptance of the benefits from free trade in goods and services has been widespread in the international community for a long time and led to establishing the World Trade Organization and the General Agreement on Tariffs and Trade. There has been much more reluctance in accepting that free trade in financial capital might confer similar benefits, in part because trade in goods and services has developed much faster. Nonetheless, the general principles of the extension to freer capital flows are agreed by members of the Organization for Economic Co-operation and Development (see also OECD, 2009).

private sector outcomes more or less offset each other in such a way that little policy action is required. While emerging markets cannot easily replicate the size and depth of the largest financial markets, they can strive to foster similar economic outcomes. The first step toward this is to gain a fuller understanding of current trends and important characteristics of capital flows. This paper attempts to address this.

In 2008, the financial crisis that originated in north Atlantic economies had important reverberations for the rest of the world. Gross global capital movements had built up considerably in prior years and were particularly evident in cross-border bank and money market flows (Figure 1). While these flows were mainly the outcome of activities between the major industrialized economies, emerging markets and Asia-Pacific were also subject to larger than usual bank-related capital flows. During the financial crisis there was a significant unwinding of the international positions established by banks as well as repatriation of portfolio investments and a notable slowdown in foreign direct investment. This financial disintermediation was disruptive for real economic variables such as trade and economic growth while it was occurring and also hindered the recovery.[4] Capital flows recovered but were slow to do so and remained more tepid than during the pre-crisis boom. At this aggregated level of analysis, there appear to be few evident trends that would warrant the magnitude of disruptive capital account reversals that occurred in either 1998 or 2008.[5]

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4. Recessions in world economic growth are rare because economic cycles are not perfectly synchronous. That is, while one economy might be in recession, other parts of the world are growing. This asynchronous outcome is at least in part aided by international capital movements. Economic slowdown in one region implies a decline in return on capital and there is a natural incentive for investors to seek higher yields where the outlook is better. As capital is reallocated between economies, some regions benefit from increased investment. This is in the interest of both the recipient and the source economy, as stronger global growth provides a fillip through trade and other linkages for recovery in those regions experiencing below-average growth. Disintermediation in international capital movements disrupts this process and exacerbates synchronous shocks by inhibiting the reallocation of resources. Consequently, financial crisis induced recessions tend to be longer and deeper than those that are part of the ordinary business cycle.

5. Refer also to James et al. (2014) for a description of capital flows by type, geographical distribution and potential implications for financial stability.

Figure 1

Global Capital Flows*

Per cent of world GDP, annual

*   Gross capital outflows excluding financial derivatives
**   Includes flows related to international banking transactions
Source: IMF.
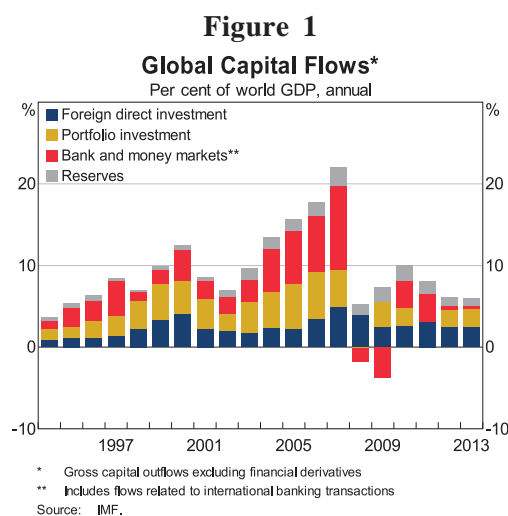
However, central banks in Asia-Pacific are currently asking what potentially destabilizing influences the normalization of monetary policy in the United States might have on regional capital movements, domestic asset prices, and exchange rates. Furthermore, since this is not an academic question, central banks are interested in tangible policy response options to capital flow reversals. The answers to these questions are difficult to calibrate. In 2008, the international financial system was subject to the largest shock in 80 years, rendering much of the usual econometric techniques either difficult to interpret or potentially misleading. The analysis presented here is accordingly based on observations that are not entirely predicated on the sharp swings observed in recent years – during which almost all variables are correlated.

Throughout this paper, we refer to Asia-Pacific being our main region of interest. In particular, we define Asia-Pacific in terms of the SEACEN region (see Appendix 6 for details about member central banks/monetary authorities and their participation in this work stream).

In Section 2, we examine the recent gross and net trends in capital flows, broken down by classification. This provides the essential background and starting point for further investigation. Appendix 1 is an important part of this paper. It defines the components of capital flows and explains the balance of payments identity. It also notes some important implications that arise from the relationship between a number of economic concepts and how they relate to the interpretation

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of capital flows. In Section 3 we probe a little deeper into aspects of bank and money market flows. Gauging the potential impact that normalization of US monetary policy interest rates might have, is addressed in Section 4. The relationship between investment returns and capital flows is discussed in Section 5. In Section 6, a number of policy implications are discussed, followed by concluding comments in Section 7.

2. Recent Composition and Trends in Capital Flows

A high level overview of balance of payments developments indicates that current account surpluses have narrowed since the early 2000s in most Asia-Pacific economies. In net terms, the region therefore remains an exporter of capital to the rest of the world, albeit noticeably less than immediately prior to 2008. This is in line with the fundamental trend for saving to exceed investment in many of these economies. Despite this, the region has been a net importer of 'private' capital while at the same time exporting even more capital through 'official' channels (Figure 2).[6] That is, the activities of monetary authorities play an important role in the composition and evolution of capital flows.

Figure 2

South-East Asia Net Capital Flows

Per cent of GDP, 1-year centred average

Sources: IMF; national central banks.

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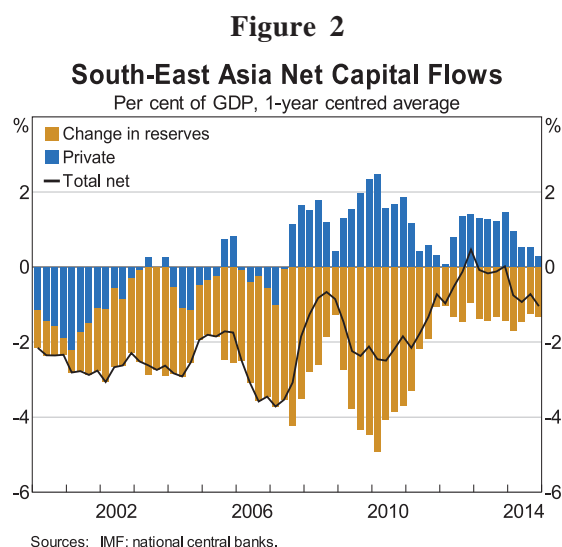
6. This churning of financial flows is interesting given the prominence of the official sector. All economies are gross importers and exporters of capital to some extent. However, in industrialized economies, this is more often than not, a private sector outcome. It is difficult to be confident about whether the role of the official sector is the consequence of private sector outcomes or at least in part the cause.

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In Asia-Pacific, the gross inflow of capital (liabilities) came to a sudden stop during the 2008 financial crisis (Figure 3). The lull persisted through the first half of 2009. This pattern is observable across all liability flows, including foreign direct investment. The non-resident inflows that were repatriated from the region at this time were mainly related to portfolio equity investments as well as bank and money market flows. The reaction of residents to the crisis (assets) helped cushion the impact on the aggregate net flows. Domestic banks lent less to other jurisdictions and residents stopped investing in international equities. Most prominent, however, were the reactions of the regional central banks to the reversal in private capital inflows. On average, central banks in Asia-Pacific stopped their reserve accumulation (capital outflow) and some intervened significantly (capital inflow) to offset some pressure arising from private outflows. Notably, capital outflows driven by the investment decisions of residents slowed several quarters before non-resident inflows turned.

Figure 3

South-East Asia Gross Capital Flows

Per cent of GDP, quarterly

Sources: IMF; national central banks.
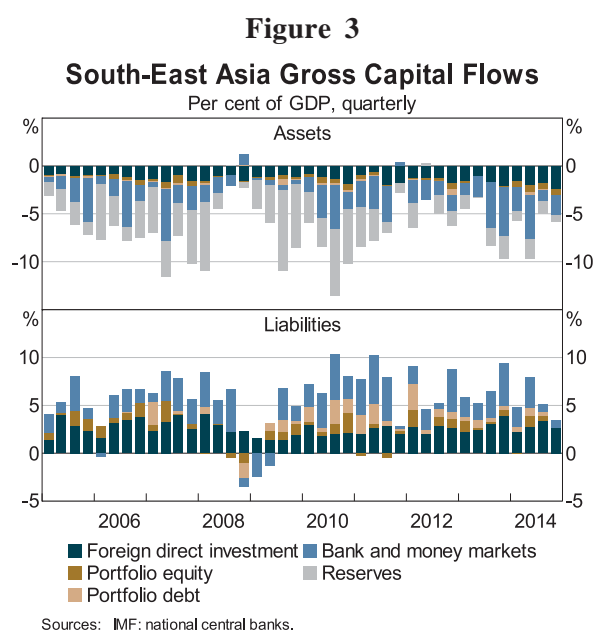
Regional capital flows have normalized since the crisis, and while there is little evidence of resurgence when looking at the average, some Asia-Pacific economies have experienced stronger gross inflows than others. In particular, non-resident investment inflows into the Indonesian stock market are notable, as are the sizable non-resident direct and portfolio flows for a small economy like

Mongolia. Also of note in the post-crisis environment, is that the rapid reserve accumulation that marked the pre-crisis period appears to have slowed. Consequently, there are smaller official outflows from Asia-Pacific economies.

2.1 Size and Composition of Capital Flows

The average composition of capital flows in Asia-Pacific indicates that most international transactions made by residents (accumulation of assets) take the form of direct investment as well as bank and money market flows (Table 1). The large gross flows for financial centers like Hong Kong and Singapore are not surprising and given the prevailing exchange rate regimes, the importance of reserves is also readily understood. For many other economies in the region, transactions by monetary authorities in official foreign exchange reserves drive a wedge between private flows and the aggregate capital account balance. The least active economies on reserves are Australia, Indonesia, Japan, and Thailand. Other jurisdictions appear to be more active in the use of reserves to manage capital account and exchange rate outcomes. Additional notable asset flows relate to resident bank lending from Cambodia and Mongolia to other economies, and sizable flows from Chinese Taipei into foreign debt instruments. While the absolute values of these flows are not particularly large, they are significant in relation to those economies' GDP.

Table 1

Size of Capital Flows by Type and Economy

Per cent of GDP, average 2012-2014

	Assets							Liabilities							Net							
	FDI	PFE	PFD	BMM	DER	PKB	KAB	FDI	PFE	PFD	BMM	DER	PKB	KAB	FDI	PFE	PFD	BMM	DER	RES	PKB	KAB
Australia	0.0	-1.4	-1.5	-2.0	2.9	-1.9	-2.2	3.6	0.9	3.9	1.1	-3.8	5.7	5.7	3.6	-0.5	2.4	-0.9	-0.9	-0.3	3.8	3.5
Cambodia	-0.3	-0.4	0.0	-11.1	0.0	-11.8	-15.0	8.8	0.0	0.0	13.6	0.0	22.3	24.7	8.5	-0.4	0.0	2.5	0.0	-3.7	10.6	9.7
China	-1.8	0.0	-0.1	-2.4	0.0	-4.2	-6.6	3.7	0.4	0.4	0.9	0.0	5.4	5.4	1.9	0.4	0.3	-1.4	0.0	-2.4	1.2	-1.2
Hong Kong	-39.2	-6.9	6.3	-25.2	18.4	-46.5	-52.4	32.2	6.6	2.7	35.7	-15.8	61.4	61.4	-7.0	-0.3	9.0	10.5	2.6	-5.9	14.9	9.0
India	-0.3	0.0	0.0	-1.0	-0.4	-1.8	-2.5	1.5	1.0	0.3	2.4	0.4	5.5	5.5	1.2	0.9	0.3	1.4	0.0	-0.7	3.8	3.0
Indonesia	-1.1	-0.1	-0.1	-0.5	0.0	-1.8	-1.9	2.6	1.9	1.8	0.6	0.0	6.8	5.1	1.5	1.7	1.7	0.1	0.0	-0.1	5.0	3.2
Japan	-2.5	0.1	-1.2	-2.7	5.3	-1.0	-1.1	0.1	1.6	1.4	3.3	-6.0	0.5	0.5	-2.4	1.8	0.3	0.6	-0.7	-0.1	-0.5	-0.6
Korea	-2.3	-1.1	-1.3	-1.9	2.5	-4.2	-5.4	0.8	0.7	0.9	-0.4	-2.2	-0.2	-0.2	-1.5	-0.4	-0.4	-2.3	0.3	-1.2	-4.4	-5.6
Malaysia	-4.8	-1.8	-0.9	-5.2	0.0	-12.6	-10.9	3.2	1.0	2.6	2.0	0.0	8.7	8.7	-1.6	-0.8	1.7	-3.2	0.0	1.7	-3.9	-2.2
Mongolia	-0.5	-0.2	0.0	-13.1	0.0	-13.9	-11.6	18.9	0.0	6.8	7.7	0.0	33.5	33.5	18.4	-0.2	6.8	-5.4	0.0	2.2	19.6	21.8
Philippines	-0.2	0.0	-0.3	-1.1	0.1	-1.5	-2.9	1.8	0.4	0.2	0.4	-0.1	2.8	2.8	1.7	0.4	-0.1	-0.6	0.0	-1.4	1.3	-0.1
Singapore	-9.3	-27.5	0.0	-23.4	6.9	-59.1	-64.8	21.0	0.6	0.6	16.8	-2.4	35.9	35.9	11.7	-26.9	0.0	-6.6	4.5	-5.7	-23.1	-28.9
Sri Lanka	-0.1	0.0	0.0	-0.4	0.0	-0.5	-2.2	1.4	0.3	3.0	2.4	0.0	7.1	7.3	1.3	0.3	3.0	1.9	0.0	-1.8	6.6	5.1
Chinese Taipei	-2.9	-3.3	-6.8	-4.4	1.2	-16.2	-19.1	0.7	1.9	-0.1	5.6	-1.1	7.0	7.0	-2.2	-1.4	-6.9	1.2	0.1	-2.9	-9.2	-12.1
Thailand	-2.8	-0.6	-0.9	-1.7	1.6	-4.3	-4.3	3.3	-0.7	1.1	1.8	-1.6	3.8	3.8	0.4	-1.3	0.2	0.1	0.0	0.1	-0.5	-0.4
Average	-1.7	-0.3	-0.1	-2.6	0.2	-4.2	-5.2	2.8	0.6	0.7	2.2	-0.1	6.2	6.1	1.3	0.1	0.1	0.0	0.0	-1.4	2.0	0.7

1	2	3	4	5	7	8

Smaller ⟵⟶ Larger

Source: author's calculations.

On the liability side, Asia-Pacific remains a major destination for foreign direct investment and non-resident banks actively lend to the region. Cambodia stands out as being a recipient of large direct investment and bank-related capital flows. Chinese Taipei is also a destination for bank and money market flows from non-resident sources. Shallow debt and inter-bank markets in Mongolia and the boom in mining-related foreign investment are evident in the liability flows for that economy.

2.2 Volatility in the Capital Account

Abstracting from the notable idiosyncratic features of volatility among the member economies, we observe that for Asia-Pacific bank and money market flows are the most volatile inflows, outflows and net flows for the majority of economies (Table 2). Since the region is a natural destination for foreign direct investment, the data confirm that this component was observed to be the most stable over the data sample presented below.[7] For some economies, portfolio flows are also shown to be volatile and might move in a compounding manner to exacerbate the fluctuations in other components. In other words, we find that gross private capital flows (PKB) are more volatile on both the asset and liability side than the gross sub-components, suggesting that the gross flows are positively correlated.

Note also that the net flows are less volatile than the gross capital movements in the region, indicating that there is a degree of negative correlation between the investment behavior of residents and non-residents. Nonetheless, flows of non-residents tend to be more volatile than what can be offset by residents. This is likely to be attributable to the international investment position of residents being smaller than that of non-residents and should be an area of interest for policy makers in the region.

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7. Note, however, that this is not always the case and that the result is not necessarily true for industrialized economies. The conventional wisdom related to being able to distinguish 'hot and cold' flows based on their labels is questionable. See for example Becker and Noone (2009) and Bluedorn et al. (2011).

Table 2

Volatility of Capital Flows by Type and Economy
Per cent of GDP, average 2012-2014*

	Assets							Liabilities							Net							
	FDI	PFE	PFD	BMM	DER	PKB	KAB	FDI	PFE	PFD	BMM	DER	PKB	KAB	FDI	PFE	PFD	BMM	DER	RES	PKB	KAB
Australia	1.3	1.4	1.0	2.7	2.3	2.9	3.2	1.6	1.3	2.8	3.8	2.4	3.1	3.1	1.7	1.7	2.8	2.4	1.5	0.9	1.2	1.1
Cambodia	0.1	0.3	0.0	5.7	0.0	5.7	5.8	2.2	0.0	0.0	6.4	0.0	6.5	7.6	2.2	0.3	0.0	5.7	0.0	2.0	5.0	5.0
China	0.5	0.1	0.2	1.4	0.0	1.5	2.9	0.7	0.3	0.2	2.2	0.0	2.4	2.4	0.8	0.4	0.2	2.6	0.0	3.4	3.0	1.2
Hong Kong	16.6	14.2	18.2	37.3	4.2	46.4	46.8	10.5	10.5	2.8	42.5	3.4	47.3	47.3	13.9	18.8	17.4	20.6	2.0	5.0	36.4	36.1
India	0.5	0.1	0.0	0.6	0.3	0.8	1.9	0.4	1.0	0.9	1.6	0.3	1.8	1.8	0.6	1.0	0.9	1.6	0.3	1.5	1.7	1.6
Indonesia	0.7	0.5	0.6	1.4	0.0	2.0	3.4	0.6	1.3	1.3	0.9	0.0	2.8	2.0	0.7	1.3	1.3	1.8	0.0	2.8	2.3	3.5
Japan	0.9	1.2	3.6	2.5	2.3	5.2	5.1	0.1	2.4	2.8	4.0	2.4	4.6	4.6	0.9	2.9	3.9	3.9	0.8	1.8	2.6	2.3
Korea	0.5	0.7	0.8	1.7	1.0	2.6	2.6	0.4	1.8	1.1	2.5	1.2	2.5	2.5	0.5	1.8	1.7	3.0	0.3	1.8	3.4	2.8
Malaysia	2.6	1.0	1.1	4.7	0.3	6.2	11.2	1.9	2.1	6.7	3.0	0.5	8.4	8.4	2.9	2.5	6.5	6.1	0.3	8.3	7.3	5.4
Mongolia	0.7	0.2	2.2	8.9	0.0	7.8	18.2	16.6	7.0	11.6	8.6	0.0	23.9	23.9	16.8	7.0	12.0	13.1	0.0	15.1	19.8	13.4
Philippines	0.8	0.0	0.7	2.1	0.4	2.6	3.9	0.6	0.5	1.9	2.2	0.1	3.1	3.1	0.9	0.5	2.1	3.1	0.4	4.4	4.3	2.5
Singapore	4.1	18.7	0.0	27.4	9.0	32.5	36.0	3.5	3.6	0.0	28.7	5.3	30.1	30.1	4.2	17.9	0.0	17.0	4.5	7.0	5.1	10.3
Sri Lanka	0.0	0.9	0.8	4.8	0.0	6.3	9.4	0.4	0.6	2.6	6.7	0.0	6.8	10.2	0.4	0.5	2.8	2.8	0.0	3.5	2.2	3.5
Chinese Taipei	0.6	2.7	2.8	7.9	0.2	9.2	9.1	0.8	4.8	1.0	5.6	0.2	8.4	8.4	0.8	4.3	2.7	6.6	0.1	3.7	5.0	2.6
Thailand	2.0	0.6	1.4	2.6	1.0	4.3	6.6	2.8	1.4	2.0	4.1	1.1	7.2	7.2	2.9	1.6	2.3	3.9	0.6	4.8	6.4	4.3
SEACEN	0.7	0.7	0.8	2.7	0.3	5.2	5.8	0.8	1.4	1.9	4.0	0.3	6.5	7.2	0.9	1.7	2.3	3.9	0.3	3.5	4.3	3.5
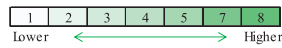
1	2	3	4	5	7	8

Lower ← → Higher

* Volatility is measured as the standard deviation of the quarterly flows as a per cent of GDP.
Source: author's calculations.

The two large financial centers of Hong Kong and Singapore display much higher volatility than others (attributable to the sizable gross flows that pass through their balance of payments). The Malaysian experience with non-resident inflows also indicates a considerable degree of volatility, and the underdeveloped state of Mongolian financial markets in combination with large international mining projects make the capital account very variable when scaled by GDP. On the other hand, there is little variability in the composition of the capital account in China and India. This stability might be a reflection of a lack of openness to financial flows and deliberate imposition of restrictions on the movement of capital (see also Appendix 2).

Another noteworthy general finding is that in net terms, the overall capital account balance (KAB) is less volatile than private flows (PKB). The implication is that the monetary authorities, to varying degrees, use reserves to offset shocks to the capital account and hence smooth the overall balance.[8] A useful illustration is the evolution of volatility in *Korean* capital flows (Figure 4). Prior

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8. Those economies that were identified as being less active in the use of reserves – Australia, Japan and others – on average do not exhibit the phenomenon where volatility in the balance on private flows is mitigated by the change in reserve assets. Hence, shocks to private flows are more directly reflected in the volatility of total net capital flows. This does not mean that monetary authorities in these jurisdictions do not resort to foreign exchange intervention from time-to-time but might indicate a higher degree of tolerance for allowing exchange rate adjustments.

to the financial crisis, the volatilities in capital account asset, liability and net flows were broadly in line at a standard deviation of around 2 to 3% of GDP. During the 2008 financial crisis, Korea experienced a reversal of liability inflows, mainly bank and money market flows, and portfolio debt flows. This increase in volatility on the liability side was offset by resident asset flows in the form of banking-related flows and official reserve transactions. That is, there was no noticeable effect on overall net capital flows as the volatility resulting from gross non-resident outflows was matched by volatility in the opposite direction from residents and intervention by the monetary authorities. Following the turmoil of the crisis, the variability in the capital account settled back to around the average rates observed prior to the crisis.

Figure 4

Korea - Capital Account Volatility

Source: Bank of Korea.
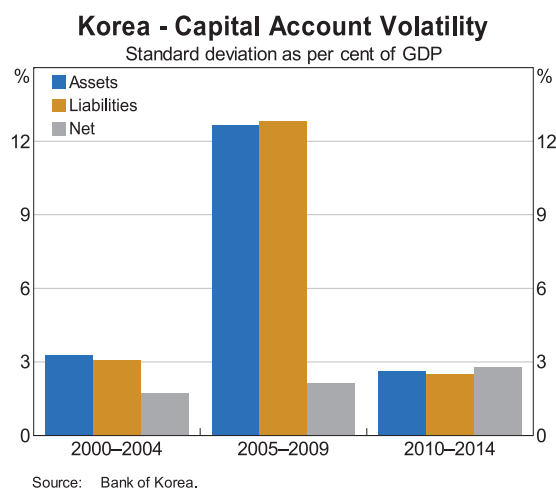
Note also that, for Korea, volatility in the private capital account balance has exhibited several cycles since the 1980s. Using the methodology employed by Balakrishnan et al. (2012), we identify surges and retrenchments in Korea's capital flows (not shown). Notably these can be characterized as relatively volatile throughout the 1980s, the Asian Crisis in the late 1990s, and then the more recent financial crisis in 2008. An interesting question for further research would be whether or not the more flexible exchange rate regime and policy responses have, over time, allowed the economy to accommodate these episodes with smaller economic costs such as loss in output, unemployment and inflation.

3. Aspects of Bank and Money Market Capital Flows

Bank and money market flows can be a major determinant of the capital account in Asia-Pacific. Foreign banks lend to the region and resident banks lend abroad, reflecting various degrees of regional and global financial integration. The three major industrialized economies alone report to the Bank for International Settlements (BIS) claims amounting to US$2.4 trillion on SEACEN member economies (Figure 5 and Appendix 3). In particular, European banks are notable as a major source of these bank-related investments, making up a considerable portion of the total at around US$1.5 trillion.

Figure 5

International Bank Claims on SEACEN Economies

Consolidated foreign claims, ultimate risk basis

Source: BIS.
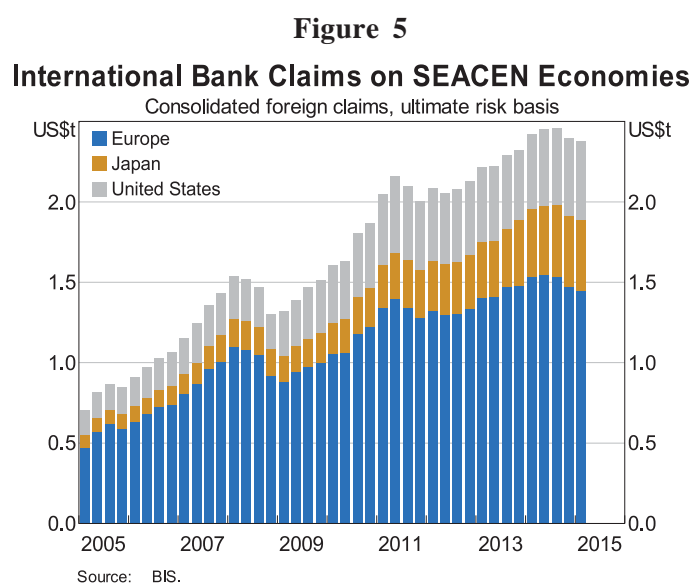
In the lead up to the most recent financial crisis, continental and banks based in the United Kingdom were roughly of equal importance (Figure 6). However, while lending from continental Europe (notably Germany and France) leveled off in 2009, banks in the United Kingdom continued to lend into the region. The stock of claims that UK banks currently have on Asia-Pacific economies in our sample amounts to almost US$1 trillion.[9]

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9. Even though the BIS statistics are on a globally consolidated ultimate risk basis, these positions might reflect that large Asian banks with London-based operations re-intermediate funds between savers and investors that are both residents in SEACEN member economies.

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Figure 6

European Claims on SEACEN Economies

Consolidated foreign claims, ultimate risk basis

Source: BIS.

Given the size of these positions and the potentially disruptive consequences from a rapid reversal, they are of considerable policy interest. While there is no *a priori* reason to believe that bank and money market flows are inherently less stable than other types of capital flows, they might require policy action at times when they do behave in a destabilizing way. Furthermore, there are a number of reasons why banks might be more susceptible to adverse shocks than other parts of the financial system. For instance, foreign currency exposures and highly leveraged positions can result in vulnerabilities that are quickly reflected in bank and money market flows when conditions deteriorate.

We do not make an explicit attempt to model banking claims but note one key feature of the flows over the most recent decade. First, we proxy the actual flows by taking the year-ended change in the stock of outstanding claims European banks have on the region. Due to a number of methodological reasons, this does not directly correspond to the flows recorded in the balance of payments but is nonetheless indicative of inflows originating in Europe. Next, we derive a measure of risk appetite from the point of view of the source of the flows using the implied volatilities of European stock markets.[10] It is apparent that the degree of risk appetite is directly related to how European banks lend and

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10. The risk appetite index is derived using the implied volatilities of equity markets in Europe (VSTOXX) and the United Kingdom (FTSE). The measure is an equally weighted aggregation of implied volatilities in the two markets, re-indexed so that the average value is equal to 100 over the period from 2005 to 2014. Values below 100 are associated with risk aversion and retrenchment while values of the index greater than 100 are to be interpreted as consistent with risk appetite.

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subsequently repatriate their investments (Figure 7). That is, European banks lend to the region when they have appetite for taking on risk and reverse their positions as they become more risk averse. The most notable reversals occurred in 2008 when Lehman Brothers collapsed and again in 2011 as European banks experienced a further bout of instability. The relationship might even have some leading attributes, which makes it a useful indicator for policy makers to monitor on an ongoing basis. These findings are consistent with the conclusions about bank-related flows to emerging markets described by the IMF in Bluedorn et al. (2011).

Figure 7

**European Bank Flows to
SEACEN Economies and Risk Aversion**

Sources: BIS; Bloomberg.
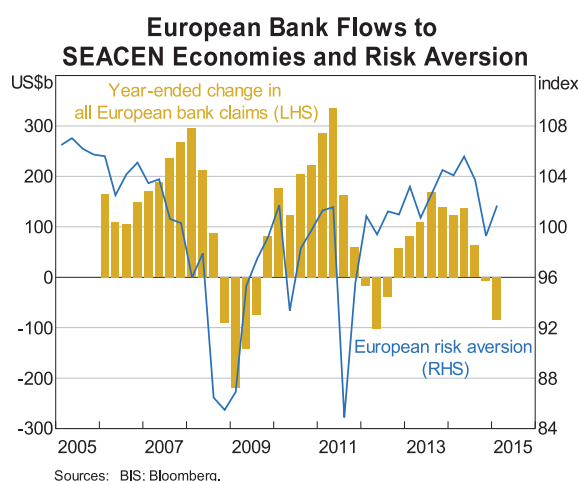
It is notable that of the bank-related inflows (liabilities) to Asia-Pacific, a non-trivial amount remains denominated in foreign currency (Table 3). The 'original sin' of borrowing in foreign currency was a major contributing factor in the Asian financial crisis as well as crises in a number of other economies. At the same time, however, there might be mitigating factors that make borrowing offshore in foreign currency less of a concern. For example, economies might have an offsetting asset position in foreign currency that can be set against these liabilities, or as is the case in Australia, the foreign exchange risk in the banking sector is fully hedged through off-balance sheet transactions in derivatives that are not reflected in the balance of payments (see also Becker and Fabbro, 2006).[11]

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11. The argument that offsetting asset and liability positions are a mitigating factor is somewhat diminished when we consider that at the sectoral or firm level, this natural hedge might not exist if the holders of assets are not the same as those with foreign currency liabilities.

Table 3

Foreign Currency Exposures of Banks in South-East Asia

As at April 2015

	Liabilities*	Liabilities*	Net position***	Net position***	Risk	Mitigating factors
	US$ billion	% of IIP**	US$ billion	% of IIP****		
Australia	531	23.4	-329	44.2	Above ave	Hedging
Chinese Taipei	170	34.7	129	26.3	Above ave	Net assets
Hong Kong	731	24.4	333	44.0	Above ave	Net assets
India	65	8.4	-33	10.2		
Indonesia	23	4.1	-11	2.9		
Japan	1,065	23.7	1,367	44.3	Above ave	Net assets
Korea	184	18.4	-44	118.3	Above ave	Small net
Malaysia	52	12.2	-2	17.3		
Singapore	761	34.3	-11	-1.9	Above ave	Small net
Memorandum Items:						
Median	--	23.4	--	26.3		

   * BIS-reporting banks' foreign currency denominated liabilities
  ** As a percentage of total economy's non-resident liabilities
 *** BIS-reporting banks' net foreign currency position
**** As a percentage of total economy's non-resident net position

Sources: BIS, IMF and SEACEN.

4. Direct Financial Exposures to the United States and Policy Normalization

The normalization of monetary policy settings in the United States is one source of uncertainty for developments in international capital movements. In Asia-Pacific, there is a risk that the resumption of capital inflows following the end of the financial crisis could once again be reversed as foreign rates of return begin to rise. Such an outcome could be disorderly and disruptive for domestic markets and exchange rates in the region.

While modeling the drivers of capital flows is inherently complicated, we calculate a number of useful metrics to assess each economy's financial exposure to the United States. For example, US residents who have invested in Asia-Pacific (capital inflow) might reverse that position (capital outflow) as the federal funds rate increases from its trough. The economies which are most susceptible to a reversal of flows are those that have been large recipients of inflows in

the past. At the same time, residents in SEACEN economies might choose to invest more abroad (capital outflow) which would act to compound the pressure.[12]

Using data on the stock of US residents' portfolio investment position in Asia-Pacific and the portfolio position of SEACEN economy residents in the US, we calculate four indicators of financial exposure to the US. The calculation of these indicators is detailed in Appendix 4, and briefly outlined below.

4.1 Measures of Exposure

Each economy has some degree of bilateral financial integration with the US in portfolio assets (Figure 8). Not surprisingly, the degree of integration is directly related to the openness of the capital account and depth of domestic financial markets. Hence, economies like Japan, Hong Kong, Singapore, and Chinese Taipei have much larger gross positions as a share of GDP than Myanmar, Cambodia, Mongolia, Nepal, and the pacific islands. Most notable is that almost all Asia-Pacific economies have a net asset position in debt instruments with the US. This reflects relatively large official foreign exchange reserve holdings invested in US Treasury securities and the lack of depth in Asian bond markets for US residents to invest in. On the other hand, much of the aggregate capital outflow from the United States is in the form of portfolio equity and since these tend to be the deepest markets in Asia-Pacific, most economies have a net liability position with US residents in equities. In overall net terms, the majority of economies in Asia-Pacific have a balanced or net portfolio asset position with the United States. Only Australia and Papua New Guinea have notable overall net liability positions.

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12. The obvious over-simplification that has been made is to omit the possible response to US monetary policy from investors in other economies. For example, what we show here does not capture that some European investors are likely to repatriate their position in Asia-Pacific to invest in the United States once the relative rate of return begins to change.

Figure 8

Net Portfolio Position vis-à-vis US Residents

2013, per cent of GDP
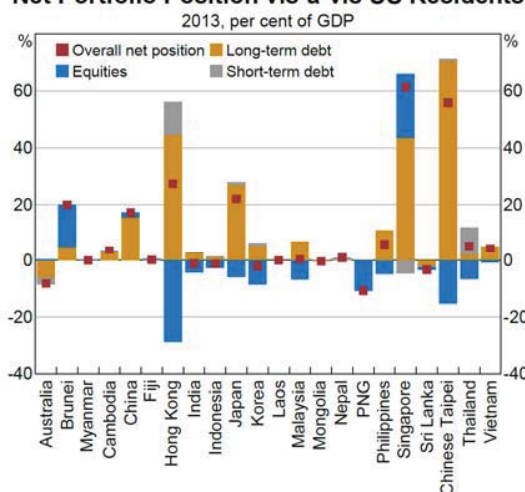
Sources: IMF; U.S. Department of the Treasury.

A measure of direct gross exposures (DGE, assets plus liabilities) that US residents have in Asia-Pacific (relative to each economy's total gross foreign position), provides some guide to the degree of financial integration with the United States. However, drivers of assets and liabilities, and hence the behavior of residents and non-residents, are likely to differ. Consequently, we also break up the gross summary measure into a measure of liabilities and assets. Direct Liability Exposures (DLE) are the result of US capital inflows into Asia-Pacific, while Direct Asset Exposures (DAE) are the result of Asia-Pacific capital outflows to the United States. Finally, we also construct a Direct Net Exposure (DNE) to the United States to reflect that assets and liabilities have some offsetting attributes. Each metric is expressed as a ratio to their respective total international investment position aggregate (gross position, liabilities, assets, or net position).

The granularity of the disaggregated metrics is particularly informative for economies where the asset and liability positions vis-à-vis the United States differ substantially. This difference is most pronounced for China (Figure 9). The gross position of China with the United States is substantial but almost entirely due to large foreign reserve holdings in US Treasuries which is indicated by the differential between the asset position and small liability position. The policy implication is that as interest rates rise in the United States, there are relatively few US portfolio investments expected to flow out of China. The

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Philippines and Thailand have a similar, albeit less pronounced, asset-liability structure. The net portfolio-related capital flows that result from normalization by the Federal Reserve therefore crucially depend on behavior on the asset side for these economies. Insofar as reserve decisions by the monetary authorities are important in the composition of foreign assets, and independent of pure portfolio considerations, one might expect little response on the asset side.[13] The focus is therefore on the size of potential liability-related capital outflows initiated by non-residents.

Economies with a considerable portion of liabilities owing to US residents include Australia, India, Japan, Korea and the Philippines.[14] Importantly, the composition of those liabilities also matters. Whereas most Asia-Pacific economies have mainly equity liabilities, Australia has a larger exposure in debt securities purchased by US residents.

Figure 9

Direct Portfolio Exposures to US Economy

Per cent, as at 2013

Sources: IMF; U.S. Department of the Treasury.

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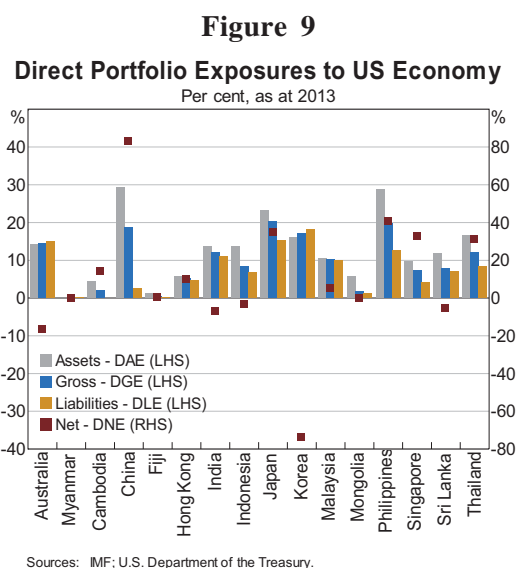
13. While official reserve assets can reasonably be expected to be less interest sensitive than private investments, to the extent that some central banks hold very large foreign exchange reserves, this excess might be driven more by the same incentives as private investments. The exchange rate adjusted return is a crucial metric in the investment decision, often overwhelming any interest rate consideration. These might be important considerations for large reserve holders, but are beyond the scope of this paper.

14. Note that what appears to be a very large net liability position for Korea is the result of the net overall investment position being close to zero. Given that this is the denominator for the calculation the small net liability position of Korea with the United States is a very large percentage of a small denominator. See also Appendix 4 for details of the calculation.

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4.2 US Monetary Policy Tightening Cycles and Capital Flows

We infer a reaction function for South-East Asian economies to policy normalization in the United States by conducting a simple event study for past tightening cycles. Given the short data sample there are only two Federal Reserve tightening cycles (early-2000s and mid-2000s) over which to observe the reaction of capital flows (refer to Appendix 5 for details). The sample includes 15 rate increases.[15] The response function is the cumulative change in average capital flows in South-East Asian economies for the quarter in which the tightening occurs and the subsequent 8 quarters, bounded by a maximum and minimum reaction over the sample (Figure 10). To benchmark the reaction of capital flows, we also calculate a baseline which is the cumulative average quarterly capital flow over the entire sample from 2000 to 2014.

Figure 10

Net Capital Flows
Cumulative response, per cent of GDP, 2000–2014

Source: author's calculations.
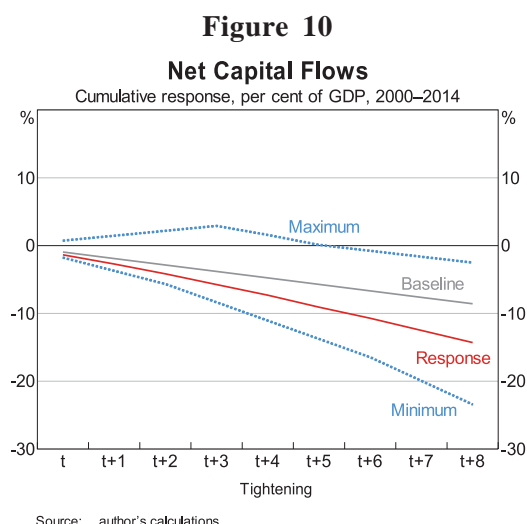
Since economies in Asia-Pacific typically record current account surpluses, they export capital to the rest of the world as shown by the gray baseline which cumulates to 8.6% of GDP over 8 quarters. During episodes when the Federal Reserve raised interest rates, total net capital flowed out of the region more quickly on average (red line), cumulating to 14.3% of GDP after 8 quarters.

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15. We drop the last three rate increases from the sample because the tail of the event study overlaps with the onset of the 2008 financial crisis. Including them would unnecessarily bias the results, given that developments in capital flows during that time are not principally driven by monetary policy developments 8 quarters earlier.

This finding is consistent with interest rate increases in the United States resulting in a repatriation of capital flows from South-East Asian economies (non-residents) and attracting increased investment from the region (residents) into the United States. The main drivers of the increased outflow appear to be a slowdown of non-resident portfolio debt inflows, bank and money market inflows, as well as a tendency for residents to invest more abroad. While it is difficult to quantify with any degree of precision, this effect might amount to 5.7% of GDP 8 quarters after the interest rate rise (or an average of 0.6% of GDP per quarter).[16] Notably the upper and lower bounds of the reaction function indicate that there is a considerable degree of uncertainty about the actual outcomes (see also below for findings from the IMF 2015 Spillover Report).

The question that arises is whether this change attributable to monetary policy developments abroad is material. The quarterly magnitude does not appear to be very large given the standard deviation of net capital flows in the region since 2012 is around 3.5% of GDP per quarter. However, capital is shown to be flowing in one direction in the event study and is not simply fluctuating around a mean during the tightening cycle. The importance of a persistently more pronounced capital outflow is likely to depend on the starting point with respect to general macroeconomic and financial market conditions. It is difficult to define a meaningful benchmark against which to measure these findings. As an outer extreme, we could delineate the Asian financial crisis as an event that was indisputably disruptive. The magnitude of the reversals in capital flows was associated with volatility in real and financial variables. During that time, the Korean experience provides a useful case study. Total net capital inflows initially slowed and then suddenly reversed at an average rate of 6.5% of GDP per quarter, cumulating to outflows of 51.8% of GDP between March 1998 and the end of 1999.[17]

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16. In this event study, the 8 quarter windows overlap so that it is difficult to exactly separate the effect from the first and subsequent interest rate increases on capital flows. Also, no attempt is made to control for expectations of future policy interest rate changes. In a similar exercise, the IMF finds a cumulative negative impact on GDP of 2% after 8 quarters for an unanticipated change in US interest rates (Bluedorn et al. 2011).

17. Another metric to gauge the magnitude of the flows is the revisions to which the data are subject. For example, in the 2015 June quarter Balance of Payments release by the Australian Bureau of Stati stics several quarters of data were each revised by more than 1% of GDP. The quarterly increase in capital outflows due to changes in the US federal funds rate described above lies well within this margin of error. See also Becker (2003).

For this type of reaction in capital flows to occur in response to tightening in the United States, the Federal Reserve would either have to act considerably more aggressively than currently anticipated, or the market reaction would have to be more pronounced than the historical norm.[18] In this context, the event study of the typical relationship between past policy rate increases in the United States and the reaction of capital flows in Asia-Pacific appears to be weak when considered in isolation. Nonetheless, there might be second round effects or additional shocks which could be transmitted to Asia-Pacific at a time when US yields begin to rise. One such second round effect might be the transmission of European risk aversion via bank and money market flow to the Asia-Pacific following a Federal Reserve rate rise that is interpreted by markets to be a net negative for the euro area's own recovery.

Interestingly, while there is a clear slowing in net bank and money market inflows from non-residents into Asia-Pacific around 4 quarters after interest rates rise in the United States, there is a very wide dispersion of potential outcomes (Figure 11). While at the extreme, banking-related flows can be shown to reverse by as much as 17.6% of GDP after 8 quarters, at times inflows might actually accelerate. We interpret this finding as an indication that bank and money market flows are likely to be a function of a wider variety of determinants than the US policy interest rate.

Figure 11

Net Bank and Money Market Flows

Cumulative response, per cent of GDP, 2000–2014

Source: author's calculations.

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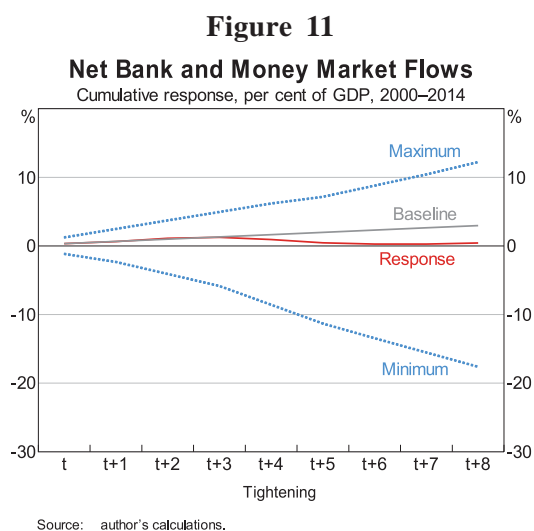
18. Current market expectations are for the US federal funds rate to rise gradually toward 2% by the end of 2017.

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One reason this wide range of uncertainty surrounds bank-related flows could be because these flows are mainly sourced out of Europe and not the United States. Arguably, the eventual normalization of policies in the euro area could have a clearer and more appreciable impact than the actions of monetary authorities in the United States.

4.3 Implication for Capital Flows from Findings in the IMF Spillover Report

The recent Spillover Report published by the International Monetary Fund (IMF) also addressed some of the ambiguities surrounding possible financial market responses to normalization of interest rates in the United States (Osorio-Buitron and Vesperoni, 2015). The report differentiates between the reasons why interest rates rise and identifies how these can be expected to impact emerging markets. Since nominal returns can reflect real, monetary or other developments, the analysis suggests that the impact on emerging markets can be very different. To summarize:

$$i_t^{U.S.} = r_t^{U.S.} + \pi_t^{U.S.} + \varepsilon_t^{U.S.}$$

where $i_t^{U.S.}$ is the nominal market interest rate; $r_t^{U.S.}$ represents the real component of the return; $\pi_t^{U.S.}$ is the component compensating for inflation; and $\varepsilon_t^{U.S.}$ reflects all other factors that affect observed nominal returns.

The findings of the Spillover Report are that 'money' shocks (that is, increases in $\pi_t^{U.S.}$ or $\varepsilon_t^{U.S.}$) that lead to higher yields in the United States result in worse outcomes for economic growth in emerging markets, net portfolio outflows, and a depreciation of the exchange rate. On the other hand, if yields in the United States rise due to a 'real' shock, implying stronger economic activity (that is, an increase in $r_t^{U.S.}$), then emerging markets tend to benefit.[19] Improved

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19. The analysis indicates that the effects of shocks emanating from the United States or the euro area are similar in magnitude, irrespective of whether they are money or real shocks. However, the transmission from the United States is more likely to be through trade channels, while shocks from the euro area are probably more closely related to the financial linkages between respective regions.

economic growth in the United States leads to better growth prospects in emerging markets, which boosts risk appetite, causes capital to flow to emerging markets, and leads exchange rates to appreciate against the US dollar.

The Spillover Report suggests that there are two transmission channels for positive growth shocks to emerging markets. The first is the usual one in which higher real growth in the United States attracts capital inflow due to the implied higher returns and causes the US dollar to appreciate. The second is a positive spillover to general risk appetite from the growth surprise (that is, improved global economic prospects) through which capital flows to emerging markets and leads to an appreciation of exchange rates vis-à-vis the US dollar. The IMF analysis indicates that the second channel dominates.

Policy interest rate increases in the United States that aim to normalize yields as the real economy recovers would appear to be more consistent with the Spillover Report conclusions that suggest the source of yield increases is a positive real growth shock. While an unanticipated monetary policy change by the Federal Reserve would be analogous to a money shock, it is difficult to envisage a reason why such a policy surprise would eventuate.

5. Investment Returns and Capital Flows

The return that non-residents are able to earn on their investments in South-East Asia economies should, at least in principle, be an indicator of capital flows. However, capital movements are also determined by a number of factors which can make it difficult to identify a clear role for returns. Furthermore, the aspect of returns that non-residents care about most might differ depending on the type of investment, the investor and extent of foreign currency exposure. We, therefore, consider several dimensions of flows that might be important and caution against applying a uniform correlation of returns and capital flows across South-East Asia.

Firstly, we suggest that nominal rather than real returns are likely to be more important to non-residents. Since non-residents are unlikely to consume the proceeds from investments in the destination economy, the rate of inflation in the recipient economy is not directly relevant.[20] Secondly, the return on investment is not easily proxied by any one measure. Depending on the depth

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20. The inflation rate nonetheless plays an important role as an indicator of general macroeconomic conditions and thereby influences capital flows.

and openness of financial markets in the receiving economy non-residents might be influenced by the return on short- or long-term debt instruments, the return in equity markets or the average total rate of return on capital in the economy. Bond yields and equity prices might be jointly significant if domestic markets are sufficiently deep for non-residents to liquidate fixed income positions and reinvest in equites or alternative investments. The investment mandate plays an important role in the decision. Thirdly, the currency composition of the underlying investment is also likely to matter. Similar to the argument about the relevant price deflator for investment returns, it is probable that investors care most about the return in their local currency (e.g., US dollars) adjusted for exchange rate effects applicable to their foreign investment positions. A complication is that there are only sparse data sufficiently comprehensive to measure the currency composition of international investment positions.

We attempt to assess the importance of some of these considerations by calculating average nominal rates of return applicable to non-resident investments across different types of instruments, in the foreign currency of the investment, and taking into account exchange rate variations by using the US dollar as a numeraire.

$$r^*_{USD} = \left(r^{FCY}_{SFI} . \beta_1 + r^{FCY}_{LFI} . \beta_2 + r^{FCY}_{EQU} . \beta_3 \right) x \, \Delta e^{FCY/USD}$$

where r^*_{USD} is the foreign rate of return to a non-resident investor expressed in US dollar terms; is the rate of return in foreign currency (FCY) on either short-term fixed income (SFI) of 90-day maturity, long-term fixed income (LFI) of around 10-year maturity, or the annualized rate of return on equities (EQU), noting that the three measures of return are equally weighted ($\beta_1 = \beta_2 = \beta_3$); adjusted by the annualized rate of change in the bilateral exchange rate $\Delta e^{FCY/USD}$ between the US dollar and the foreign currency of the destination economy. For completeness, we also calculate the differential between this measure and an equivalent measure of US dollar-denominated returns based on US Treasury notes, bonds and the S&P 500 Index (which obviously does not require conversion into US dollar terms).

Returns on short and longer-term fixed income securities are relatively slow moving and predictable compared with the more extreme fluctuations in equities and the exchange rate. In Table 4, we show the results of correlations between the components of the capital account and different measures of return. We only investigate the effect on capital inflows/liabilities that might exhibit a relationship with returns and therefore leave aside the actions of residents in

their accumulation or retrenchment of foreign assets. The first measure is the foreign currency return that a non-resident investor is able to earn in fixed income (i.e., averaged across short- and longer-term securities). The second indicator is also in foreign currency but adds the return on equities. Measures three and four adjust the first two measures for exchange rate developments, and the fifth measure is the differential in total US dollar returns between the destination economy and the United States. The Table lists those economies for which a significant positive correlation of between 40% and 60% was found. For example, in both Australia and Korea, there is evidence that the average total return on financial instruments, denominated in their currencies, is positively correlated with non-resident portfolio debt flows.

Table 4

Significant Positive Correlations between Capital Flows and Measures of Return
Sample quarterly data 2000 to 2014, excluding 2008 and 2009

	KAB	FDI	PFE	PFD	BMM	DER	RES	PKB
1. Fixed income return in FCY	AUS, KOR	KOR, CHT	SIG, THL			AUS, HKD, KOR, CHT	CAM, HKD	AUS, KOR
2. Total returns in FCY	AUS, HKD, KOR, SIG	SIG	INI, JAP, PHP, SIG, SLK	AUS, KOR	KOR, PHP, SIG, SLK			AUS, HKD, KOR, PHP, SIG, SLK
3. Fixed income return in USD		CAM	SLK	MYR		HKD, INI	HKD, INI, SIG	
4. Total return in USD	HKD, INI, INO	HKD, INO		AUS, INO	HKD, BMM			HKD, INI, INO
5. Total return differential in USD	KOR		PHP, SLK		KOR, SLK	HKD		KOR, PHP, SLK

Memorandum items:
Table lists economies for which correlation coefficients were found to be at least 40 per cent. None exceeded 60 per cent.
Correlations between returns (foreign currency, FCY, or US dolars, USD) and respective capital inflows/liabilities by category.
Sample includes Australia, Cambodia, China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Sri Lanka, Chinese Taipei and Tha
No significant correlations were found for China.

Source: author's calculations.

The most notable findings are:

- There is no uniform pattern of significant correlations between returns and capital flows that can be generalized across all economies. We interpret this as a reflection of the importance of idiosyncratic factors.

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These are potentially a function of the behavior of different investor bases and financial instruments.

- The strongest results for correlation with capital flows were for the average rate of return across all instruments (short- and long-term debt and equities) denominated in the destination economies' currency. This was strong for portfolio equity flows (in India, Japan, the Philippines, Singapore, and Sri Lanka) as well as bank and money market flows (in Korea, the Philippines, Singapore, and Sri Lanka).

  Interpretation of this result can be complicated for policy makers. It is not immediately obvious why equity returns might be a significant determinant of bank and money market flows. However, considering that bank-related capital movements can be shown to be sensitive to risk aversion (see above) the reflection of generalized investor sentiment in equity markets might be captured in the correlation coefficient between equity returns and bank-related capital flows. Note, however, that the strongest correlation between risk aversion and capital flows during the financial crisis was omitted from the analysis to give a clearer indication of regular relationships.

- Other correlations were weaker for individual components of the capital account. However, a degree of co-movement results in notable positive correlation of the private capital account balance or the overall capital account with returns. That is, while the exchange rate adjusted total return measure might for instance be only weakly correlated with debt-related flows and bank-related flows, if these flows move in the same direction then the relationship might be stronger in the aggregation of all flows. This was particularly evident for the total return across all securities adjusted for exchange rate variations (Hong Kong, Philippines, and Singapore) as well as the return differential measured in US dollars (Korea, Philippines, and Sri Lanka).

There is no easily identifiable relationship between returns and the flows. Furthermore, there appears to be some evidence to suggest that the characteristics of returns that matter in the determination of capital flows differ between economies. While the work presented here is rudimentary, it could be refined in several ways to attempt to enrich the understanding of relationships that are deterministic. While the rates of return are equally weighted, they could instead be weighted by the importance of different types of foreign investment. While we assume that the US dollar is the numeraire for all non-resident investors, this might not necessarily be the case, especially considering how active European

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banks are in lending to Asia-Pacific. An attempt to more closely relate movements in capital to the relevant exchange rate adjustment should also bear in mind that there are a number of factors that might mitigate foreign exchange risk. For example, natural hedges might exist in the form of offsetting foreign currency denominated assets or economies with more developed financial markets might engage in a significant degree of hedging through derivatives (see also Becker and Fabbro, 2006).

6. Policy Considerations, Implications and Options

All policy makers are likely to agree with generalized statements that recommend 'appropriate' or 'sound' practices. The real challenge for individual economies lies in understanding and defining a hierarchy of policy objectives that is appropriate and sound. The policy mix most conducive to better outcomes in Asia-Pacific is also a moving target as economies develop and the global environment changes. For a summary of policy actions since the 2008 crisis see Hussain et al. (2011).

We can safely assert that macroeconomic fiscal and monetary policy should be aimed at certain principles such as debt sustainability and achievable targets linked to variables such as inflation. Nonetheless, the exact implementation and objectives vary from one economy to another. Increasingly, macroprudential policies have also been advocated to achieve consistency between traditional macroeconomic management and financial sector supervision. The main fiscal and monetary policy options should, therefore, always be set in an 'appropriate' manner (as defined by the authorities). Insofar as this is not always the case, during times of capital flow disruptions, such misalignments should be corrected first before alternative or additional policy responses are contemplated. In other words, it might prove to be counterproductive to implement policies that respond to developments in the capital account when fiscal and monetary policies are out of alignment with macroeconomic fundamentals.

This paper has nothing to say about the appropriate exchange rate regime, other than to note that the exchange rate is one of the most important prices in any economy. It has important implications for the real sector, nominal values, and financial markets. It is also jointly determined with the current account, capital account, and the saving-investment balance. The choice of exchange rate regime is, therefore, a central decision that all policy makers have to evaluate in the context of the degree of adjustment that can be absorbed by the exchange rate.

6.1 Bank and Money Market Flows

The financial crises in 1998 and 2008 were primarily associated with bank and money market flows. Given that this is a sub-component of the capital account where emerging markets often experience volatility, it is worth understanding more fully. Bank and money market inflows appear to be the most flexible in financing those residuals or imbalances not financed through other means. At turning points in the economic or financial cycle, bank and money market flows might consequently reflect the buildup of excesses. It is, therefore, not surprising that this sub-component is more often subject to reversals and bouts of volatility. The relationship between risk aversion and bank-related capital flows should not be surprising if investor sentiment triggers an unravelling of unsustainable positions.

Banking flows have exhibited the instability that could be predicted at those times when the banking sector, either domestically or abroad, is the underlying source of shocks. That is to say, banking sector shocks are most likely to be reflected in transactions undertaken by that sector. However, this is not to be over-simplified to imply that bank loans and money market financing will necessarily be the only, or even the principal, source of instability in the future. This may have been the case in 1998 and 2008 but is not assured to be a source of instability during future crises. For instance, one could conceive of a shock that would destabilize those flows that the conventional wisdom would consider to be 'safer', 'cold' or inherently more 'stable'. Such attributes are usually believed to be a feature of direct investment flows. Notwithstanding this preconception, during times of heightened activity in mergers and acquisitions in industrialized economies such as in the mid-2000s, foreign direct investment was also observed to be volatile. And in some Latin American economies when questions arise about the enforceability of property rights, direct investment might become flighty.[21] The policy implication is that domestic and international political, macroeconomic and financial developments can be the source of volatility in 'all' types of capital movements. It would be naïve to restrict scrutiny to just a narrow subset of the capital account.

The domestic policy focus should take the form of ensuring that banking and non-intermediated financial markets are as robust and safe as they can be. Internationally, economies have to ensure that they are able to withstand the

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21. The re-nationalization of petro-chemical assets in several Latin American economies in the 2000s provides examples of shocks to property rights that might affect foreign direct investment.

consequences of crises that originate in jurisdictions that are beyond the direct sphere of their own influence. A key recommendation is to create the correct incentives and remove distortions that would drive unproductive or speculative lending by non-resident banks.

A more systematic and detailed dissection of banking-related flows and the underlying stock of assets and liabilities to better understand the dynamics of the capital account is required. Building on the work of Pontines and Siregar (2012), future research should aim to also include additional variables that are identified as important in this paper. For example, risk aversion could be refined to relate more specifically to the economy of origin (common lender) rather than the US variable used. The relevant exchange rate considerations and therefore, foreign currency exposures, would also be likely candidates for investigation. Furthermore, the degree of openness to capital flows and substitutability between different components of the flows are likely to be important. This type of work should proceed by careful analysis of existing data and evolving trends. Modeling historical relationships provides useful insights but is only of limited use in guiding future policy responses.

6.2 Foreign Exchange Exposures

Foreign exchange exposures in the banking system that arise from cross-border lending are often a source of volatility. Furthermore, a short-term policy response to such volatility often necessitates access to foreign currency which complicates the capacity of local authorities to respond. It requires reliance on an adequate stock of foreign exchange reserves and the ability to deploy that stock when needed. In a crisis situation, the use of foreign exchange reserves can be inhibited if there is a perceived signaling problem or stigma associated with a run-down in the stock. As a result, international organizations and individual constituencies have become vocal in advocating cooperation in building safety nets where economies cooperate in the event of a crisis. This cooperation might take the form of a network of foreign currency swap lines or coordinated policy responses. These types of actions can help underpin confidence and perhaps even forestall those crises that result from little more than a change in investor sentiment. However, it is difficult to secure multilateral agreement on such initiatives and even more difficult to convince central banks to subjugate their domestic monetary targets to international objectives and factors beyond their own control. It would appear that these difficulties would be less of a pressing concern if foreign currency exposures were limited at the outset. Banking crises that involve the local currency can be addressed more easily with the liquidity that domestic central banks control and are able to supply freely without limit.

6.3 Role of Foreign Exchange Reserves

Insofar as reserves are used to offset the destabilizing effects of private agents, they might be a useful policy tool. However, as noted in Appendix 1, monetary authorities have to be cautious not to introduce instability by their actions in foreign exchange markets if private flows reflect fundamentals and official transactions in reserves imply a 'crowding-out' of the private sector for a given current account balance. In the medium-term, a policy objective might be to foster private market outcomes that are conducive to a more stable capital account. Such outcomes are observable for most industrialized economies, irrespective of their size. The openness of the economies to international capital movements, the exchange rate regime, and domestic economic policies have to be consistent and supportive of such a goal. A specific course of action would be to encourage the types of large resident institutional investors who could provide some counterbalance to the actions of non-residents. Retirement funds or similar pooled saving vehicles could be fostered to play a larger role in the region.[22]

6.4 Monetary Policy Responses to Capital Account Reversals

The relationship between returns and capital flows is difficult to define. It would appear that different aspects of returns are important for each economy and cannot be generalized even across a region with many similarities. Monetary policy abroad is also only loosely related to capital account developments. There is a link but it is not strong and surrounded by a wide band of uncertainty.

In a study for Korea, Choi et al. (2014) suggest that monetary policy is best suited to addressing the domestic macroeconomic consequences of capital movements and that foreign exchange reserves are better suited to smoothing the capital account. Importantly, they also note that if monetary policy were tightened to stem capital outflow and stabilize the reversal of foreign inflows, it would have unhelpful consequences for domestic growth if the episode is associated with a deflationary economic shock.[23] There is, therefore, an explicit trade-off that constrains the use of monetary policy, which is further complicated if the monetary authorities also have some exchange rate objectives.

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22. See also Genberg et al. (2005), especially pages 82-83.

23. This policy choice is also described in Kokenyne et al. (2010).

Given how little time is devoted in this paper to how monetary policy might relate to capital flows, at best policy makers would be well advised to consider a number of other responses to capital account developments before responding with monetary policy. It would appear to be a rather blunt tool in the context of the capital account unless the exchange rate is fixed and monetary policy is imported from abroad (as it is in Hong Kong).

6.5 Cross-contagion between Flows and Fostering Substitutability

Another area to monitor is the possibility of contagion within the capital account. Whereas industrialized economies typically enjoy a degree of substitution in the capital account to finance the aggregate requirement, emerging economies are often subject to compounding volatility because at times, all flows move in the same direction (Becker and Noone, 2009). The credibility of domestic macroeconomic policy settings is an important determinant of stability, as are the international investment positions of residents which might offset the actions of non-residents and provide a natural hedge. One policy implication is that the private sector might not be able to fully equilibrate without official intervention in many emerging economies. This could be telling about the appropriate balance between domestic and international policy objectives in the context of an open capital account.

6.6 Capital Flow Management Measures

One of the goals to help stabilize capital flows and mitigate risks has been the deepening and development of local currency debt markets. However, progress on this objective remains a long-term aim and policy makers might have to respond to fast changing capital flows before it can been achieved. As a result, the implementation of measures to manage capital flows in specific circumstances is now considered to be part of the policy toolkit, and has been endorsed by the major international organizations (IMF, 2015 and IMF, 2011). Some general guiding principles apply to the implementation of capital flow measures.

Management of flows begins with a prevention of, or response to, inflows and the build-up of vulnerabilities. Economies are advised to exhaust their macroeconomic policy options before implementing restrictions on capital movements. This approach seeks to ensure that policy settings are appropriate and do not create the type of distortions that exacerbate vulnerabilities. That is, policies will typically seek to lean against inflows (e.g., allowing exchange rate appreciation reduces the potential for one-way bets). Prudential regulations and

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capital controls can also help to forestall the build-up of balance sheet vulnerabilities and credit booms. However, there is a risk of creating distortions which could create unintended misalignments and associated vulnerabilities elsewhere in the financial system.

The risk of creating distortions is especially pronounced if capital flows reflect the underlying financing decisions of firms in the host economy. Given that there is some degree of substitutability between different forms of financing, and therefore capital flows, efforts by policy makers to discriminate using capital flow measures might (unintentionally) not be welfare enhancing (Smithy and Valderramaz, 2008). There is no a priori reason to believe that the policy maker always has better information. Therefore, it might be preferable to address the root cause of instability such as the international or market features that lead to volatility.

Measures should target specific risks and be tailored to the circumstances of the economy. For instance, if inflows are intermediated through the regulated financial system, prudential tools can be the main instrument, but if inflows bypass regulated institutions, then capital controls may be the only option.

The last resort of implementing capital controls should ensure broad coverage of the measures, and only be imposed when flows are expected to be temporary. Controls are unlikely to remain effective if the capital is expected to leave as soon as they are lifted. In the medium-term, such controls are typically either circumvented or result in undesirable distortions which render them ineffective. As a result, it is generally acknowledged that controls can only remain effective temporarily and should be removed as soon as practicable.

There is also a regional dimension to the potential imposition of capital flow measures. Insofar as one economy imposes restrictions, these actions might divert flows to another economy that non-residents consider to be a close substitute. One could imagine a cascade of measures implemented across Asia-Pacific that would benefit from some regional coordination to avoid beggar-thy-neighbor type outcomes. A particularly undesirable outcome would be if resort to restrictions leads to a delay in necessary macroeconomic adjustment. This is especially the case if costs increase if they persist for longer.

A final point that policy makers contemplating capital flow measures should bear in mind relates to the consequences they might have on the credibility of policies and the impact on the composition of the non-resident investor base.

The nature of capital flow measures is to alter the rules of the game. By definition this creates a degree of uncertainty that non-residents might view as a risk or dead-weight loss for which they will require some form of compensation. Even a very successful capital flow measure which prevents the large scale reversal of non-resident investments, say through a moratorium on liquidating certain investments, might raise the risk that at some future point investors will once again face the risk that their assets in the host economy are inaccessible. Such a fundamental, albeit temporary, alteration in property rights might run contrary to the investment mandate of some non-residents. The question is whether the type of investors who remain and are willing to bear these policy-related risks are those that are necessarily always the most conducive to stable and efficient cross-border capital allocation.

7. Concluding Comments

Even in Asia-Pacific, there appear to be few regularities that would allow generalized policy advice other than to do what this paper attempts to do – dissect the capital account and exposures to make policy makers aware of looming vulnerabilities and appropriate responses.

We have attempted to show that careful and methodical analysis of developing trends allows the formulation of potential policy responses in the event of rapid inflows, sudden stops, and possible reversals. The balance of payments and international investment position provide a useful framework to think about capital flows. Some volatility is inevitable but the manner in which economies accommodate this volatility is a policy choice with competing objectives that have to be evaluated ex ante. All policy reactions have costs and benefits.

The implications for capital movements in Asia-Pacific following on from policy normalization in the United States are highly uncertain given that there is no recent precedent of either the 2008 financial crisis or unwinding of extraordinary policy responses. History is therefore of only limited usefulness. Nonetheless, there are a number of reasons to believe that, notwithstanding considerable uncertainty, the probable negative implications might well have been overestimated in recent years.

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Appendix 1 – Balance of Payments Accounting and Definitions

Throughout the project, we use the balance of payments identity to construct data sets and make policy inferences. At times, we choose to group certain types of flows based on particular characteristics. Our use of abbreviations and methodology are detailed in this Appendix. The basic concepts are as follows, where the negative of the current account is equal to the variables on the right hand side:

$$-CAB^i_t = I^i_t - S^i_t$$
$$= KAB^i_t$$
$$= PKB^i_t + RES^i_t$$
$$= FDI^i_t + PFE^i_t + PFD^i_t + BMM^i_t + DER^i_t + RES^i_t$$

where CAB^i_t is the current account balance for economy i at time t, S is national saving, and I is investment. From national accounts accounting we know that the current account balance is equal to the saving-investment imbalance.[24] Insofar as domestic saving and investment are not equal, a shortfall in financing has to either be imported as capital inflow or a surplus exported as capital outflow. The balance of payments counterparts to the current account balance and saving-investment imbalance are therefore cross-border financial flows.

We define KAB[25] to be the capital account balance, which comprises the private capital account balance (PKB), and the change in official foreign exchange reserve balances (RES). Since reserves are a policy tool controlled

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24. For ease of exposition we write this as the inverse of the current account balance equal to investment less saving since the double-entry accounting of the balance of payments means that the capital account is equal to the inverse sign of the current account.

25. International standards (*Balance of Payments and International Investment Position Manual – BPM6*) specify that the 'financial' account is the main counterpart to the current account. However, since we are primarily discussing capital flows, we prefer to use the term 'capital account' to describe the record of cross-border financial transactions recorded in economies' external financial accounts. The actual item in the official statistics that is referred to as the 'capital account' (capital transfers and flows associated with non-produced/non-financial assets) is usually very small and adds little to the analysis at hand.

by the monetary authorities, they are deemed not to be a reflection of private sector decisions.[26]

The components of the private capital account balance are foreign direct investment flows (FDI), portfolio equity flows (PFE), portfolio debt flows (PFD), bank and money market flows (BMM)[27], and derivatives (DER). Capital transfers, flows associated with non-produced/non-financial assets, as well as errors and omissions, are generally small and therefore omitted.

Each of the components detailed above have underlying gross asset and gross liability flows which are the result of transactions entered into by residents and non-residents. Capital inflows (a positive sign) arise when external liabilities to non-residents are incurred by the recipient economy's residents, but when external liabilities decline this repatriation by non-residents is recorded as a negative inflow (i.e., effectively an outflow). Gross inflows can therefore be characterized as the net purchase of resident assets by non-residents. Capital outflows are purchases of non-resident assets by residents (a negative sign), but can also be thought of as capital inflows when residents repatriate their investments (outflows with a positive sign). Gross outflows can therefore be characterized as the net purchase of non-resident assets by residents. Overall net flows are the sum of gross inflows and gross outflows.

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26. While all non-reserve related flows are assumed to be private, this might not be true for economies whose currencies are held as international reserves. A useful example is the United States. While actions in the foreign exchange market to alter the level of foreign exchange reserves held by the Federal Reserve are clearly US official flows, so are capital inflows into US Treasuries that represent investment of non-resident reserve holdings. Such capital flows are most likely reflected in the portfolio debt category (i.e., a central bank non-resident to the US buys Treasuries as part of its reserves). Insofar as official flows remain small relative to other investment flows, this is unlikely to be a major issue. However, for smaller economies the effect might be more pronounced (e.g., in Australia for portfolio diversification). In this case we assume that even reserves behave like private flows since it is most likely that these currencies are not regarded as core reserves and are mainly held for diversification and return enhancement purposes rather than direct intervention. We therefore ignore the impact of official non-resident capital flows for the purposes of this analysis.

27. In the balance of payments these flows appear under the category of 'other investment'. As bank loans and money market transactions are typically the main components of this category, we refer to these flows as 'bank and money market' flows to lend them a more meaningful label.

Since this derivation is the outcome of simple double-entry bookkeeping, a number of interesting relationships between the flows are implied that have important policy implications. Most notably, if the fundamentals that determine the current account, saving and investment are given in the short-term, so that the total capital account is fixed, then changes in official reserves must be accommodated by private capital flows to maintain the balance of payments identity. That is, policy actions that induce reserve-related capital flows will affect other parts of the capital account. Typically bank and money market flows are negatively correlated with reserves (see also Becker and Noone, 2009). Also note that, for a given private capital account balance, a change in one type of private flow must be offset by a change in the sum of the others. This suggests that there is an inherent tendency for negative correlation between capital flows within the capital account which might also be indicative of a degree of substitutability. Industrialized economies exhibit a higher degree of negative correlation between the flows than emerging economies. This is, at least in part, because they are less likely to accumulate reserves and also helps to explain why gross flows are more broadly balanced in industrialized economies (see also Bluedorn et al., 2013).

Appendix 2 – Measuring the Diversification and Openness of Gross Capital Flows

We calculate a measure of how freely capital flows in and out of economies following Becker and Noone (2009). The degree of openness (Flow Openness) for every economy or type of flow (i) depends in every period (t) on the ratio of the absolute value of gross resident and non-resident flows to the absolute value of the sum of gross and net flows, as follows:

$$
Flow\ Openness_{it} = \left[\frac{|resident\ flows_{it}| + |nonresident\ flows_{it}|}{resident\ flows_{it} \quad nonresident\ flows_{it} \quad net\ flows_{it}} - \frac{1}{} \right] x\ 200
$$

When capital flows readily in both directions, we expect the sum of substantial absolute gross flows to be large relative to net flows, because the gross movements are at least partially offsetting. In this case, the index tends toward 100. Global financial centers, such as the United Kingdom and Hong Kong, register a very high index value as capital is channeled in and out with large two-way flows, but in the context of relatively small net positions. However, when capital flows are very one-sided, we expect the sum of gross flows to be more in line with net flows. The most extreme case would be where gross flows (either assets or liabilities) are the same size as net flows. This would occur if either resident or non-resident flows were completely restricted. In this case, the value of the index would be zero.

Substantial two-way flows may indicate that residents have the capacity to offset volatility caused by foreign investors, in part because residents hold a stock of foreign assets. If residents do not invest abroad, they lack the capacity to initiate either capital outflow (when they invest) or capital inflow (when they repatriate). Thus, more substantial investment by domestic residents abroad may provide a natural hedge to manage capital flow volatility. The extent of gross flows may also reflect the degree of market development. For example, it would be unrealistic to expect portfolio debt flows to play a major part in smoothing capital flows in economies that do not have well-developed domestic bond markets. Furthermore, the extent of gross capital flows reflects the degree of capital account openness – the less open the capital account, the less scope there is for shocks to one type of flow to be offset by changes in other flows.

Care also needs to be exercised in interpreting the policy implications of the index. Some flows might record a low index due to capital account restrictions,

while others might register a low index because either resident or non-resident flows are inhibited due to a lack of market development. While a policy implication of the latter might be to foster market development, for the former, the outcome already reflects a deliberate policy choice. Furthermore, it is important to understand the composition of the index. For example, economies that are natural destinations for foreign direct investment such as Australia and Mongolia will have more non-resident inflows than resident outflows and hence score relatively low on this index. The data can also be sensitive to the data sample given the volatility in capital flows data.

Leaving aside changes in foreign exchange reserves, the private capital flows in the Asia-Pacific region vary in their openness and diversification from relatively closed or one-sided to open and well diversified. The most closed economies are the Philippines, China and India, while Korea, Thailand and Hong Kong are open by this measure (Figure 12). The remaining economies are somewhat mixed for a variety of idiosyncratic reasons.

Figure 12

Private Capital Account Balance Openness

Source: author's calculations.
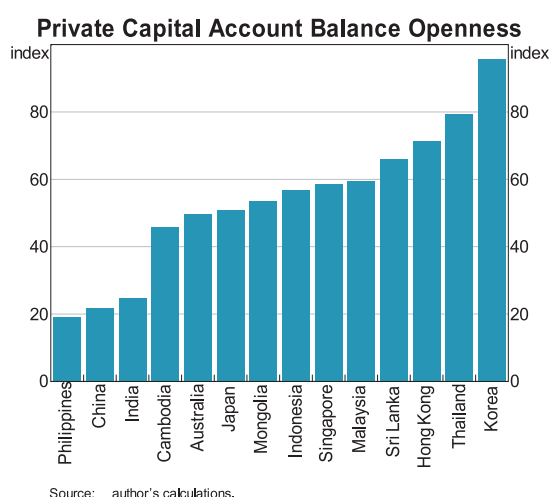
Importantly, while we would expect those economies with a higher openness score to be better suited to accommodating capital account shocks, there are important idiosyncratic factors to consider. A very open economy might still experience disruptions from capital flow reversals if the underlying flow arose due to market distortions or a misalignment of macroeconomic fundamentals and policy. Conversely, a relatively closed economy might have more policy tools to address sudden developments in the capital account.

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Appendix 3 – Banking-related Claims on SEACEN Members by Source

Several SEACEN member economies can be flagged as having notable exposures to the main banking centers in industrialized economies. For example the financial hubs of Hong Kong and Singapore are significantly integrated with other major banking centers in Europe, Japan and the United States, as are Chinese Taipei, Malaysia, and Korea.

Table 5

Claims of Major Banking Jurisdictions on SEACEN Economies*

Per cent of GDP, as at end 2014

	Europe	Japan	United States	G3
	% of GDP	% of GDP	% of GDP	% of GDP
Brunei	17.1 #	0.0	3.7 #	20.8
Cambodia	1.7	0.0	0.1	1.8
China	3.3	0.8	1.0	5.1
Chinese Taipei	15.5 #	4.9 #	7.8 #	28.2
Fiji	0.1	0.0	0.0	0.1
Hong Kong SAR	150.3 #	22.0 #	19.2 #	191.5
India	6.0	1.4	3.9 #	11.2
Indonesia	3.7	2.8 #	1.7	8.2
Laos	1.8	4.6 #	0.0	6.4
Malaysia	18.6 #	6.4 #	4.7 #	29.7
Mongolia	5.1	0.0	0.4	5.5
Myanmar	0.1	0.0	0.0	0.1
Nepal	0.6	0.0	0.0	0.6
Papua New Guinea	4.4	4.6 #	0.2	9.2
Philippines	5.4	2.6	3.0 #	10.9
Singapore	70.4 #	16.1 #	21.3 #	107.8
South Korea	8.5 #	3.9 #	6.2 #	18.6
Sri Lanka	7.9	0.2	0.8	8.9
Thailand	4.7	20.3 #	2.6	27.6
Vietnam	6.2	2.7 #	1.0	9.9
SEACEN total	8.5	2.6	2.8	13.9
SEACEN total (US$ billion)	1,470	441	482	2,394

* Consolidated foreign claims of reporting banks on individual economies
 by nationality of reporting banks; amounts outstanding; ultimate risk basis.
Notable position vis-a-vis foreign banking sectors.

Sources: BIS; IMF.

Other notable exposures are those of Brunei to Europe; Indonesia, Laos, PNG, Thailand, and Vietnam to Japan; as well as the exposures that India and the Philippines have to the United States. Shocks that affect the source economies are important in the interpretation of potential vulnerabilities of the destination economies.

Appendix 4 – Direct Financial Exposure to the US Economy

Direct financial exposure to the US economy is one relatively transparent way to calibrate the potential response of capital flows to a normalization of monetary policy by the Federal Reserve. Previous work on such a measure can be found in Bluedorn et al. (2011). We build on this work to ascertain a more refined understanding of direct portfolio linkages between the United States and SEACEN member economies.

The value of these different measures is interpreting them in conjunction to better understand the nature of exposures to US investors and US financial instruments. This should be useful information when forming a view about the likely response of capital flows to Federal Reserve normalization of monetary policy. Note also that the calculation of these indices is restricted to portfolio positions and does not encompass foreign direct investment or bank and money market flows. Since we expect the response of different financial flows to be sensitive to different determinants, we prefer to investigate exposures separately.

Direct Gross Exposure to US Economy (DGE) – sum of gross US investments (resident and non-resident, or US assets and US liabilities) as a share of the total gross international investment position of each SEACEN economy:[28]

$$DGE_i = \frac{\left(\sum_{k=1}^{K} A_{US,i}^k + L_{US,i}^k\right)}{A_i + L_i}$$

where the direct gross financial exposure to the United States (DGE_i) is measured as the sum across a universe (K) of US portfolio assets and liabilities (denoted as $A_{US,i}^k$ and $L_{US,i}^k$) for each SEACEN economy i. The US portfolio instruments considered (k) are equity, short-term debt, and long-term debt. These US assets and liabilities are expressed as a share of the total international portfolio position of SEACEN economy i (denoted as A_i and L_i).[29] Note, for example,

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28. This first metric of direct exposure follows the work in Bluedorn and others (2011). The remaining measures are augmented by SEACEN to refine the analysis and to overcome some of the shortcomings identified in the gross measure.

29. The data source for the SEACEN member international investment position is the IMF. Data for the position of US residents in SEACEN economies (US assets) and SEACEN positions in the US (US liabilities) are taken from the US *Treasury International Capital System (TIC)* database available online at
http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/fpis.aspx#usclaims.

that if economy i's foreign assets were entirely held as US Treasuries (a US resident liability) then $A_i = L^k_{US,i}$ and if US residents were the only foreign investors in economy i, then $A^k_{US,i} = L_i$. In an extreme case where both of these examples occur, the calculated index would be equal to one. The index tends toward zero as the importance of the United States declines in the international investment position of an economy.

A shortcoming of this measure of direct exposure is that it is unable to differentiate between the relative composition of assets and liabilities. For example, an economy such as China might have a large stock of US assets in the form of reserves held in US Treasuries but because its capital account remains relatively closed to non-resident investment, has only very few liabilities to US residents. However, the index calculated for China might have the same value as for an economy that has very few US assets but instead a large stock of liabilities owing to US residents. Whereas the former implies that the normalization of US monetary policy might have no effect at all on the reserve decisions of the People's Bank of China, and hence capital movements, the latter example might imply significant capital outflows for an economy with the opposite asset-liability composition. Gross assets and gross liabilities are treated equally while they clearly have different implications for the expected response of capital flows. Consequently, the quantitative results of the Bluedorn et al. (2011) study are difficult to interpret reliably.[30]

The supplementary metrics developed by SEACEN outlined below attempt to overcome this shortcoming measure by separating assets and liabilities, and by calculating a net position.

Direct Liability Exposure to US Economy (DLE) – US investments (non-resident) in SEACEN economy, as a share of international liabilities of SEACEN economy:

$$DLE_i = \frac{\sum_{k=1}^{K} A^k_{US,i}}{L_i}$$

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30. Also note that while the IMF constructed metric for direct financial exposures to the US encompasses all positions, we restrict our measure to portfolio positions in equity and debt. One could reasonably expect that foreign direct investment and banking-related positions respond differently to portfolio investment. An aggregate metric might, therefore, be difficult to interpret.

This measure calculates the direct exposure of SEACEN economies to the United States through the liabilities owing to US residents (from the perspective of SEACEN residents). It is essentially a measure of gross outflow exposures if US residents choose to repatriate their investments (assets) in SEACEN economy *i* due to changes in US returns (which might be linked to developments in US monetary policy settings).

Direct Asset Exposure to US Economy (DAE) – SEACEN economy investments (resident) in US economy (US liabilities), as a share of total international assets of SEACEN economy:

$$DAE_i = \frac{\sum_{k=1}^{K} L_{US,i}^k}{A_i}$$

This measure calculates the direct exposure of SEACEN economies to US assets (e.g., the value of US Treasuries held as reserves). It is a simple measure of how important the United States is in the overall composition of foreign assets for SEACEN economies.

Direct Net Exposure to US Economy (DNE) – net US investments (resident and non-resident) in SEACEN economy, as a share of net international investment position of SEACEN economy:

$$DNE_i = \frac{\left(\sum_{k=1}^{K} A_{US,i}^k - L_{US,i}^k\right)}{A_i - L_i}$$

This net measure avoids the problems of the DGE measure proposed by Bluedorn et al. (2011) but also has some shortcomings. Note that insofar as a SEACEN member has a net international investment position where assets and liabilities are of a similar magnitude (e.g., Korea) the denominator of the index approaches zero and pushes the index toward infinity.

Appendix 5 – US Federal Reserve Tightening Cycles

Since 1990, we identify four distinct tightening cycles in US monetary policy. The Federal Reserve raised nominal short-term interest rates in the mid-1990s, late-1990s, early-2000s and mid-2000s (Figure 13). Each cycle had a different starting point (trough), speed of adjustment, and end (peak).

Figure 13
Effective U.S. Federal Funds Rate

Source: U.S. Federal Reserve Board.
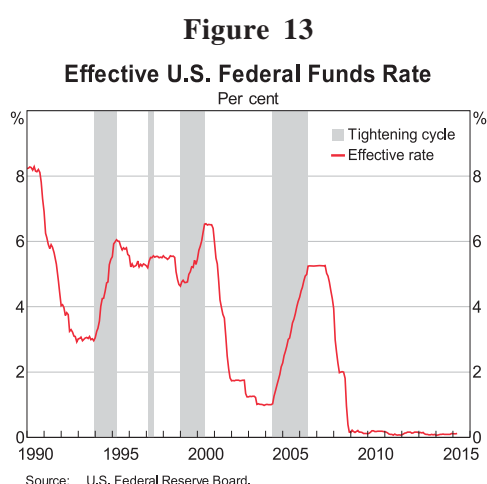
The cycles are defined by the quarter in which the Effective Federal Funds Rate first increased and the quarter in which it peaked (Table 6). No attempt is made to differentiate between the sizes of the rate increase in each quarter we examine. Apart from the very short cycle in the late-1990s, this does not appear to matter substantially as rates typically rise by an average of around 50 basis points per quarter.

Table 6
US Monetary Policy Tightening Cycles

	Trough or start		Peak or end		Duration	Extent	Average
	Date	Per cent	Date	Per cent	(a) no. of qtrs	(b) change bps	(b) ÷ (a)
Mid-1990s	Mar-94	3.00	Jun-95	6.00	6	300	50
Late-1990s	Mar-97	5.25	Jun-97	5.50	2	25	12
Early-2000s	Mar-99	4.75	Jun-00	6.50	6	175	30
Mid-2000s	Sep-04	1.00	Sep-06	5.25	9	425	50

Sources: US Federal Reserve; author's calculations.

Appendix 6 – SEACEN and Working Group Membership

Since its inception in the early 1980s, The South-East Asian Central Banks (SEACEN) Research and Training Centre has established its unique regional position in serving its membership of central banks in the Asia-Pacific region through its learning programs, research work, and networking and collaboration platforms for capability building in central banking knowledge. Over the years, SEACEN has built a wide network base, with whom the Centre collaborates in the design and delivery of its programs in central banking knowledge areas (Macroeconomic and Monetary Policy Management; Financial Stability and Supervision; and Payment and Settlement System) and Leadership and Governance.[31]

Regular Members:

SEACEN membership has grown to 20 central banks/monetary authorities.

1. Autoriti Monetari Brunei Darussalam
2. National Bank of Cambodia*
3. People's Bank of China
4. Reserve Bank of Fiji
5. Hong Kong Monetary Authority
6. Reserve Bank of India
7. Bank Indonesia*
8. The Bank of Korea*
9. Bank of the Lao PDR
10. Bank Negara Malaysia*
11. The Bank of Mongolia*
12. Central Bank of Myanmar
13. Nepal Rastra Bank
14. Bank of Papua New Guinea
15. Bangko Sentral Ng Pilipinas*
16. Monetary Authority of Singapore
17. Central Bank of Sri Lanka*
18. Central Bank, Chinese Taipei*
19. Bank of Thailand*
20. State Bank of Vietnam

Associate Members:

SEACEN has 7 Associate Member Central Banks/ Monetary Authorities that are invited regularly to participate in all SEACEN learning programs as well as the annual SEACEN Governors' Conference/High-level Seminar.

1. Reserve Bank of Australia*
2. Bangladesh Bank
3. Royal Monetary Authority of Bhutan
4. Monetary Authority of Macao
5. State Bank of Pakistan
6. National Reserve Bank of Tonga
7. Reserve Bank of Vanuatu

Observers:

SEACEN also has 8 Observer Central Banks/ Monetary Authorities which are invited regularly to participate in all SEACEN training programs.

1. Da Afghanistan Bank
2. Central Bank of Islamic Republic Iran
3. Bank of Japan
4. Maldives Monetary Authority
5. Reserve Bank of New Zealand
6. Central Bank of Samoa
7. Central Bank of Solomon Islands
8. Central Bank of Timor-Leste

* Members with representation on the working group

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31. Refer also to SEACEN's website: http://www.seacen.org/

The project team for *"Living with Volatilities: Capital Flows and Policy Implications for South-East Asian Central Banks (SEACEN)"* was led by a Visiting Research Economist, with 13 participating economists across 9 member central banks and The SEACEN Centre.

Visiting Research Economist
Reserve Bank of Australia
Mr. Chris Becker
Head of Domestic Portfolio and Liquidity Analysis

National Bank of Cambodia
1.　　Mr. Oudom CHENG
Section Chief
International Economic Research Division
Economic Research and International
　　　Cooperation Department

Bank Indonesia
2.　　Ms. Francisca Hastuti
Deputy Director
Central Bank Education and Research Center
Central Banking Research Group

Bank of Korea
3.　　Dr. Kim Young Ju
Capital Flows Analysis Team
International Department

Bank Negara Malaysia
4.　　Mr. Sim Wee Haw
Senior Economist
Monetary Policy Department

Bank of Mongolia
5.　　Ms. Munkhchimeg Sukhee
Economist
Balance of Payment Statistics and Research
Division
International Economic Department

Bank of Mongolia
6.　　Mr. Tsenguunjav Byambasuren
Economist
Balance of Payments Division
International Economic Department

Bangko Sentral ng Pilipinas
7.　　Mr. Angelo Paolo T. Kalaw
Senior Research Specialist
Department of Economic Research

Central Bank of Sri Lanka
8.　　Mr. Harsha Paranavithana
Senior Economist
International Finance Division
Economic Research Department

Bank of Thailand
9.   Ms. Chanaporn Sereevoravitgul
Senior Economist,
Financial Stability Team 1-2,
Macroeconomic and Monetary Policy Dept,
Monetary Policy Group

Bank of Thailand
10.   Ms. Pim-orn Wacharaprapapong
Economist
Macroeconomic and Monetary Policy
Department
Monetary Policy Group

Central Bank Chinese Taipei
11.   Mr. Ti-Jen Tsao
Senior Economist
Department of Foreign Exchange

The SEACEN Centre
12.   Dr. Vincent Lim
Senior Economist
Research and Learning Contents

The SEACEN Centre
13.   Ms. Nurulhuda Mohd. Hussain
Economist
Research and Learning Contents

In this paper, the grouping referred to as 'South-East Asia' includes Australia, Cambodia, China, Chinese Taipei, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Mongolia, the Philippines, Singapore, Sri Lanka and Thailand.

Chapter 2

CAPITAL FLOW VOLATILITY AND ITS IMPLICATIONS FOR THE CENTRAL BANK – THE CASE OF CAMBODIA

By
Oudom Cheng[1]

1. Introduction

With the ending of the prolonged civil war in 1999 and restoration of full political stability, the Royal Government of Cambodia (RGC) introduced many social and economic reforms to create a sustainable path for economic growth through the attraction of private sector investment. As a result, Cambodia has achieved a remarkable economic growth which averaged 8.3%[2] over the last 15 years. The growth had been supported mainly by the continuance of foreign direct investment (FDI) inflowsm,[3] particularly into the garment, tourism, agriculture and real estate sectors. Although Cambodia has grown rapidly as a result of its industrial development, its economy is highly dependent upon external factors, and thus is more vulnerable to global business cycles (Khou, Cheng, Leng and Meng, 2015). In particular, exports of garments, tourism, construction, and exports of agricultural products are highly susceptible to external shocks. Evidently, the recession in many of its export markets and the bust in its domestic real estate market (Hem, 2013) reduced Cambodia's GDP growth rate to just 0.1% in 2009 from 6.7% in 2008.

Since 2010 onwards, Cambodia, like other countries in the region, has recovered from the recession and has been receiving higher capital flows into the country (Madhur, 2014), especially through banking channels.[4] Capital inflows

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1. Economist / Section Chief, International Economic Research Division, Economic Research and International Cooperation Department, National Bank of Cambodia.

2. Source: National Institute of Statistics, Cambodia.

3. Official development assistances still play an important role in Cambodia's economic rehabilitation.

4. "Although bank-related flows are just one component of overall capital flows, they are an especially procyclical and volatile one that is important for transmitting financial conditions" (Committee on International Economic Policy and Reform, 2012). Alfaro, Kalemli-Ozcan Volosovych (2005) in their study found that bank credit tends to increase capital flows volatility.

have been a major contributor to Cambodia in developing its economy. However, it has also led to challenges for monetary policy and financial stability in Cambodia (Madhur, 2014). The surge in these kinds of flows is believed to be mostly in short-term types, and thus can be questioned whether they are sustainable or can be reversed in the near future. On the other hand, there have also been concerns over external shocks that can spill over to Cambodia and trigger capital outflows, such as the monetary policy normalization (increase interest rate) by the Federal Reserve of the United States within the next quarters.

Given the increasing capital flows to Cambodia, this paper aims at answering how best to accommodate the capital flows with minimal effects on the macroeconomy by focusing on its implications for Cambodia's Central Bank (National Bank of Cambodia – NBC). To answer this question, this paper will first identify the volatility of the total flow as well as the level of volatility of each composition of the capital flows to see whether the total net capital flows are volatile and which types of flow are inherently volatile contributing to the volatility of the total net flows. We next move on to investigate how the normalization of monetary policy in the U.S. may impact on capital flows in Cambodia. Thirdly, the study will investigate the emerging vulnerabilities and potential risks arising from the recent capital flows as well as the risks that may arise from the normalization of the U.S monetary policy. The paper then discusses the necessary policy options to address those risks and vulnerabilities, if any.

This rest of the paper is organized as follows. Section 2 provides the recent development of capital flows in Cambodia. Section 3 reviews the previous studies on the capital flows volatility and their determinants. Section 4 describes the data used, sources and the methodology used to analyze the volatility of capital flow components and the degree of exposure to the U.S economy, together with the results of the analysis. Section 5 draws on the results from the analysis in Section 4 to identify the risks and vulnerabilities related to the current trend of capital flows and the possible impact of the U.S monetary policy normalization and raise the implications of the results for central bank's policies. Section 6 proposes feasible policy responses to address those risks and vulnerabilities. The final section summarizes the findings and concludes the paper.

2. Recent Developments of Capital Flows in Cambodia

2.1 Capital Flows into Cambodia

Cambodia has persistent current account deficit due to its high demand for imported goods while its exports of goods have been increasing, but at a lower level compared to imports. Although net service surpluses have been recorded over the past years, the amount are relatively small and cannot off-set the amount of imports into Cambodia.

To finance the persistent current account deficits, Cambodia has received continuously large capital inflows mainly in the forms of official development assistance (ODA), FDI and banking and money market (BMM) flows. However, Cambodia has only a very small proportion of portfolio investment.

Net capital inflows into Cambodia have been increasing moderately since 2005, but subsequently declined in 2009 due to the impact of the global financial crisis. However, it recovered quickly a year after that and accelerated to reach the highest level in 2012. Net capital flows declined slightly in the second half of 2013 but bounced back quickly in the last quarter.[5] So far, there are no inflows of portfolio equity and portfolio debt into Cambodia because Cambodia has just launched its stock exchange in 2012 and there are only two companies listed in the stock exchange. From Figure 1, Cambodians have been investing in portfolio equity overseas, but the amount has been very small averaging only around 0.2% of GDP per annum during 2005 to 2013.

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5. In 2013, Cambodia held its national election. After the election, there were some strikes and demonstrations over the result of the voting. During this period, there was a lot of deposit withdrawals from the banks.

Figure 1
Balance of Payments Compositions (as% of GDP)
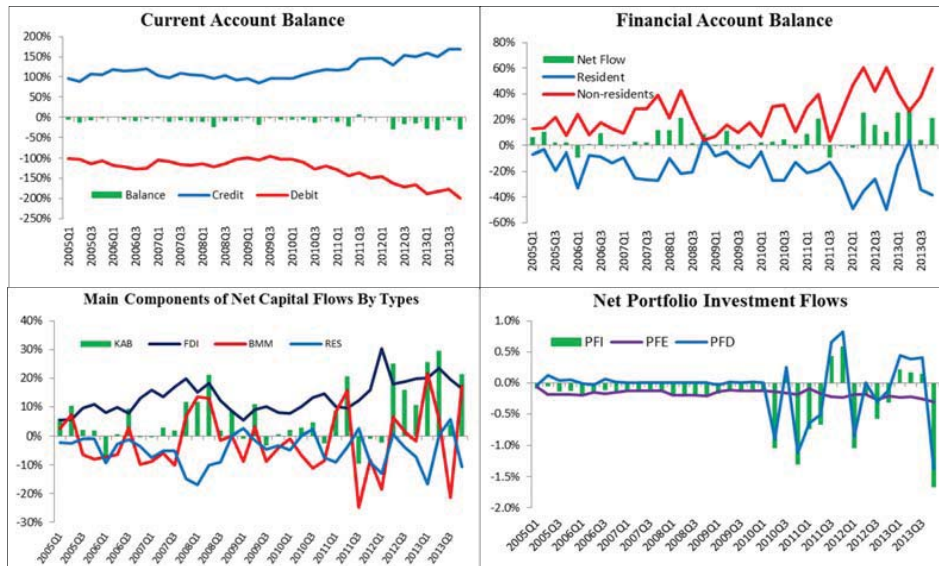
Source: International Monetary Fund.
Note: KAB denotes capital account balance, foreign direct investment as FDI, portfolio equity as PFE, portfolio debt as PFD, bank and money market flows as BMM, and the change in official reserve assets as RES.

For the same period, Cambodians have been lending abroad through portfolio debt averaging annually at only 0.1% of GDP. This amount is very small compared to the flows of FDI averaging at 13.5% of GDP and bank and money market or other investments (BMM)[6] has an annual average of 1.7% of GDP. It is noticeable that the portfolio debt flows have been very active starting from 2009 which was the period during which Cambodia began its recovery from the impact of the global financial crisis. The debt flows have been attributed to foreign trade channeling through banks.

Among the total net inflows of capital into Cambodia, FDI has been the major contributor followed by BMM flows and reserve asset flows, while there has been no Portfolio Investment (PFI) by non-residents into the country due to the absence of an active financial market.[7]

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6. In Section 4 on the methodology and results, we explain why other investment flows is labeled as BMM.

7. Cambodia has just launched its financial market in late 2012 with only two companies listed in its stock exchange. Other financial instruments, such as bonds, are non-existent to date.

2.2 Capital Flows by Residency

Figure 2
Main Compositions of Capital Flows by Residency (as% of GDP)
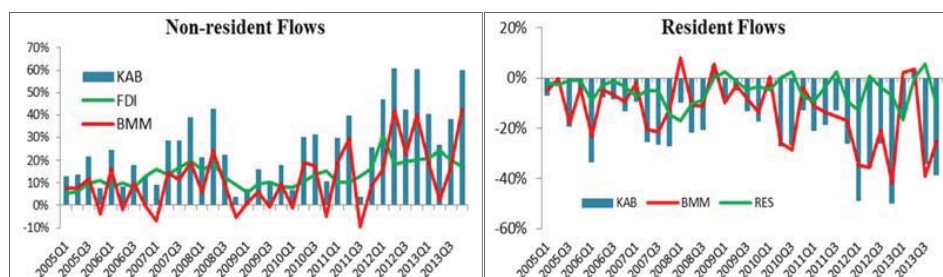
Source: International Monetary Fund.

Categorizing non-resident flows, FDI inflows were stable during the 2009 crisis-hit period but it then surged and has been increasing over the last five years. However, in 2014, the gross FDI inflows slowed down a little due to the effect of the political situation in 2013. However, for BMM (Other investments), it did drop during 2009, indicating the withdrawal of investments by non-residents. However, it resumed after that. It is observed that the BMM flows have been contributing more and more shares to the total gross inflows, surpassing FDIs. Looking at the resident flows to other countries, the most noticeable outflows is the BMM outflows while the rest of the components of capital outflows are very small in proportion, which is negligible.

3. Literature Review

To date, there is a large body of literatures on capital flows.[8] The studies have examined the internal and external factors that cause capital flows to surge or diminish in the emerging market economies, including the developing Asian economies. Recently, more and more studies have begun to assess the effect of domestic and external factors on the volatility of capital flows directly in addition to their volumes. However, there are not many case studies conducted so far for individual countries.

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8. For definition of capital flows, see Turner (1991) page 31.

Among the few studies, Claessens, Dooley and Warner (1995) analyzed a sample of five industrial and five developing countries using some simple univariate statistical methods to study the predictability of the flows with the purpose of investigating whether a certain type of capital flow is more volatile (hot) that others (cold). Their findings suggest that information about the overall capital account is independent of the composition of flows. Their evidence pointed out that capital flows are highly substitutable and endogenous with respect to external shocks and internal policies.

Deviating from other previous researchers on capital flows, Bekaert and Harvey (1997) constructed a panel data set of 20 emerging market economies where the independent variable is the estimated volatility obtained through GARCH type estimation, rather than a rolling window to estimate the determinants of stock market volatility. Their results showed that capital market increased the connection between the local market and the world market but did not increase the volatility in the local market.

Later in 2005, Alfaro, Kalemli-Ozcan, and Volosovych (2004 and 2005) pooled data from the advanced and emerging economies and fitted a series of cross-country regressions, focusing on total equity flows to measure both the determinants of capital flows and their volatilities. To measure volatility, they divided the standard deviations of the total equity inflows per capita by the gross mean for the sample period. Their studies both in 2004 and 2005 found that the importance of institutional quality has direct impact on FDI while strong macroeconomic policies can help stabilize the volatility of capital flows.

Broner and Rigobon (2005) conducted their study on a sample of 58 countries to explain why capital flows are more volatile in the emerging countries than advanced economies. They used the standard deviation method in computing the volatility of capital flows. After fitting cross-country regressions, they concluded that the emerging countries' capital flows are explained by persistence of shocks, and the shocks are subjected to contagion effects. Domestic and international macroeconomic variables explain very little of the dynamics of capital flows into the emerging market economies. However, specific country characteristics explain a significant amount of the unconditional volatility of capital flows across countries. More interestingly, they explained that capital flows volatility, especially in the emerging market economies were all related to underdevelopment of the domestic financial markets, weak institutions, and low income per capita.

Another study in 2006 by Neumann, Penl, and Tanku, examined the impact of financial liberalization on capital flows' volatility, measured as the standard deviation of capital flows on GDP within a five-year rolling window for FDI, portfolio and other debt flows. Analyzing a set of panel data of 26 countries including 15 mature and 11 emerging market economies, they found that portfolio flows have little response to capital account liberalization, while the liberalization tend to significantly increase volatility in FDI flows.

The International Monetary Fund (IMF) in its 2007 Global Financial Stability Report also conducted the analysis of both the determinants of capital inflows as well as its volatility on a set of 56 countries including both the developed and emerging market economies. It used the generalized method of moments (GMM) technique of which the lagged values of independent variables were used instruments. Their results pointed that the higher the level of financial openness, the more open the economies and increased global liquidity can likely lower the level of capital flows volatility.

Following Bekaert and Harvey (1997), Broto, Diaz-Cassou and Erce-Dominguez (2008a), in their paper titled "The Source of Capital Flows Volatility," examined the determinants of volatility of capital inflow components in the emerging countries using the GARCH model type on a panel data set of 48 emerging and developing countries. Their results revealed that global factors influence the volatility of both portfolio and other flows significantly while there was no impact on FDI. Noticeably, they also found that a developed financial system can reduce the volatility of portfolio flows and that FDI and domestic banking sector's volatility seemed to substitute each other.[9]

Later, Broto, et al. (2008) in their study paper "Measuring and Explaining the Volatility of Capital Flows Towards the Emerging Countries," looked at 48 emerging and less developed countries. In measuring the capital flows volatility, Broto, et al. (2008) employed a computed absolute value of residuals from an autoregressive integrated moving average (ARIMA) model estimated for every country and type of capital flows on a quarterly basis. Their results showed that global factors, beyond the control of the emerging economies, have come to play a more significant role in driving volatilities than country specific factors, such as the global growth and inflation, U.S. interest rate, global stock market movements, etc. On the domestic side, economic and political stability were

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9. "Results also signal to a negative relation between competition on the domestic banking sector and FDI volatility," (Broto, Diaz-Cassou and Erce-Dominguez, 2008).

found to reduce the volatility of capital flows but increases that of other flows; less competition in the domestic banking systems increases FDI's volatility while reducing that of other flows.

In 2009, Becker and Noone wrote a paper on "Volatility in International Capital Movements" using data set of 6 industrialized and 6 emerging economies to examine whether different types of capital flows have inherent characteristics that make the total capital flows volatile. Through the analysis using some statistical properties, they found that no specific type of flows can explain the overall capital flows. Their findings on the industrialised countries were in contrast to the findings on the emerging market economies in that the volatility of the individual components of capital flows increase in a substitutional way to one another while this was not the case for the emerging economies.

Most recently, Mercado and Young Park (2011) conducted a study focusing on developing Asia using a panel data regression on 50 emerging market economies to find out the driving forces of the size and volatility of FDI, portfolio flows, and other investment flows into the emerging market economies by focusing on Asia. Using the GMM where lagged values of independent variables were instrumented in the equation, the authors could avoid the influence of variables on the two sides of equations on each other. Their findings showed that trade openness increases the volatility of all types of capital flows, while change in stock market capitalisation, global liquidity growth, and instutional quality lowers the voality. They also concluded the case found for the emerging Europe and Latin America that regional economic cooperation and policy coordination can be an important element in designing a policy framework to manage capital inflows in the emerging economies.

Summing up all the results from the studies above, we can observe that the factors that contribute to the increase in capital flows volatility are much related to bad domestic policies (Alfaro, Kalemli-Ozcan and Volosovych, 2004), underdevelopment of domestic financial markets, weak institutions, and low income per capita. The results seemed to be mixed since some other studies found that trade openness increase volatility of portfolio and other flows significantly, but not for FDI. On the contratry, the study by Neumann, Penl and Tanku (2006) found that capital account liberalisation which represents higher openness of the economy and financial sector increases volatility in FDI flows significantly, but not for portfolio flows. Bekaert and Harvey (1997) also verified this in their findings that capital market development does not increase the volatility in the local market.

Looking at the external factors, global factors which are beyond the recipient countries' control, influence significanctly in driving volatilities of both portfolio and other flows significantly, while there was no impact on FDI. This finding is consistent with the nature of FDI that it is long term in nature and thus will not likely be affected by short-term external shock, mainly the global change in prices.

Factors that can reduce the volatility of capital flows include developed financial system (including higher stock market capitalization), while economic and political stability were found to reduce the volatility of capital flows but increases that of other flows. Similar to the findings by Alfaro, Kalemli-Ozcan and Volosovych (2004) which is related to institutional matter, less competition in domestic banking systems increases FDI's volatility while reducing that of other flows (Broto, Diaz-Cassou and Erce-Dominguez, 2008). Institutional quality encourages FDI inflows while strong macroeconomic policies can help stabilize the volatility of capital flows (Alfaro, Kalemli-Ozcan and Volosovych, 2005). Moreover, the higher the level of financial openness, the more open the economies, and the increase in global liquidity can likely lower the level of capital flow volatility (Mercado and Young Park, 2011).

4. Data, Methodology and Results

4.1 Data and Description

In this paper, the quarterly balance of payments data for Cambodia will be used for the analysis. The data cover the period from the first quarter of 2005 to the fourth quarter of 2013 which is the most up-to-date data span available. The data are obtained from the International Financial Statistics (IFC) of the IMF. The analysis focuses mainly on net capital flows[10] in order to identify the direction of the flows and their channels. This paper will use the standard balance of payments identity with the following form:

$$CAB = KAB = FDI + PFE + PFD + BMM + RES + DER$$

Here, the current account balance (CAB) will be identical to the capital account balance (KAB). That is, CAB=KAB. The components of the capital account balance are foreign direct investment (FDI), portfolio equity (PFE),

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10. As can be seen in Section 2 concerning the recent developments of capital flows in Cambodia, only BMM and RES have noticeable outflows. Therefore, this paper would use net flows.

portfolio debt (PFD), bank and money market flows (BMM), the change in official reserve assets (RES), and derivative flows (DER). BMM represents 'other investments' in the accounts published by the IMF but this label is not informative. Hence the paper will use the term BMM instead.

4.2 Methodology and Results

In this paper, we first aim at identifying the size and volatility of the total net capital flow as well as each composition of capital flows to see whether the total net capital flows are volatile and which types of flows are inherently volatile (cold) and contributing to the volatility of the total net flows. We later move on to pinpoint the factors that are associated with the volatility of the total net capital flows and the compositions of the flows. The methodology that we adopt in this paper is based on the analysis of the statistical properties of capital flows employed by Claessens, Dooley, and Warner (1995); Neumann, Penl, and Tanku (2006); Becker and Noone (2009); and the latest study by Mercado and Young Park (2011). As the data type used is country-specific and limited in time span, the analysis in this paper deviates in some ways from the above researches in that more simple techniques of analysis are used to adapt to the limitation. The methodology, accompanied by each section's results, is outlined as follows:

4.2.1 Size of Capital Flows

The size of capital flows is measured by the ratio of net capital flows to nominal GDP.[11] The size of capital flows reflects its importance to the economy. As Cambodia is a net capital importer, it is of more interest to focus on the net flows or net financing because only the remaining capital in the country can have impacts on the economy.

From Figure 3, the total net capital flows to GDP has been rather slow from 2005 to 2010 but increasing over time since then. Looking at the compositions of the flows, FDI has been on an increasing trend, implying its bigger size and higher contribution to economic growth in Cambodia. Meanwhile, the size of BMM has been stable from 2005 but it started increasing from 2011 onwards. The BMM flow has been more volatile since then and exhibited net outflows, meaning that BMM has not been contributing noticeably to the domestic economy. Portfolio equity has been recording increasing net outflows as a share to GDP.

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11. Where financial and macroeconomic instability is a potential concern for the analysis in the paper, gross flows are relevant.

The portfolio debts have also been recording net outflow, however, have been moderate before 2010 but became highly volatile in its size to GDP after 2010.

From the above results, it can be seen that portfolio investment outflows have been increasing, indicating more exposure to external shock on Cambodia's wealth. On the other hand, net reserve asset outflows have been fluctuating over the period.

Figure 3
Size of Capital Flows
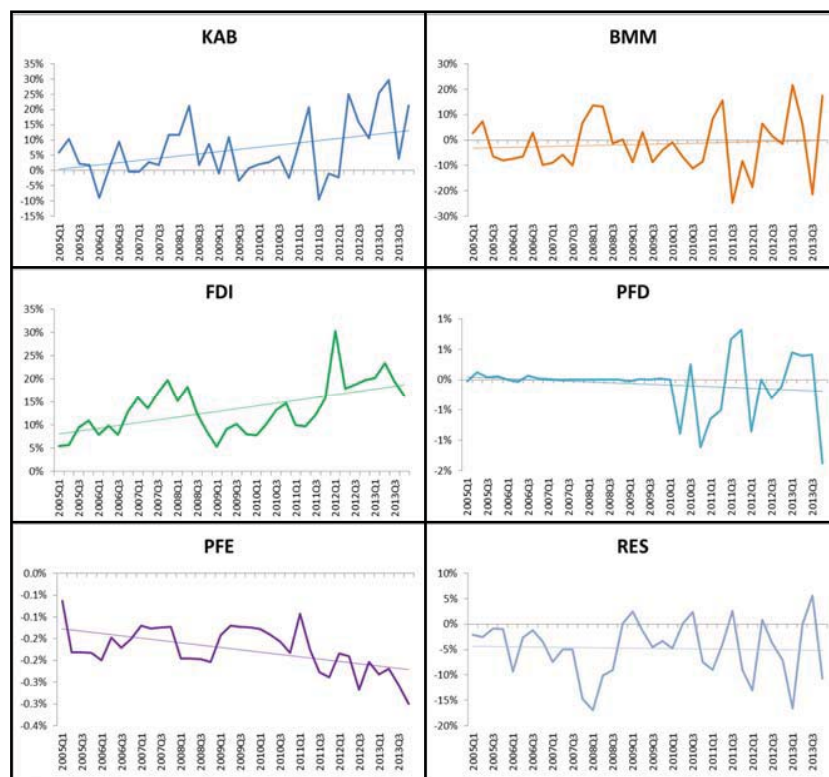
Source: Author's calculation.

It is visible that the total net capital flows and each type of the flows have dropped in 2009 and started to recover after that. This reflected that external shock had a strong impact on the flows. The magnitude is given in the following figure measured by the difference between the size of each flows in 2009 and 2008. From Figure 4, BMM dropped the most followed by FDI. In 2010, FDI

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recovered completely with an increase of up to 3.3% while the size of BMM still showed a 2.2% fall from 2009, followed by reserve asset and portfolio debt flows.

Figure 4
Magnitude of Crisis Impact and Recovery from Crisis
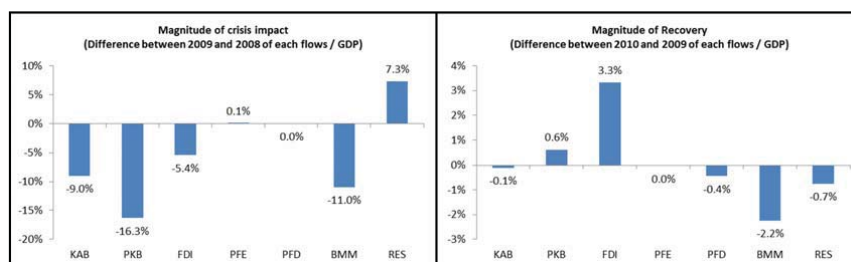
Source: Author's calculation.

What can be drawn from this section is that the size of total net capital inflows to the economy has been increasing over time to around 20% of GDP in 2013, while the major composition contributing to the flow is mainly FDI which contributed around 20% of the GDP and BMM around 6% of the GDP. On the other hand, the rest of the capital flow compositions have been exhibiting net outflows, implying that Cambodians have been investing overseas rather than in the domestic economy (See Table 1).

Table 1
Net Capital Flows to GDP

Period	KAB	PKB	FDI	PFE	PFD	BMM	RES
2005	5.1%	6.7%	7.9%	-0.2%	0.0%	-1.1%	-1.6%
2006	0.2%	4.3%	9.7%	-0.2%	0.0%	-5.2%	-4.2%
2007	3.9%	12.0%	16.6%	-0.1%	0.0%	-4.5%	-8.1%
2008	10.8%	19.8%	13.6%	-0.2%	0.0%	6.4%	-9.0%
2009	1.8%	3.5%	8.2%	-0.1%	0.0%	-4.6%	-1.7%
2010	1.7%	4.1%	11.5%	-0.2%	-0.4%	-6.8%	-2.4%
2011	4.8%	9.6%	12.0%	-0.2%	0.1%	-2.3%	-4.8%
2012	12.4%	18.2%	21.7%	-0.2%	-0.3%	-3.0%	-5.8%
2013	20.1%	25.5%	19.9%	-0.3%	0.0%	5.9%	-5.4%
Average	**6.8%**	**11.5%**	**13.5%**	**-0.2%**	**-0.1%**	**-1.7%**	**-4.8%**

Source: Author's calculation.

4.2.2   *Volatility of Capital Flows*

To measure the volatility of capital flows, we first scale the quarterly total net capital flows by the nominal GDP and then calculate the average standard deviation of the ratio over a quarterly one-year rolling window. This exercise is applied also to each composition of capital flows on their net basis.

Figure 5
Average Volatility of Capital Flows (2005 – 2013)
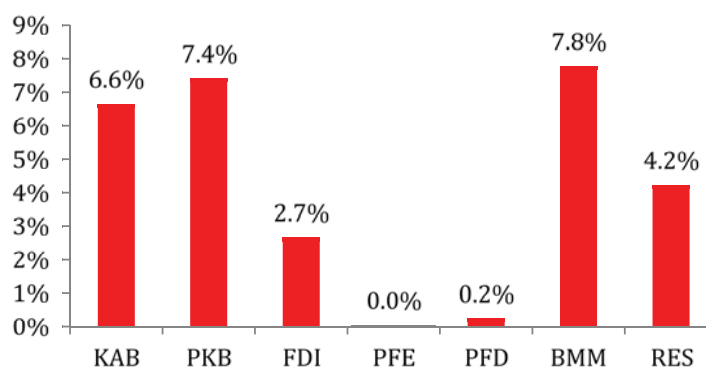
Source: Author's calculation.

The result shows that the overall capital flows are highly volatile.[12] Looking at each composition, only BMM is the most volatile item followed by the reserve asset.[13] According to Claessens, Dooley, & Warner (1995), once a component has high volatility, it is regarded as 'hot' money and is likely to reverse or stop in the short future. Therefore, BMM is then called hot money. As claimed by de Brouwer (1999) and Brecker and Noone (2008), bank lending flows are the most unstable type of flows and are prone to sudden stop. However, FDI also exhibit some degree of volatility. Portfolio debt flows and portfolio equity, according to the index calculated above, are almost not volatile at all. This can be explained by the absence of capital and money market in Cambodia. Overall, it can be drawn that the volatility in the total capital flows are driven up by the volatility in mainly the banking and money market as well as reserves and less

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12. Note that the volatility of the total capital account is often less than that of its component as it is the sum of all the components together.

13. As Cambodia is a dollarized economy, the volatility of reserve assets is common since the NBC uses foreign exchange intervention actively to stabilise the exchange rate.

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by FDI. Noticeably, the trend analysis of the standard deviation of capital flows showed that after the crisis in 2009, all compositions of capital flows have been increasingly volatile, doubled that before the crisis.

Table 2
Capital Flows Volatility by Year Blocks

	KAB	PKB	FDI	PFE	PFD	BMM	RES
2005-2008	5%	5%	2%	0%	0%	5%	3%
2009-2010	5%	5%	2%	0%	0%	5%	3%
2011-2013	10%	11%	3%	0%	1%	12%	6%

Source: Author's calculation.
Note: The one-year rolling standard deviations were averaged for each year block to show the evolution of volatility before, during, and after the global financial crisis.

4.2.3 Persistence of Capital Flows

To further identify whether the capital flows and its components are stable (cold) or volatile (hot), we calculate the autocorrelation coefficients for each flow on the net basis over the whole sample period using the quarterly flows to nominal GDP ratios and the correlations are calculated for 16 lags (quarters). Higher positive correlation compared to its past values implies that the flow is more stable (or 'cold' flow type).

Figure 6
Persistence of Capital Flows (2005 – 2013)
(Autocorrelation of net capital flows as a percentage of GDP by type)
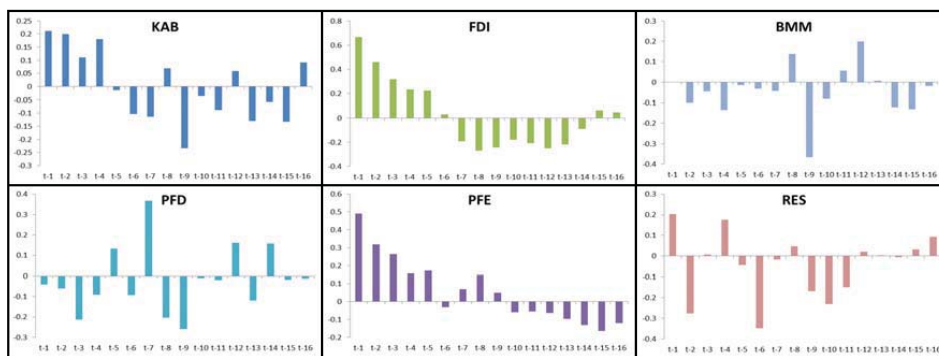
Source: Author's calculation.

The results from the autocorrelation analysis showed that total capital flows and all compositions of capital flows in Cambodia have not been persistent overall. However, it can be observed that there have been some high degrees of persistence in the total capital flows, FDI and portfolio equity before the t-4 and t-6. This implies that total capital flows are persistent for four quarters before they become volatile. However, FDI and portfolio equity are persistent for six quarters before they become volatile. All the three are only positively correlated in the short horizon. Overall, it can be drawn that among all the components of capital flows, FDI and portfolio equity are colder types compared to others (portfolio debt, BMM, and reserve assets) and, thus, less volatile.

4.2.4 Composition of Cross-border Finance

In this sub-section, we try to investigate the importance of each composition of net capital flows to the total net capital flows. The importance of each flow to the total flows is calculated by dividing the absolute value of the net flow of each composition to the sum of the absolute value of all flows in the capital account over the whole sample period. If a certain type of flow becomes more important in the total capital flows, its volatility would also influence the volatility of the total flows.

Figure 7
Importance of Each Composition to the Total Capital Flows
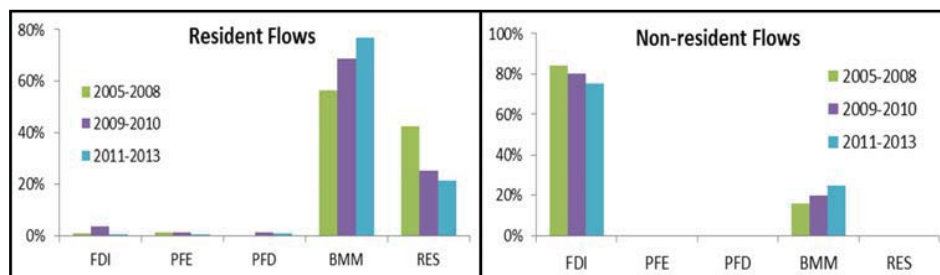
Source: Author's Calculation.

Our findings indicate that FDI has been dominating the total flows followed by BMM flow and by reserve assets in that order. The BMM flow, on the other hand, is becoming more important to the total flow in both directions (resident and non-resident flows) over time, while the inflows of FDI have been reducing its role in the total capital inflows. The increasing role of BMM over the last

decade could possibly be attributed to the higher development and integration of the banking sector. However, after the global financial crisis in 2009, it could also be driven by the increase in global liquidity.[14] According to Pradhan, et al., (2011), all the emerging market economies have attracted large inflows which suggested the importance of global liquidity as a push factor driving some of these inflows.

4.2.5 Interactions between the Compositions of Flows

To have a comprehensive view of the interaction between each composition of the flows, we estimate the cross-correlation coefficients for all the compositions of capital flows over the whole sample period. The quarterly capital flows data as a ratio to nominal GDP are used for this purpose.

Table 3
Within Capital Account Correlations (2005 – 2013)

	KAB	FDI	PFE	PFD	BMM	RES
KAB	1					
FDI	0.339017	1				
PFE	-0.31586	-0.44118	1			
PFD	-0.07197	0.06557	-0.02871	1		
BMM	0.818604	0.00871	-0.10003	-0.19671	1	
RES	-0.16059	0.39378	0.079671	0.238999	-0.46773	1

Source: Author's calculation.

Firstly, the results show that the overall capital account balance has a very strong and positive correlation with the BMM of 0.88, while it also has a positive but rather weak correlation with the FDI of 0.34. These suggest that the overall capital account flows co-move together with BMM while an increase in FDI also sees a slight increase in the total capital flows to some extent.

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14. After 2009, both the size and volatilities of capital flows have increased significantly.

On the other hand, the total capital flows are negatively correlated with the flows of reserve asset, portfolio equity and portfolio debt. Therefore, it can be said that the movement of these three types of flows have no effect on any change in the total capital flows.

FDI is found to have negligible negative correlation with all the other compositions but, to a small extent, with portfolio equity of 0.44 and reserve assets of 0.39. Its contrasting relationship with portfolio equity can be drawn that higher FDI inflows are associated with some outflows of portfolio equity for investment abroad. While the negative relationship between FDI and reserve assets is mainly reflecting that the increase in FDI results in more absorption of foreign capital into reserves through intervention.

Similarly, portfolio equity is found to be negatively correlated with portfolio debt and BMM but positively correlated with reserve assets. Portfolio debt, like portfolio equity, also has positive but rather very weak correlation with reserve assets. Nonetheless, it is difficult to make a conclusion from this. Finally, the BMM is found to be weakly, negatively correlated with reserve assets, similar to FDI, with the coefficient of 0.47. This reflects the increase in absorption of foreign capital into reserves through intervention.

4.2.6   Openness to Capital Flows

A further analysis that will add up to the previous finding is to see how open the capital account in Cambodia is. We employ the method used by Becker and Noone (2009) to create the openness index which is measured by the absolute value of the sum of gross flows to the absolute value of the sum of gross and net flows over the whole sample period. The mathematical expression of the index is shown as follows:

$Flow\ Openness_{ii}$

$$= \left[\frac{|resident\ flows_{ii}| + |nonresident\ flows_{ii}|}{|resident\ flows_{ii}| + |nonresident\ flows_{ii}| + |net\ flows_{ii}|} - \frac{1}{2}\right] \times 200$$

The notion is that the less open the capital account, the less scope there is for shocks to one type of flow to be offset by changes in other flows. When capital flows freely in both directions, the sum of the absolute gross flows will be large relative to net flows. In this case, the index tends towards 100. When capital flows are very one-sided, the gross flows will be smaller relative to the net flows, where the gross flows are the same size as net flows. In this case, the value of the index would be zero.

Figure 8
Openness Index (2005 – 2013)
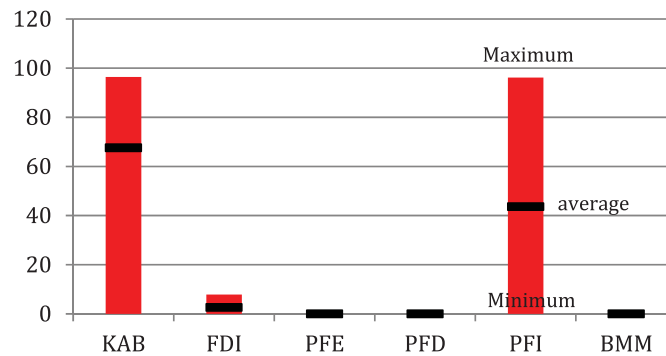
Source: Author's calculation.

Consistent with the characteristics of the flow compositions in Cambodia where FDI is one-sided and dominated by non-residents investing in Cambodia, the FDI openness index stays slightly at around 9. This shows somewhat a small degree of openness in terms of FDI. Portfolio investments, on the contrary, showed very high degree of openness at around 97. Two reasons can be offered for this high degree. One is that Cambodia's capital account regime is very open while the second explanation is that portfolio investment is very small or near zero in terms of residents' investment abroad, while the inflows of portfolio investment inflows have been persistently zero due to the absence of a formal financial market in Cambodia, as mentioned earlier. These two factors thus can cause the index to show such a high level. The portfolio investment is thus highly open but not volatile. The BMM openness index is zero, indicating that it is very much a one-sided type of flows with mainly non-residents inflows into Cambodia. Overall, Cambodia's openness degree is very close and thus is less likely for shock to affect Cambodia's overall capital flows, but a small degree to FDI.

4.2.7   Capital Flows and Economic Variables

As found in many researches, capital flows are acknowledged to bring both benefits and costs to the recipient economy. This section tries to explore the relationship between total capital flows, its compositions and some important economic variables such economic growth, inflation, exchange rate, and unemployment rate in Cambodia. The relationship is measured by the cross-

correlation coefficient between net capital flows to GDP with other variables of interest.

Table 4
Correlation Coefficient of Capital Flows with Economic Variables

	Real GDP Growth*	CPI*	Unemployment Rate*	Nominal Exchange Rate (KHR/US$)*
KAB	0.001944	0.364268	-0.17495	-0.2175
FDI	0.041997	0.499314	-0.34158	-0.53365
PFE	-0.03504	-0.51999	0.178349	0.273976
PFD	0.069938	-0.14445	0.092779	0.120919
BMM	0.032908	0.108566	-0.06038	-0.22332
RES	-0.10802	-0.06065	0.147019	0.578408

Source: Author's calculation (*sourced from the National Bank of Cambodia).

The results showed that real GDP growth has very small positive correlation with KAB, FDI, PFD, and BMM. On the other hand, the growth rate also has very small negative correlation with PFE and RES. This suggests that, in Cambodia, the GDP growth is only slightly associated with capital flows.

For price movement, the CPI in Cambodia has small and positive correlation with FDI and a slightly smaller coefficient of correlation with the overall capital flows. Also, the CPI has very small positive relationship with BMM. Although the relationship is weak, it implies that once total capital flows, FDI and BMM increase, the CPI would also increase to a small extent. This is not the case for PFE (-0.51) and PFD (-0.14) where they have negative correlation with the CPI. As we found in the earlier sections that PFE and PFD are net outflows having negative signs, the negative relationship here implies an increase in outflows. Therefore, it can be interpreted that once PFE and PFD outflows increase, the CPI decreases. This relationship is as expected in accord with the economic theory.

On the contrary, unemployment has completely opposite signs of correlation coefficient from the CPI with capital flow compositions. However, all the coefficients are small and thus exhibit weak relationship of unemployment rate with capital flow compositions. Overall, it can be said that the increase in net capital inflows such as total capital flows, FDI, and BMM is consistent with the decline in unemployment rate, while the increases in the net outflows of PFE

and PFD increase the unemployment rate. Again, this is as expected in accord with the theory.

The nominal exchange rate of the KHR/US$[15] has exactly the same signs of correlation with capital flow compositions as that of the unemployment rate and are as expected based on the theory as well. From this result, it can be interpreted that the increase in net capital inflows such as total capital flows, FDI, and BMM can lead to the appreciation in the exchange rate while the increases in the net outflows of PFE and PFD increase the depreciation in exchange rate.

Overall, it can be seen that capital flows have higher impact on the exchange rate followed by the CPI, both of which are of high interest to the central bank which is the monetary authority of the country.

4.2.8 Exposure to the U.S.

In answering how likely Cambodia can be impacted by the increase in the U.S. Federal Reserve Policy Rate (Fed Fund Rate), we first measure the exposure to the U.S. financial sector using the exposure index as described below. The data on the U.S. Holdings of Foreign Securities and Cambodia's holding of the U.S. securities are obtained from the U.S. Department of the Treasury while the data on Cambodia's international investment positions are obtained from the IFS of the IMF. So far, Cambodia holds only some U.S. assets as securities. The exposure index can be calculated using the following measures:

$$DGE_i = \frac{\sum_{k=1}^{K} A_{US,i}^k + L_{US,i}^k}{A_i + L_i}$$

The direct gross financial exposure to the United States (DGE_i) is measured as the sum of all types of securities such as equity, short-term debt, and long-term debt (K) of U.S. portfolio assets and liabilities (denoted as $AUS_{,ik}$ and $LIS_{,ik}$) with (i) representing Cambodia. To indicate how much is the exposure of the U.S. for Cambodia, the U.S. assets and liabilities are divided by Cambodia's total international portfolio position (denoted as A_i and L_i). The more important the U.S is to Cambodia's international investment position as a whole; the DGE would have a tendency towards 1 or 100% as a percentage expression.

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15. KHR represents Khmer Riels which is the local currency of Cambodia.

To distinguish the relative exposure by compositions, we calculate the exposure index by breaking down the compositions into asset, liability and net exposure, respectively.[16] To capture the outflow exposures if there could be repatriation of U.S. residents' investments once there is a change in monetary policy, we use the measurement of Cambodia's Direct Liability Exposure DLE_i to U.S. economy which can be written as follow:

$$DLE_i = \frac{\sum_{k=1}^{K} A_{US,i}^k}{L_i}$$

In measuring how much is Cambodia's holding of the U.S. securities out of its total foreign assets, the exposure index is represented by DAE_i.

$$DAE_i = \frac{\sum_{k=1}^{K} L_{US,i}^k}{A_i}$$

This measure of indicate net exposure of net Cambodia's international investment position to the U.S.

$$DNE_i = \frac{\sum_{k=1}^{K} A_{US,i}^k - L_{US,i}^k}{A_i - L_i}$$

Table 5
Direct Exposure to the U.S. (percentage)

DGE	DLE	DAE	DNE
1.9	0.0	4.4	14.2

Source: U.S. Holdings of Foreign Securities at the End of the Year from the IMF and the Department of the Treasury/Federal Reserve Board.

The exposures of Cambodia to the U.S. are very small with the highest DNE of 14.2% only. Most notable is that Cambodia has no exposure to U.S. assets. Therefore, it is expected that there will be no reversals of securities investments to the U.S. once the U.S. Federal Reserve starts to normalize its monetary policy.

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16. These measures follow that used by Bluedorn, Duttagupta, Guajardo and Topalova (2011).

5. Fact Finding on Foreign Direct Investment and Bank and Money Market Flows[17]

5.1 Bank and Money Market Flows

Since we found that the BMM flows have been the most volatile and increasing in importance to the total capital flows with its current status as the second most important composition of capital flows after FDI, thus it is very important to explore further the characteristics of this composition. In this section, we shall look at the sources of the BMM flows into and out of Cambodia. We then try to identify what are the risks and vulnerabilities related to this flow.

Here we shall focus on the liability side of the BMM flows since it can encounter reversals from Cambodia while the asset side can be withdrawn from other countries and thus will not affect Cambodia much.

5.1.1 Sources of the Non-residents Inflows of BMM

To locate the sources of the BMM, the percentage share of each source was divided by the total BMM inflows, utilizing the most up-to-date data span available from the Statistics Department of the NBC. The share then is averaged from 2007 – 2014.

Table 6
Share of Compositions of Bank and Money Market Inflows into Cambodia
(Average 2007 – 2014)

Liabilities	2007	2008	2009	2010	2011	2012	2013	2014	Average
Trade Credit	16.9%	-13.7%	39.5%	47.9%	50.3%	11.8%	37.5%	28.9%	27.4%
Government	37.6%	43.5%	62.8%	52.2%	31.1%	25.5%	37.9%	35.1%	40.7%
Bank Flows	33.3%	58.8%	-107.6%	20.9%	16.7%	49.4%	15.1%	14.5%	12.7%
Bank Borrowings	-1.8%	73.3%	-131.9%	-9.3%	1.2%	31.3%	5.7%	5.5%	-3.3%
Currency and deposits		-14.5%	24.3%	30.2%	15.6%	18.2%	9.4%	9.1%	15.9%
Others	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other	4.4%	11.4%	105.4%	-21.1%	1.8%	13.3%	9.5%	21.4%	18.3%

Source: National Bank of Cambodia.

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17. Since our data span covers only 2005 to 2013, we cannot identify the impact of the U.S. policy rate changes on capital flows in Cambodia because the U.S. Fed has reduced it policy rate from early 2007 and has been keeping it low at zero lower bound from the beginning of 2008.

The major source among the compositions of the BMM is government transaction which is a stable source and considered to be of very low risk. Besides, looking at the private BMM flows, trade credit takes up a considerable portion, indicating exposures to possibility of reversals given its short-term nature. Thirdly, banking flows are dominated by currency and deposit transactions. The currency and deposit transactions have been rather stable over time. However, bank borrowings from abroad have experienced large swings so far with its share to the total BMM increasing dramatically before the crisis and then dropping sharply also during the crisis while recovering very slowly afterwards. This clearly indicated that bank borrowings are very volatile and thus pose a risk of sudden reversals. Although the BMM is only around 1.3% of GDP,[18] the exposure of the BMM to external shock can lead to sudden reversal and thus expose the banking sector to liquidity risk.

5.1.2 *Locations of the Liabilities of Cambodian Banks*

Based on the data from the Bank for International Settlements (BIS),[19] Cambodia's banking sector has liabilities mainly to the European banks while there is very little amount owed to U.S. banks. The liabilities of Cambodia's banks are also recorded with banks in India but the amount is very small and thus negligible. Comparing to the GDP, the outstanding liabilities of Cambodia's bank to the U.S. is only 0.1% as of 2014 while it is just 1.6% to the European banks (see Figure 9). Therefore, any negative impact that may reverse these liabilities will not have much impact on Cambodia. As mentioned in the last paragraph, though, the risk of sudden reversal may post a liquidity problem should there be external shock, especially channeling from Europe.

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18. Which was found in the section on composition of cross-border finance.

19. In this section, the data on foreign inflows and outflows are only available in aggregate forms and thus could not indicate where the flows come from and go out to.

Figure 9
Foreign Claims on Cambodian Banks (US$ million)
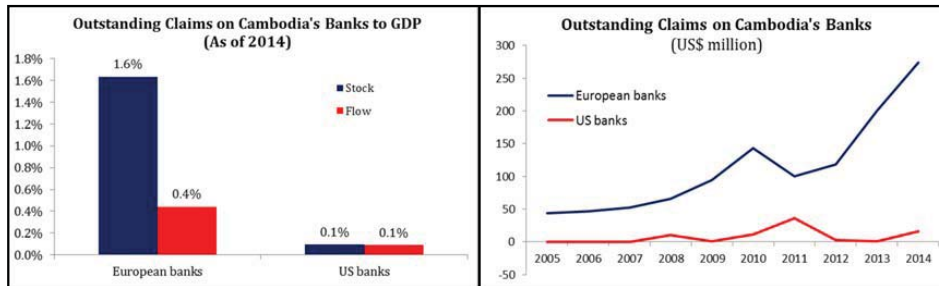
Source: Bank for International Settlement.

As Figure 9 showed, the 2011 European debt crisis (mainly caused by the Greece debt crisis) led to sharp withdrawal of European bank lending to Cambodia.

5.2 Foreign Direct Investment Flows

Although it is less volatile, FDI, as we found, has been accounting for the largest proportion of the total capital flows and accounting for a large share to GDP of around 13.5% on average over the last decade. The FDI in Cambodia is fully financing the current account deficit along with official development assistance (IMF, 2014). The swing in FDI can have big impact on Cambodia's economic growth. In this Section as well, we focus on the net inflows of FDI because Cambodian direct investment abroad is relatively small compared to FDI into Cambodia.

Figure 10
Foreign Direct Investment Flows (US$ million)

Source: International Monetary Fund.

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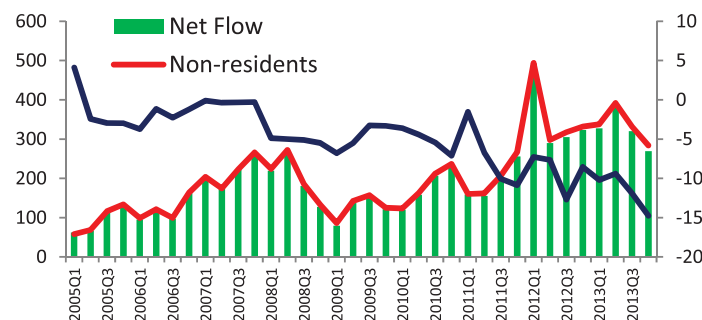
5.2.1 FDI Inflows by Sector and by Countries

From Table 7 below, the top ten countries investing in Cambodia are from Asia while the U.S. investment inflows in Cambodia are ranked at No. 11 and averaged at only 2% of the total FDI inflows.

Table 7
Share of FDI in Cambodia to its Total by Country

No.	Country	2008	2009	2010	2011	2012	2013	Average
1	China	19.3%	38.3%	40.3%	40.8%	35.8%	33.8%	34.7%
2	Vietnam	6.1%	14.9%	13.9%	9.9%	13.7%	8.5%	11.2%
3	Korea	16.5%	14.2%	8.1%	11.0%	9.4%	7.8%	11.2%
4	Malaysia	15.3%	4.3%	10.6%	5.2%	4.7%	6.2%	7.7%
5	Chinese Taipei	2.1%	2.6%	6.6%	8.2%	8.1%	9.4%	6.2%
6	Hong Kong	0.0%	1.1%	3.9%	4.5%	7.2%	5.9%	3.8%
7	Singapore	0.4%	3.4%	5.0%	5.4%	4.3%	4.1%	3.8%
8	Japan	3.3%	1.0%	1.1%	3.0%	1.3%	9.5%	3.2%
9	Thailand	2.1%	4.0%	1.8%	0.8%	1.6%	2.2%	2.1%
10	Saudi Arabia	9.8%	2.2%	0.0%	0.0%	0.0%	0.0%	2.0%
11	United States	3.8%	0.9%	1.3%	1.1%	2.1%	2.5%	2.0%
12	Australia	4.1%	0.6%	1.1%	1.3%	0.8%	1.6%	1.6%
13	United Kingdom	0.8%	0.6%	0.5%	0.5%	2.4%	1.5%	1.0%

Source: National Bank of Cambodia.

Figure 11
Major Banks' Shareholders by Nationalities to Total Banks' Capital in Cambodia
(As of April 2015)
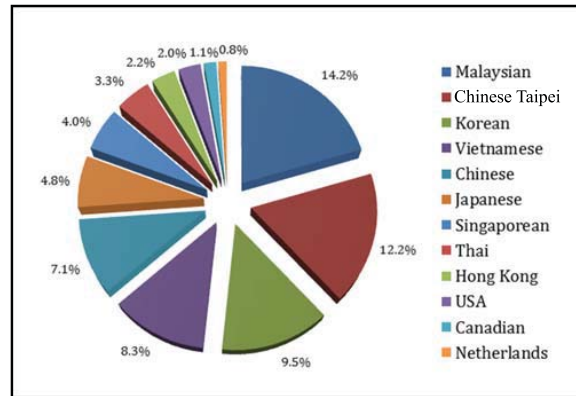
Source: National Bank of Cambodia.

5.2.2   FDI Inflows by Sector

Table 8
Share of FDI in Cambodia to its Total by Sector

No.	Sector	2008	2009	2010	2011	2012	2013	Average
1	Manufacturing	17.0%	15.5%	15.5%	22.2%	29.4%	26.7%	21.1%
2	*Financial Activities*	37.2%	17.4%	19.8%	10.5%	20.6%	17.0%	20.4%
	2.a. Banks	33.0%	15.9%	18.8%	8.7%	19.2%	15.2%	18.5%
	2.b. MFIs	4.2%	1.5%	1.0%	1.8%	1.4%	1.9%	1.9%
3	Hydropower	8.0%	20.3%	28.6%	27.3%	17.7%	18.1%	20.0%
4	Agriculture	10.2%	18.3%	20.7%	21.3%	16.7%	15.4%	17.1%
5	*Accommodation*	7.4%	11.2%	5.2%	8.4%	6.9%	6.0%	7.5%
6	Telecom	12.3%	4.9%	1.4%	1.2%	0.2%	0.0%	3.3%
7	Construction	1.8%	4.1%	4.0%	3.7%	1.5%	1.5%	2.8%
8	Mining & quarrying	1.7%	1.5%	1.3%	1.4%	1.2%	1.0%	1.3%
9	Real Estate	0.7%	1.1%	1.7%	1.7%	1.0%	1.2%	1.3%
10	Other	3.8%	5.8%	1.8%	2.2%	4.7%	12.9%	5.2%
	Total FDI Flow	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: National Bank of Cambodia.

FDI into Cambodia has been concentrating mainly in the manufacturing sector. As manufacturing is a productive sector, this increase should correlate with higher employment. This is as we found in Sub-section 4.2.7 on capital flows and economic variables where the FDI is negatively correlated with the unemployment rate (coefficient of -0.34). Only slightly different in its share to the total flow, Cambodia has been receiving substantial FDIs into the banking sector. It is evident that the total assets of the banking sector has been growing along this line while the credit growth should also exhibit a rapidly increasing trend (IMF, Cambodia 2013 Article IV consultation, 2014). Therefore, there can be some vulnerabilities associated with this rapid growth in the banking sector (IMF, Cambodia 2013 Article IV consultation, 2014).

Table 9

Correlation Coefficients of Non-resident Inflows of KAB, FDI, and

BMM with Banks' Assets, Credit Growth, and Capital[20]

	Asset	Credit Growth	Banks' Capital
KAB	0.723	0.082	0.699
FDI	0.760	0.194	0.740
BMM	0.570	0.015	0.548

Source: National Bank of Cambodia.

The results from the correlation analysis above confirm that Banks' capital and asset have high positive correlation with FDI gross inflows while it also showed somewhat high positive correlation with the BMM. However, both FDI and BMM gross inflows have rather weak but positive correlation with credit growth, meaning that the FDI and BMM increase could to a less extent push up credit growth. According to the 2013 Article IV consultation report for Cambodia by the IMF (2014), private sector credit has been accelerating at 30% year-on-year on average in the last three years with credit-to-GDP ratio moving to almost over 40%.[21] The same report mentioned that this was due to the entry of new banks[22] into the market, leading to the increase in bank flows

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20. Only KAB, FDI and BMM are used here because of the absence of both portfolio equity and portfolio debt inflows into Cambodia.

21. Refer to Figure 15 in the Appendices for Cambodia's Credit to GDP gap.

22. Refer to Table 12 in the Appendices for the number of banks in Cambodia.

from abroad, and the heightened competition in the system that also contributed to the rapid credit growth.

6.   Risks and Vulnerabilities

According to the results found in earlier sections, overall capital flow in Cambodia is very volatile of which the main driver is the volatility of BMM, followed by the reserve asset flows and to a less extent by FDI. The volatilities in all the components have been increasing particularly after the global financial crisis in 2009, which reflects the possible spill-over effect from the ample global liquidity and the easing of monetary policy in the advanced economies. In addition to that, the BMM has been increasing in its importance to the total capital flows.

With these ongoing trends, on the domestic side, the capital flow surge, as we found, has been contributing to rapid credit growth[23] and channeling to the real estate sector and causing rising asset price in Cambodia (IMF, Cambodia 2013 Article IV consultation, 2014). This issue has an implication for the central bank to safeguard financial stability, especially credit risk as well as asset price inflation due to the increasing asset price which can push up overall price largely.

In relation to the external factors, the increasing role of the BMM is indicative of a greater reliance of Cambodia's banking system[24] on foreign funding which is very volatile, as we found. This has exposed Cambodia to risks of capital reversals. Although Cambodia has very limited connection with the U.S, once the U.S. starts to normalize its monetary policy, it may lead to an increase in dollar funding costs and thus cause a stop or reversal of capital flows from the region,[25] and thus Cambodia's foreign funding can also see spill-over effects. This matter as well has an implication on financial stability in Cambodia, especially the possible sudden decline in liquidity.

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23. The data on credit growth covers only those reported by banks while it does not cover shadow banking institutions. Therefore, the exact figures for credit growth might be higher.

24. Excessive risk taking by banks to compete for market share amid a growing role of foreign financing can result in a deterioration of asset quality, increase in financial sector vulnerabilities and liquidity risks, and a decline in confidence during a downturn. High degree of dollarisation limits the lender-of-last resort capacity of the central bank.

25. Although we found small exposure to the U.S, the concern is on the second-round effect which Cambodia can face once the countries in region are affected. This is because Cambodia's banking system investments are foreign dominated and are mainly from the region. In sub-section 5.2.1, we found high reliance of FDI from Asia. A further study on the second-round effect from Asia will be very beneficial in order to have better understanding of capital flows issues in Cambodia.

7. Policy Considerations

Currently, the main concern is on the domestic front where the credit growth is high and credit to the property sector has been rising sharply, causing the real estate price to continuously go up along this line. This may cause the materialization of a credit and real estate bust once there is a shock to the economy. Therefore, policies to help contain the level of credit growth should be considered while at the same time measures that encourage the shift of toward more reliance on foreign funding is preferred.

In the current context, strengthening the supervision of individual banks' health and careful monitoring of the credit growth progress should be in place. The movement of real estate prices should also be monitored cautiously. Coupling with that, bank funding from abroad (particularly, borrowings and deposits) should be subjected to reserve requirement in order to encourage banks to seek more long-term funding from the domestic economy. A mixture of macroprudential policies that can help reduce the exposure of banks to the real estate sector are of necessity at the moment. It can be the decrease in the loan-to-value ratio (LTV)[26] for the property sector and a ceiling on loans to the real estate sector for individual banks.

Since the macroeconomic and financial condition is favorable in the current period, it is a convenient time to encourage banks to strengthen their shock absorbance capacity. Therefore, regulations that increase banks' solvency and liquidity are the appropriate measures.

Taking into consideration the upcoming ASEAN Economic Community (AEC) establishment by end of 2015, the setting of policy that affect this process (such as capital control) is to be approached with greater caution and consideration. Therefore, policy related to capital control or creation of new barriers to capital mobility can only be introduced as an exception during an emergency on a temporary basis.

In a broader way, Cambodia should focus on containing macro financial risks especially on the domestic side. Policy mix should be considered by introducing both monetary policy measures and macroprudential measures as well by focusing on reducing the risks and vulnerabilities on the domestic side while also reducing the exposure to foreign funding from abroad which can face

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26. The imposition of this measure should be considered only for the vulnerable sectors, particularly the real estate sector.

reversals or sudden stops once there is monetary policy normalization in the U.S. and especially in Europe.

8. Summary and Conclusion

In this paper, we try to identify the evolution of the size and volatility of capital flows in Cambodia as well as the risks and vulnerability associated with capital flows both from the domestic and external factors, particularly in light of the expectation of U.S. monetary policy normalization. Then, we explore the policy options applicable to the current situation in Cambodia.

The findings showed that the size of capital flows is significant compared to the GDP while only the net FDI exhibited significance to the GDP while other net flows are very small and even negative compared to the GDP. Out of the total net capital flows, FDI is the main contributor to the total capital flows followed by BMM. However, the BMM is increasing in its share to the total capital flows and is the most and highly volatile composition which, according to the literature, is likely to reverse or stop in the short future. The reserve asset flows are the second most volatile item followed by FDI which is the least volatile. However, since Cambodia adopts a managed-float exchange-rate regime, the RES is volatile due to active foreign exchange market intervention. Meanwhile, portfolio equity and debt are found not volatile at all due to the underdeveloped capital and debt market; Cambodia's portfolio equity and debt flows invested abroad involve only a very small amount. An interesting finding on the volatility of capital flows showed that all the components of capital flows in Cambodia did not volatilize much but their volatilities doubled after the global financial crisis. This reflected the spillover from ample global liquidity into Cambodia. Nonetheless, a test on the persistency of capital flows revealed that only FDIs and portfolio equity are persistent but only for a short horizon. Therefore, they are regarded as stable sources of capital flows in Cambodia.

BMM and FDI are the dominant compositions established by the research findings. BMM's sources are mainly from Government transactions, followed by trade credit and banking flows. Private transactions which are associated with short-term maturity dominate the BMM and foreign claims on Cambodia's banks are mainly from the European banks while it is very small from the U.S., compared to European banks. Those claims are very small when considered as a share to GDP. Therefore, it is likely that negative shock transmitted from Europe will cause higher volatility than the U.S., but negative shock incurred by

both of them will cause only a small effect only to the growth in Cambodia. While for FDI, Cambodia is mainly relying on the investment inflows from the Asian economies and the sectors receiving the most inflows are manufacturing and banking. The high growth of the banking sector has been contributing to the higher credit growth in Cambodia. Therefore, any impact on the Asian economies[27] will transmit to Cambodia as well.

To better measure the likelihood of the U.S. impact on Cambodia, we calculated the exposures of the U.S. to Cambodia. The analysis revealed that the U.S. has no assets in the form of securities with Cambodia and thus the normalization of its monetary policy will not impact Cambodia. However, the normalization can have a second-round effect on Cambodia through the influence on the European and Asian economies.

With the above scenario, some risks and vulnerabilities were identified. The risks include high credit growth and rising real estate price, higher reliance on foreign funding by banks,[28] and exposure to the European banks, but not to the normalization of the U.S. monetary policy. Thus, the policy options that are appropriate for the current situation are associated with containing the credit risk and the real estate boom-bust cycle, shifting the banking funding structure to a more stable source and especially to the domestic source rather foreign financing. The policies can be a mixture of monetary policy and macroprudential policy together to tackle the above issues. However, any policies related to capital control require cautious consideration given Cambodia's commitment to the joint-establishment of the AEC toward the end of 2015.

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27. In sub-section 5.2.1 on FDI, it is evident from the findings that Cambodia has been receiving a lot of investments from the Asian economies, especially China.

28. This indicates higher exposure to the global cycle, and thus the global factors are becoming more important in determining capital flows volatility in Cambodia.

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Figure 12
Resident Capital Flows to GDP (in%)
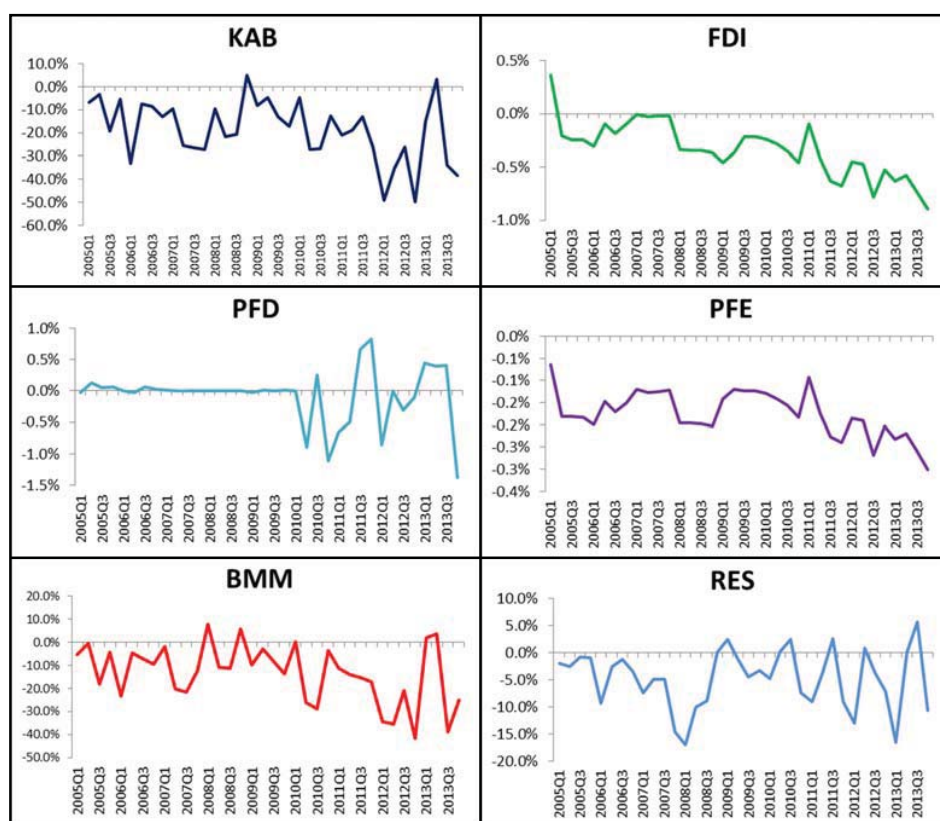
Source: IMF and Author's calculation.

Figure 13
Non-resident Capital Flows to GDP (in%)
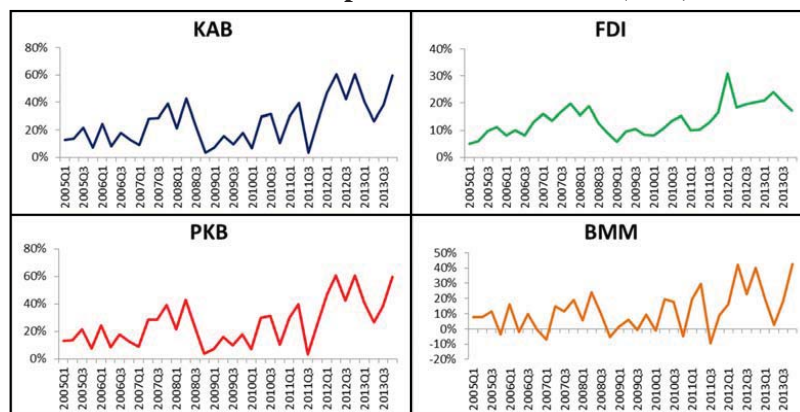
Source: IMF and Author's calculation.
Note: Since Cambodia has no inflows (Non-residents' investments) in portfolio equity and portfolio debt in Cambodia, the figures of both portfolio equity and portfolio debt are not shown here.

Figure 14
Net Capital Flows to GDP (in%)
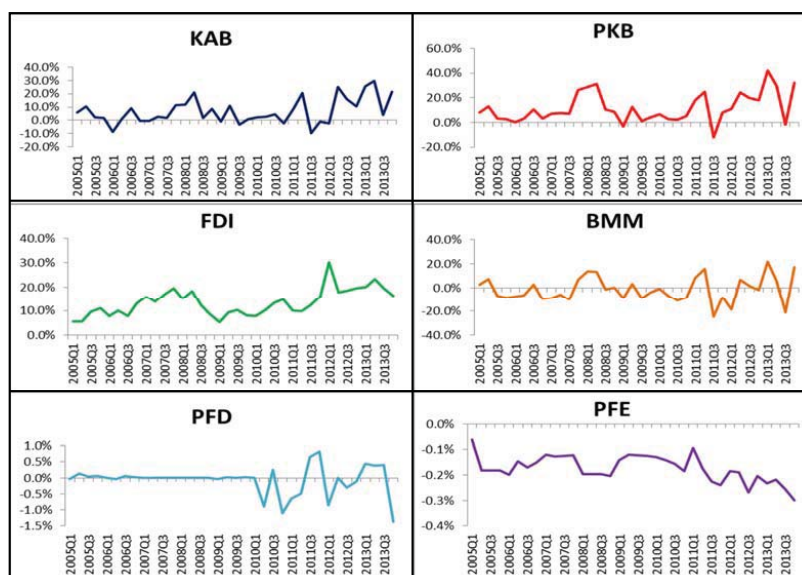
Source: IMF and author's calculation.

Table 10
Net Capital Flows to GDP

Period	KAB	PKB	FDI	PFE	PFD	BMM	RES
2005	5.1%	6.7%	7.9%	-0.2%	0.0%	-1.1%	-1.6%
2006	0.2%	4.3%	9.7%	-0.2%	0.0%	-5.2%	-4.2%
2007	3.9%	12.0%	16.6%	-0.1%	0.0%	-4.5%	-8.1%
2008	10.8%	19.8%	13.6%	-0.2%	0.0%	6.4%	-9.0%
2009	1.8%	3.5%	8.2%	-0.1%	0.0%	-4.6%	-1.7%
2010	1.7%	4.1%	11.5%	-0.2%	-0.4%	-6.8%	-2.4%
2011	4.8%	9.6%	12.0%	-0.2%	0.1%	-2.3%	-4.8%
2012	12.4%	18.2%	21.7%	-0.2%	-0.3%	-3.0%	-5.8%
2013	20.1%	25.5%	19.9%	-0.3%	0.0%	5.9%	-5.4%
Average	**6.8%**	**11.5%**	**13.5%**	**-0.2%**	**-0.1%**	**-1.7%**	**-4.8%**

Source: Author's calculation.

Table 11
Compositions of Capital Flows to Total Capital Flows

	Period	FDI	PFE	PFD	BMM	RES
Resident	2005-2008	0.8%	1.2%	-0.3%	56.2%	42.2%
	2009-2010	3.4%	1.4%	1.4%	68.7%	25.1%
	2011-2013	0.6%	0.2%	1.0%	76.9%	21.2%
Non-resident	2005-2008	83.9%	0.0%	0.0%	16.1%	0.0%
	2009-2010	80.3%	0.0%	0.0%	19.7%	0.0%
	2011-2013	75.1%	0.0%	0.0%	24.9%	0.0%
Net	2005-2008	-60.5%	-0.8%	-0.2%	123.4%	38.1%
	2009-2010	105.2%	-1.0%	2.9%	50.7%	-57.8%
	2011-2013	-158.9%	1.7%	-5.3%	150.8%	111.6%

Source: Author's calculation.

Table 12
Banking System in Cambodia (as of December 2014)

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	**Commercial Banks**	**15**	**15**	**17**	**24**	**27**	**29**	**31**	**32**	**35**	**36**
	- Foreign Branches	0	3	3	3	5	7	9	9	10	11
	- Subsidiaries	3						9	10	11	12
	- Locally incorporated	12	12	14	21	22	22	13	13	14	13
2	**Specialized Banks**	**4**	**5**	**7**	**6**	**6**	**7**	**7**	**7**	**9**	**11**
	- State-owned	1	1	1	1	1	1	1	1	1	1
	- Privately Owned	3	4	6	5	5	6	6	6	8	10
3	**MFIs**	**39**	**39**	**42**	**44**	**45**	**52**	**60**	**67**	**71**	**78**
4	**Representative Offices**	**2**	**2**	**2**	**2**	**3**	**2**	**2**	**4**	**6**	**7**
5	**Leasing Company**									**2**	**6**

Source: National Bank of Cambodia.

Figure 15
Cambodia's Credit to GDP Gap
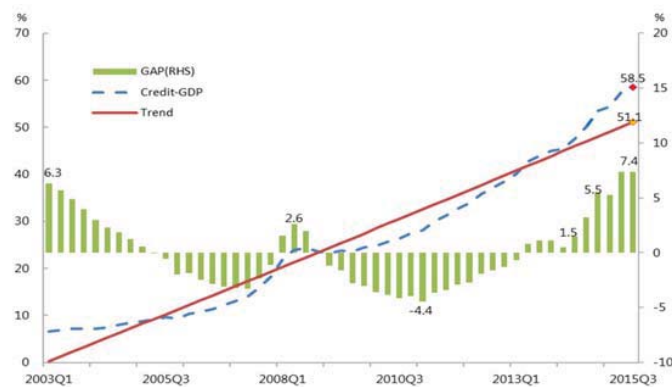
Source: Author's calculation.

Figure 16
Credit Expansion by Sectors

	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Agriculture, FOrestry and Fishing	23%	27%	27%	28%	33%	29%	25%	29%	30%	34%	34%	35%
Manufacturing	54%	41%	39%	33%	13%	32%	28%	18%	17%	14%	16%	10%
Trade*	48%	41%	38%	21%	26%	20%	24%	31%	28%	26%	29%	35%
Real Estate*	12%	18%	22%	26%	27%	32%	33%	38%	40%	42%	45%	46%
Hotel & Rest.	26%	25%	35%	22%	18%	12%	7%	14%	20%	21%	21%	20%
Other	31%	21%	20%	19%	23%	18%	24%	20%	23%	29%	26%	30%
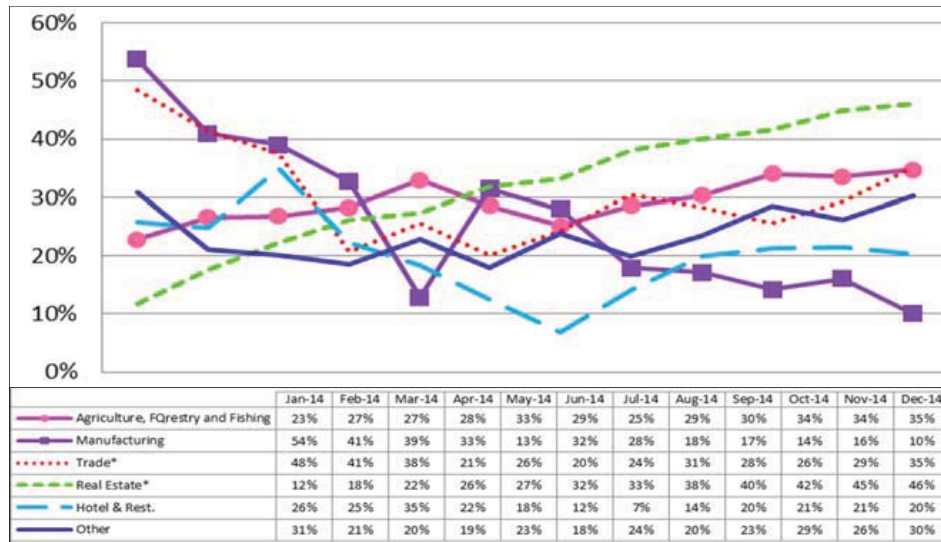
Source: National Bank of Cambodia.

Chapter 3

LIVING WITH VOLATILITIES: CAPITAL FLOWS AND THEIR IMPLICATIONS FOR CENTRAL BANK POLICIES – THE CASE OF INDONESIA

By
Francisca Hastuti[1]

1. Introduction

1.1 Background

Indonesia, like most other developing countries within the SEG[2] that face a gap between investments and savings, has benefited greatly from an open economy and implementing freer capital flows. A decade after implementing financial deregulation, net capital inflows skyrocketed from US$134 million or 1% of GDP in 1980 to US$16.5 billion or 5% of GDP in Q1:1997. Such massive capital inflows stimulated investments, resulting in faster economic growth and higher income per capita. The economy grew at 7 to 8% on average, and the country moved from being classified as low income to middle income.

Although the financial system has been further liberalized - by the enactment of Act No 24 in the year 1999 on Foreign Exchange and Exchange Rate System - the first five years after the enactment of the Act (1999-2004), there was a retrenchment in capital flows. The share of capital flows to GDP slipped from 5% (1997) to 1% of GDP. Capital flows only recorded positive inflows starting from Q1 2005. As domestic financial markets have become more integrated and the macroeconomic condition improved, capital inflows increased remarkably, as did their recorded volatility. Economic growth became unsustainable and

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tended to be lower than the average growth rate prior to 1997. In 2014, for example, although capital inflows increased four folds in comparison to the 1997 figure, the economy grew at a below average rate of 5.3% compared with the average prior to 1997. Increasing volatility not only contributed to slower real average economic outcomes but also disrupted monetary and financial stability as capital inflows and outflows weighed in on exchange rate stability and market liquidity.

1.2 Objective of the Study

Against the abovementioned background, the primary question to ask is what factors most affect the volatility of capital flows. Is it openness, domestic financial crisis, or the external environment that most affect the overall direction and volatility of capital flows? In this regard, this study has the following objectives:

i.   To analyze recent trends in order to identify the pull and push factors of capital flows, as well as the volatility of capital flows;

ii.   To explore the key factors that most affect volatility of the capital flows; and,

iii. To map out and explore the policy responses that have been taken or deemed necessary to manage volatility of capital flows.

To systematically describe all the fact findings of the study, this paper is organized as follows: Section 2 describes the stylized fact of the economy and capital flows into Indonesia while Section 3 focuses on the literature review on factors that affect capital flow volatility. Section 4 explains the data and methodology used while Section 5 presents the recent trends and event analysis, as well as factors that affect the volatility of capital flows. This Section also describes the policy measures that have been taken to address the problem. Section 6 concludes and draws some lessons from the study.

2.   Stylized Facts on the Economy and Capital Flows

2.1 Stylized Facts of the Economy

Based on the macroeconomic performance since the 1980's, we can draw several stylized conclusions on Indonesia's economy.

- There has been a shift from agriculture and natural resource-based predominance to manufacturing. The share of agriculture and natural

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resource-based to GDP has been decreasing over time from 24% (1980's) to 13.7% (2014). Meanwhile, the share of manufacturing has increased from 12.9% to 29.1%. However, natural resource-based products are still the predominant export commodities of Indonesia. In 2014, for example, 53% of exports are natural-resource based products whether raw materials or manufactured products. These commodities not only contribute a relatively low value-add, but are also vulnerable to changing prices and demand.

- The economic and financial integration intensified the impact of the changing external sector and environment on the economy, either through economic, trade or financial transmission or expectation. In the last five years, for example, in tandem with the slowdown of the global economy and trade, Indonesia's economic growth rate also decelerated from 5.58% (2013) against 6.03 (2012), 6.17% (2011) and 6.22% (2010).

- On the tradable sector, falling demand (amid the slowdown of global economic and trade particularly for China and India, which are the largest importers of Indonesia's quarrying products) and falling prices contributed to the decline in export performance. The slowdown in the tradable category led to a tapering in export growth. In the meantime, the non-tradable sector also weakened as demonstrated by the slowdown of the growth of credit channeling by banking sector.

- In terms of the fiscal deficit, the Indonesian government uses external debt as sources of financing to fill the gap. There is, however, a slight change in the source of funding. The government presently also seeks sources of financing from the commercial market. Traditionally, the fiscal deficit problem lies with subsidies as these are burdensome fiscally, particularly in times when tax-revenues are squeezed. Weakened fiscal revenues when subsidies are high, has compelled the government to institute savings and has progressively squeezed government capabilities for financing infrastructure development. Heavy subsidies on administered prices have led the fiscal sector vulnerable to the changing prices in world commodities particularly oil.

- There is relatively high pressure on inflation, particularly for administered prices and the foods (VF) for which prices are volatile. Meanwhile, the core inflation is kept at between 1 to 2%.

2.2 Stylized Fact of the Balance of Payment/Capital Flows

- Indonesia has experienced current account deficits except during 1998 to 2011 (see Figure 1 below). The current account deficits are caused by the large deficits on trade on services whereas the trade account (trade on goods) has recorded surpluses. This trend was broken in 1998-2011, when the trade and service accounts recorded a surplus. The surplus in the trade account is able to offset the deficit on services. The surpluses have been tapering since 2005 as imports grew faster than exports and trade in service regained normality, recording a large deficit as the interest payment obligations went back to normal.

- In 1999-2001, Indonesia and foreign creditors reached an agreement on the debt restructuring program (for payment obligations falling due on 2000 - 2002), with the grace period for payment obligations being agreed upon for both principal and interest services.

- Since 2012, the current account has slipped back to record a deficit. Falling demand, the slowdown of the global economy and trade, falling commodity prices and relatively low value-add of the predominant export products, have all exerted pressure on exports. The IMF and World Bank project the current account deficit to be around 2-3% of GDP until 2020 (see Figure below).

Figure 1
Indonesia Current Account Balance

1. Current Account Balance, Q1: 1995 – Q4: 2014
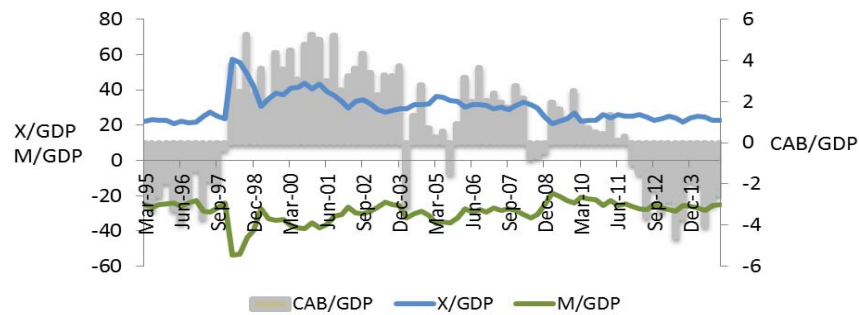
2. Projected Current Account Balance 2014-2020

Source: IMF-e library data, http://elibrary.data.imf.org/
DataExplorer.aspx
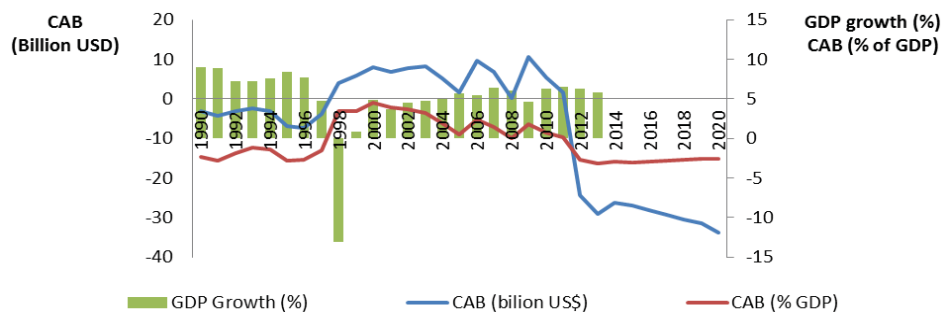
- The capital account posts surpluses with liabilities side exceeding the asset side. At most times, the large surplus in the capital account is able to offset the current account deficit, leading to increases in reserves (see Figure 2 below).

Figure 2
Current, Capital and Financial Account
Q1:1995 – Q4: 2014

Source: IMF-e library data, http://elibrary.data.imf.org/DataExplorer.aspx
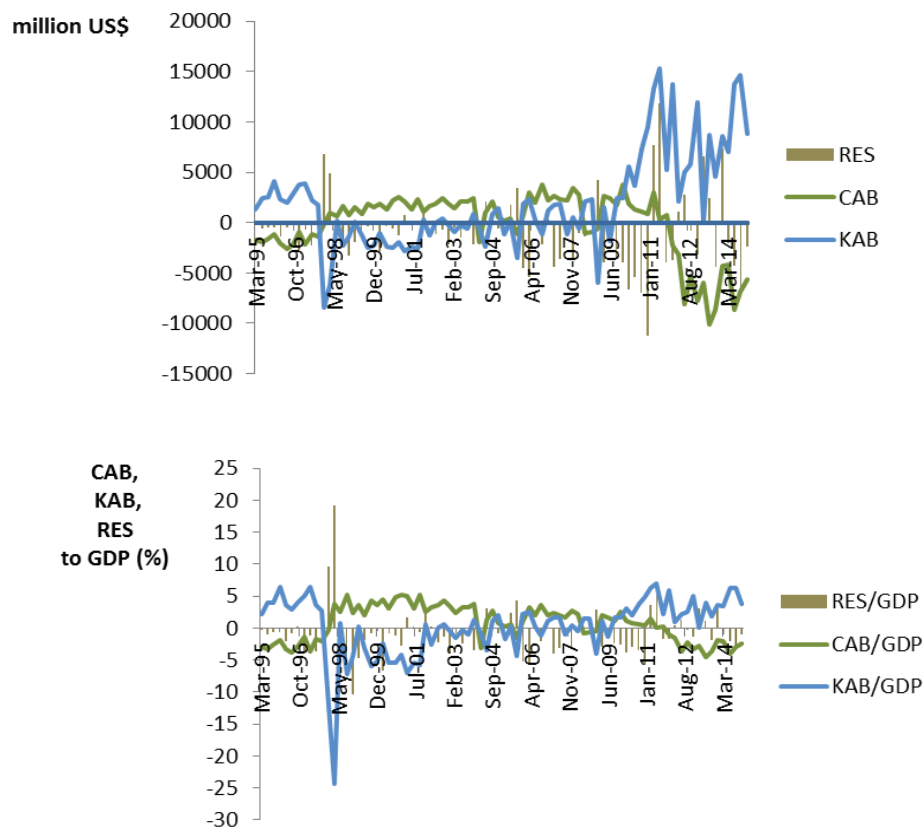
- FDI is a dominant component. Abundant natural resources combined with the large potential market have attracted foreign direct investments into Indonesia.

- As the financial market becomes increasingly integrated, foreign portfolio equity and bank money market are growing. Foreign investments are not only placed in foreign currency denominated instruments but also on local currency denominated instruments such as government bonds and securities traded in the domestic market. Liabilities to non-residents who hold government bonds and securities have doubled in the last five years. The high level of non-resident ownership (30 to 40%) on domestic financial market instruments underscores the potential impact of the reversal in price.

3. Literature Reviews on Capital Flows

In one of their paper, Aizenman and Pinto summarize several studies on the nature and impact of volatilities as follows:[3]

- Joshua Aizenman and Nancy Marion (1993): policy uncertainty is negatively associated with private investment and growth in developing countries.

- Garey Ramsey and Valerie Ramey (1993): negative association between growth and volatility.

- Ricardo Hausmann and Michael Gavin (1997): case study of Latin American and the Caribbean explore the underlying causes and source of volatility, its cost and corrective policy regime.

- Dani Rodrik (1999): weak institutions and latent social conflict as the main reason for the negative impact of volatility on growth. Strong institutions dampen volatility, while weak institutions enhance negative consequences.

- William Eaterly, Roumeen Islam, and Joseph Stiglitz (2000): the financial system as prime factor in growth volatility. Up to a point, greater financial depth is associated with lower growth volatility, but as financial depth and leverage grow, the financial sector could become a source of macro vulnerability.

- Daron Acemoglu, Simon Johnson, James Robinson and Yunyong Thaichoren (2003): arguing that crises are caused by bad macroeconomic policies through increased volatility, leading to lower growth but bad macro policies, in turn, are the product of weak institutions.

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3. Aizenman, Joshua and Brian Pinto, (2004), "Managing Volatility and Crisis: A Practioner's Guide Overview," *National Bureau of Economic Research Working Paper*, 10602, June, p. 13

The abovementioned studies identify bad macroeconomic policies and the financial system as the sources of volatility. However, from the background and description of the stylized conclusion, it is evident that several factors other than policies and financial system vulnerability also affect capital flows and their volatility. We can summarize the literature review on the theoretical framework and empirical studies on volatility of capital flows on factors that affect capital flow as follows:

- Ferretti and Razin (2000): weaknesses on domestic performance such as trade, economic growth, overvalued exchange rate, and financial development as well as exogenous variables such as world interest rate, growth rate of developed countries and exchange rate regime (peg) may stimulate reversals.

- Tong and Wei (2009): liquidity shock is more severe in countries, which prior to crisis, have foreign portfolio investments and higher loans than foreign direct investments.

- Becker and Noone (2009): financial integration increase capital mobilization, particularly for developing countries, lack of substitutability of components leads to volatility on a component may affect the volatility of the total flows. Volatility of banks and money markets is relatively high while the flow of foreign direct investments is relatively stable. However, the degree of volatility is not an intrinsic part of the type of capital flows and can vary noticeably depending on idiosyncratic features of the economy.

- Forbes and Warnock (2011): emphasizing the role of domestic factors such as the current account deficit, financial system vulnerability and the role of contagion as well as global factors such as world interest rate, changes in world demand and global risk that could affect the volatility of capital flows. Contagion effect could be transmitted through trade channels (including direct trade, competitiveness, and changes in commodity prices), financial channel as well as economic transmission (including through expectation based on the similarity of the characteristics of the economy, in particular the external sector).

- Ahmed and Zlate (2013): growth and interest rate differentials are statistically and economically important determinants of capital inflows and risk aversion.

- Hur and Kondo (2013): reserves have endogenously negative association with sudden stops and thus higher reserves reduce the possibility of a sudden stop.

- Bacchetta (1992): using the overlapping generation model, joint liberalization of capital flows and of the domestic financial system in small countries

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leads to a large increase of net capital inflows only in the initial stage of liberalization. With Wincoop (2000), Bacchetta claims that large net capital inflows that lead to overshooting asset prices combined with increasing global uncertainty may lead to declines in the net inflows and be replaced by net outflows.

- Broto et al. (2011): using three determinants of volatility of the capital flows,[4] conclude that although the domestic macroeconomic factors can reduce the volatility of a certain component without affecting the volatility of the others, global factors have become the most determinant of capital flow volatility for emerging economies. Furthermore, Broto et al. also claim that domestic factors such as institutional quality and the soundness of macroeconomic policy affect the volatility of capital flows in emerging markets more than advanced economies.

From the aforementioned literature review, we determine that openness of the economy and macroeconomic performance as well as the external environment are the pull and push factors of capital flows and their volatility. In terms of the domestic environment, this include macroeconomic performance, economic growth, openness of the economy, current account, foreign reserves, terms of trade, exchange rate, substitutability of component (financial market development) and financial system vulnerability. Deterioration in any of these factors can lead to disruptions and increased volatility of capital flows for Indonesia.

On the other hand, the external environment as a component of the push factor would include economic growth of advanced economies or major partners, commodity prices, global demand, world interest rate, the change in investor expectations and policy measures taken by central banks of advanced economies. Deterioration in this component could negatively affect the domestic macroeconomy and capital flows.

We may also conclude that from the macroeconomic perspective that the openness and repayment capacity of the economy would affect capital flows. The proxy indicator of the repayment capacity of the economy is a combination of economic growth, export and reserves.

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4. The three determinants include global, domestic macro and financial indicators. Broto et al. use US 3m T-bill, S&P, US inflation, world GDP growth and global liquidity as proxy indicators for global indicator. GDP, inflation, openness, reserves as the proxy indicator of domestic the macroeconomic environment and bank asset, credit, deposit, interest rate differential, and capitalization as the proxy for the soundness of financial indicator.

Although from the literature review we can determine a broad range of factors that could affect volatility of the capital flows but due to data availability, we will only focus our analysis on factors such as openness, economic and financial crisis, and the contagion effect of policy measures taken by central banks of advanced economies through its effect on world interest rate.

4. Data and Methodology

4.1 Data - Type and Source

For the domestic macroeconomic factors, the data include GDP (both nominal and growth rate), current account balance, capital and financial account, foreign reserves, exchange rate (nominal and real), monetary policy interest rate, and stock price index.

For the external environment, data include Fed-fund interest rate and LIBOR as a proxy for world interest rates. Unless stated otherwise, we use Economic and Financial Statistics published by Bank Indonesia, the e-library of the International Monetary Fund for data on balance of payment, the Federal Reserve of New York for historical data on FFR, the Bank for International of Settlement for data on exchange rate, and Bloomberg as source of data for financial market.

4.2 Methodology

We use trend and events (particularly financial events) analysis to uncover factor(s) that affect capital flows and the volatility of the flow of funds into Indonesia. We will not perform quantitative analysis for testing the hypothesis that the identified controlled variable(s) affect the capital flows significantly.

For analysis purposes, we measure the degree of openness, degree of exposure of foreign investments, and degree of volatility of capital flows. We process the data using the following methodology:

1. Openness indicator is measured as:

$$Flow\ Openness_t = [\frac{Resident\ flows_t + Nonresident\ flows_t}{Resident\ flows_t + Nonresident\ flows_t + Net\ flows_t} - \frac{1}{2}]\ x\ 200$$

2. Degree on gross exposure as the fraction of asset and liabilities of components (or investments of a certain country of origin) to the total asset and liabilities:

$$DGE_{it} = \frac{A_{it} + Lit}{A_t + Lt}$$

And degree on liabilities exposure as the fraction of liabilities on certain components or liabilities to certain major home country to the total liabilities of capital flow:

$$DLE_{it} = \frac{L_{it}}{L_t}$$

3. Degree on volatility as the standard deviation of the quarterly flows as percentage to GDP, and

4. For the degree of repayment capacity, we use the fraction of Net IIP and external debt to GDP ratio. The reason to focus on external debt to GDP ratio is because the ratios are increasingly used to assess the vulnerability of repayment capacity.

5. Fact Findings and Data Analysis

5.1 Size and Trend of Capital Flow

Indonesia, like other developing countries, faces the I-S gap problem. Recognizing the benefit of implementing an open economy, Indonesia in the 1980's began to deregulate its banking and financial market system and conduct outward looking oriented policies in order to generate higher economic growth. The financial system was liberalized further in 1999 by the enactment of Act No. 24 on foreign exchange and exchange rate system.

As the economy became more integrated to the global economy, capital flows increased markedly. The annual net capital inflows increased from US$1.9 billion or 1% of GDP in 1981 to US$10.9 billion or around 5% of GDP in 1996 (a year prior to the Asian financial crisis).

However, in the five years after freer capital flows and exchange rate system were implemented in 1999, there was a retrenchment in foreign capital

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and its share to GDP slipped to 1% from the 5% in 1996. The capital account recorded positive numbers for all components in Q1: 2005 but in Q2 the same year, certain components, namely, bank money market and equity dropped. Since then, while showing a remarkable increase (from US$2.6 billion or less than 1% of GDP in 2005 to US$ 44.2 billion or 5% of GDP in 2014, capital flows have become increasingly volatile. After the enactment of the Act No. 24, capital flows into Indonesia declined sharply in 5 occasions, i.e., in 2005, 2008, 2010, 2013, and 2014 (see Figure 3 below and Appendix 3.b attachment for figure on share to GDP).

Figure 3
Trend of Indonesia Net Capital Flows, By Types of Components
(in million US$, Q1 1994 – Q4 2014)
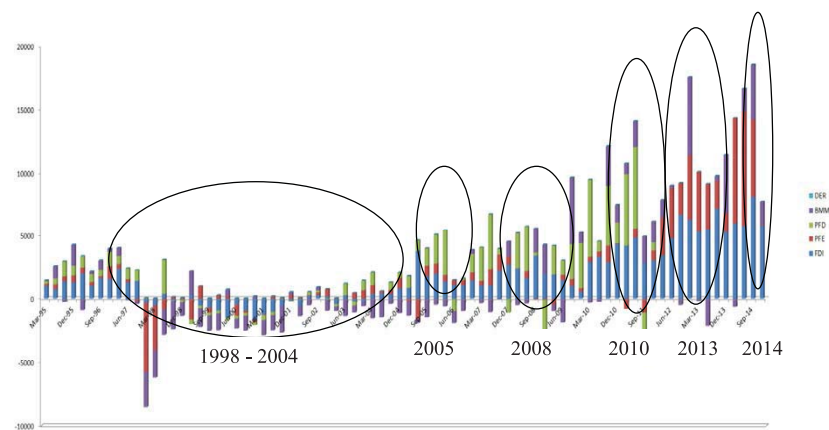
Source: IMF-Balance of Payment – Indonesia.
Note: DER (Derivative), BMM (Bank Money Market/Other Investment), PFD (Portfolio Foreign Debt), PFE (Portfolio Foreign Equity) and FDI (Foreign Direct Investment. since 2012, Foreign Debt Portfolio included in PFE (Portfolio Equity).

The first and the most prolonged retrenchment occurred in 1999 till 2004. A year prior to the 1998 crisis, the domestic macroeconomic conditions were still sound performance, with relatively high economic growth, a growing trade account surplus, exchange rate and inflation at expected levels. The only negative signals were the debt burden and unfavorable external environment. The debt burden reached 159% of GDP.[5] A high ratio of external debt to GDP could become the downside risk for the economy if there is a shock in its flows. On the external environment front, we witnessed the Thai-baht crisis and the Fed

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5.   Refer to Reinhart-Rogoff, maximum threshold of 90%.

raised the FFR seven times at 25bps each time, from 3% to 6.5% from 1994 till 1996. As the FFR increased, LIBOR also increased.

The domestic environment became less favorable as political turmoil occurred (which ended in the resignation of President Soeharto on May 1998), with Indonesia defaulting on its external debt payment obligations (a debt restructuring program was put in place from 1999-2001), and the financial system collapsed (61 out of 176 banks were closed during from 1 October 1998 till June 1999).

The external environment also became increasingly less favorable as Indonesia's sovereign rating was downgraded to below investment grade from 1999 to 2005. With debt crises occurring in Turkey and Argentina (1999-2001), the Fed continued to raise the FFR (June 1999 till May 2000) which caused a hike in world interest rate.

As the economy entered into crisis and then recession, capital flows not only began to drop but also reverse. Besides external debt and foreign portfolio investments, FDI also dropped (see Appendix Figure 3.a and Appendix Figure 3.b on components). After regaining a positive number in Q1 2003, capital flows became increasingly volatile.

Amid the slow-down in economic growth as a result of decreasing consumption (from 70% to only 53% of GDP) and government expenditure (from an average of 10% to 5% of GDP), strong pressure on capital flows begin to emerge in Q2 2005. The reversal of non-resident investments led to a large deficit in the capital account which traditionally recorded a surplus. The capital account started to record a deficit in Q2:2005 and by the next quarter (Q3:2005), the deficit registered US$3.5 billion or 3% of GDP. Unlike previous the shock (1999-2003), when all components dropped, in 2005, only portfolio equity and debt instruments declined significantly (while FDI remain unchanged). However, this disruption was only for a very short time and by the next quarter, there was a recovery.

Prior and during the retrenchment, the Fed continuously raised the FFR (June 2004 to September 2005). This policy affected the world interest rate (LIBOR) and caused the interest rate differential to increase (see Table 1 below). Coupled with the depreciation of the local currency, the increase in LIBOR was deemed as the push factor for capital flight. The other unfavorable external environment developments were the downside risks of increasing world oil prices and the global economic development, particularly for the US and China, which caused the Indonesian economy to slow down.

Table 1
Global and Monetary Policy Interest Rate
(Jan 2004 – Sept 2005)

Period of	FFR raised (from – to)	LIBOR ($, 3m)	US-Prime rate	BI-rate (MPir)	Interest rate differentials		
					FFR - MPir	LIBOR-MPir	USprime rate-MPir
June 2004	1 % to 1¼ %	1.61	4.25	7.34	6.09	5.73	3.09
Augs 2004	1¼ % to 1½ %	1.8	4.5	7.37	5.87	5.57	2.87
Sept 2004	1½ % to 1¾ %	2.02	4.75	7.39	5.64	5.37	2.64
Nov 2004	1¾ % to 2 %	2.41	5	7.41	5.41	5	2.41
Dec 2004	2 % to 2¼ %	2.56	5.25	7.43	5.18	4.87	2.18
Feb 2005	2¼ % to 2½%	2.92	5.5	7.42	4.92	4.5	1.92
March 2005	2½% to 2¾%	3.12	5.75	7.44	4.69	4.32	1.69
May 2005	2¾% to 3%	3.34	6	7.95	4.95	4.61	1.95
June 2005	3% to 3¼%	3.52	6.25	8.25	5	4.73	2
Augs 2005	3¼% to 3 ½%	3.87	6.5	9.51	6.01	5.64	3.01
Sept 2005	3 ½% to 3¾%	4.07	6.75	10	6.25	5.93	3.25

Note: MPir=monetary policy interest rate.
Source: the FedRes NY (FFR), Bank Indonesia-Economic and Financial
Statistics.

In 2007-08, during the US financial crisis, capital flows into Indonesia decreased from US$42.9 billion (2007) to US$31.9 billion (2008) which led to the decrease in its share to GDP from 4% to 3%. All components decreased including FDI. Portfolio and the bank money market continued to decrease in 2009-10 (the time when financial crisis hit the European countries). While the US and European financial crisis affected global financial liquidity, it also affected the global flow of funds including foreign investments into Indonesia.

The most recent observed shocks occurred in Q3 2013 and Q4 2014, during which the domestic economy slowed down and both trade as well as the current account recorded deficits. On the external environment front, we witnessed the Fed reduce FFR continuously, to almost 0%, while implementing the tapering off program. This had a beneficial effect on the expectations for US bonds and financial assets. We also witnessed the downside risk of increased oil prices and the slowdown of global economic growth and trade.

From the aforementioned trend and event analysis, we can determine the push and pull factor of capital flows. In addition to the factors identified in the literature review, we observe that rating, investor behavior and changing expectations can also affect capital flows. By comparing one period to another, we may also conclude that a worsening domestic environment can increase volatility greater than those triggered by changes in the external environment.

Further questions concern which component is dominant and which factor most affect capital flows, and which component is the most volatile. The following two Tables confirm that, with a share to total liabilities of more than 40%, FDI is the most dominant component (see Table 2). The Table also indicates that the share of FDI to total liabilities has been increasing over time including during the crisis. The increase in its share suggests that during the crisis, the decrease of other components was much higher than FDI.

Table 2
The Share of Components to Total Liabilities, 1995 - 2014

Indicator		1995-97	1998-03	2004-07	2008-10	2011-14
Average share to Total Liabilities	FDI	35.8	40	48.4	41.6	51.6
	PFE	28.4	26	60.3	40.5	34.5
	BMM	1.8	2.6	0.5	0.6	0.6

Source: Author calculation based on quarterly data on BOP of Indonesia.

The data on volatility (see Table 3 below) shows that, (i) the volatility of the liabilities side (4.9) is much higher than the asset side (1.7) which is similar to the net components (4.6). This suggests that the impact of the surges and drops on the liabilities side to the net flows and thus to GDP will be more severe than the surges and drops on assets side, (ii) the volatility of PKB (gross private capital flows) for both asset and liabilities is higher than for KAB and sub-components, suggesting that there is a positive correlation between components, (iii) the most volatile components are foreign portfolio debt and equity instrument, whereas FDI is the least volatile, even during the crisis. FDI also recovers faster than the other components (see also Figure 3 in the Appendix); and, (iv) higher volatility in assets, liabilities and the net suggest that a crisis affect the volatility of capital flows. Domestic economic and financial crisis increases volatility more than the contagion effects.

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Table 3
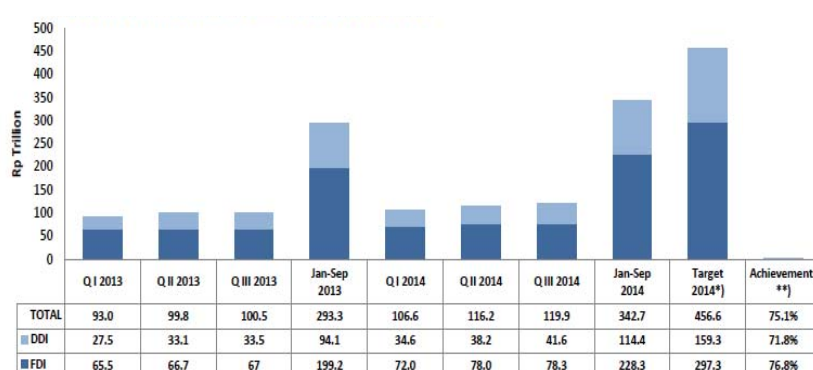## Volatility of Capital Flows, by Components, 1995 – 2014

	ASSETS						LIABILITIES						NET					
	FDI	PFE	BMM	DER	PKB	KAB	FDI	FPE	BMM	DER	PKB	KAB	FDI	PFE	BMM	DER	PKB	KAB
1995-1997	0.1	0.1	0.0	0.0	3.7	0.1	1.0	2.7	1.6	0.0	1.9	4.7	1.0	2.7	1.6	0.0	3.0	4.6
1998-2003	0.0	0.0	0.2	0.0	8.4	0.2	1.3	3.4	2.8	0.0	7.7	5.1	1.3	3.4	2.8	0.0	5.2	5.1
2004-2007	0.4	0.5	2.0	0.0	2.9	2.1	1.3	1.7	0.8	0.0	2.9	2.1	1.3	1.6	2.1	0.0	3.9	5.1
2008-2010	0.4	1.7	1.4	0.0	3.8	1.6	0.6	1.7	1.3	0.0	4.2	1.8	0.6	1.6	1.3	0.0	2.7	2.1
2011-2014	0.7	0.6	1.4	0.0	2.1	2.0	0.7	1.5	0.9	0.0	1.5	2.0	0.7	1.5	1.8	0.0	2.3	2.1
1995-2014	0.6	0.4	1.3	0.0	8.4	1.7	1.5	2.6	2.1	0.0	6.1	4.9	1.5	2.6	2.4	0.0	4.9	4.6

Source: Author's calculation.
Volatility is measured as the standard deviation of the quarterly flows as percentage of GDP based on IMF e-learning database.

We further analyze the behavior of FDI by comparing it with domestic direct investments (investments of residents in the country) Figure 4 below clearly indicates that it is not only dominant among foreign investments, but also higher than domestic direct investments.

Figure 4
Domestic and Foreign Investment Q1 2013 – Q3 2014

	Q I 2013	Q II 2013	Q III 2013	Jan-Sep 2013	Q I 2014	Q II 2014	Q III 2014	Jan-Sep 2014	Target 2014*)	Achievements **)
TOTAL	93.0	99.8	100.5	293.3	106.6	116.2	119.9	342.7	456.6	75.1%
DDI	27.5	33.1	33.5	94.1	34.6	38.2	41.6	114.4	159.3	71.8%
FDI	65.5	66.7	67	199.2	72.0	78.0	78.3	228.3	297.3	76.8%

Source: Investment Coordinating Board-2014 Report.

We then analyze the reasons as to why foreign investors remain resolute in their investments in Indonesia. Among them are, (i) the implementation of the AEC (ASEAN Economic Community) Program (free trade and freer flow of production factors), combined with the distance, stimulates investments among the intra ASEAN member countries to increase significantly. In 2014, Japan and China, Singapore, Malaysia and Thailand were the top 5 foreign investors

in Indonesia. Prior to 2010, US, Japan and European countries were the major investors; (ii) The abundant natural resources has compelled foreign investors to continue seeking out Indonesia as a potential market for their products or preserve their production-supply chains; and, (iii) dependency on the banking system as sources of financing in the highly regulated banking industry and limited access to international and domestic capital markets, are constraints for domestic investments to grow as fast as foreign investments.

However, as rank of its ease of doing business is less competitive than the other SEG economies, Indonesia will probably have stringent challenges in the future (see Table 4 below).

Table 4
Rank of Ease Doing Business of Selective SEG Economies, 2014

Economy	Ease of Doing Business Rank	Starting a Business	Dealing with Construction Permits	Getting Electricity	Registering Property	Getting Credit	Protecting Minority Investors	Paying Taxes	Trading Across Borders	Enforcing Contracts	Resolving Insolvency
Singapore	1	1	2	2	2	2	2	2	1	1	2
Malaysia	18	3	8	9	10	3	3	5	3	5	4
Taiwan, China	19	4	5	1	7	8	6	6	4	14	1
Thailand	26	9	3	3	3	17	5	10	5	4	5
Vietnam	78	14	7	22	5	5	15	25	10	7	14
Philippines	95	22	20	6	16	19	18	20	8	16	6
Indonesia *	114	20	23	16	17	11	7	24	7	21	8
Cambodia	135	24	25	23	15	1	9	13	22	22	9

Source: World Bank Report.

On the PFE, in the last five years, foreign investments have increased from US$13.3 billion (2001) to US$ 146 billion in 2010 and US$205 billion in 2014. Prior to 2010, foreign equity investments grew faster than debt instruments. Foreign equity investments increased from US$4.5 billion to US$88 billion, while foreign debt increased from US$8.8 billion to US$57 billion. Post-2010, debt instruments grew faster (almost double, from US$57.3 billion to US$102.5 billion) than equity (from US$88.9 billion to US$102.1 billion). A portion of the debt instruments were local currency denominated debt instruments such as bonds and securities purchased by non-residents. Supported by relatively high yields, the purchase of the local currency government bonds and securities by non-residents increased significantly (see Figure 5).

Figure 5
Local Currency Denominated Instruments Owned by Non-resident,
January 2005 – September 2014
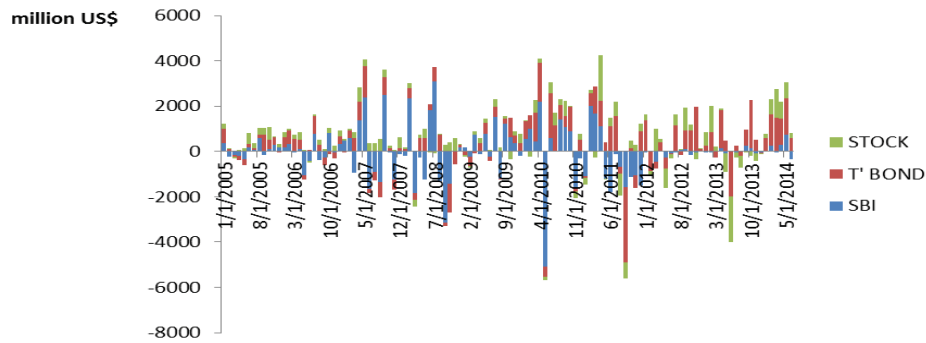
Source: Bank Indonesia, Economic and Financial Statistics.

The above Figure shows that although SBIs (Central Bank Certificates) have relatively high yields, they have significantly decreased since 2010. The provision on the minimum holding period of 3 months, which was increased to 6 months later, affected the interest of non-residents for purchasing the SBI.

On the bank money market instrument (BMM), stronger investment performance stemmed primarily from the private sector. Although its share to GDP is far below FDI and PFE, BMM has grown significantly. On the liabilities side, loans are the main instrument of non-resident investments in Indonesia. Meanwhile on the asset side, currency and deposit is the major instrument for the resident investment abroad. (see Figure 6 below).

Figure 6
Trend on Bank Money Market, by Type of Instruments
2001 - 2014
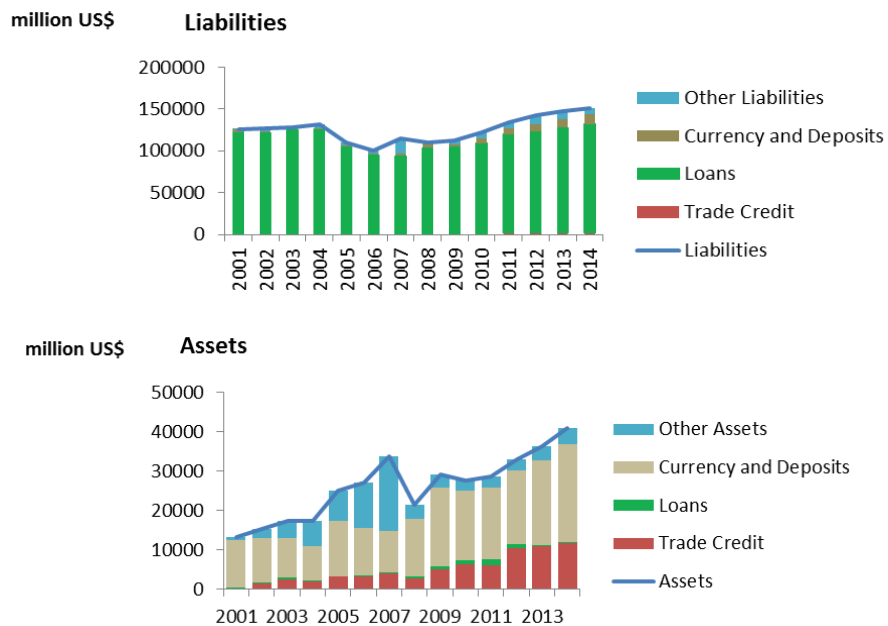
Source: Bank Indonesia, Economic and Financial Statistics.

Using the BIS data on banking claims to Indonesia, we observe that Japan, UK and the US are the top three creditors. The combined loans channeled by the banking system from these three countries increased markedly from US$10.6 billion or 56% of the total loans in March 2005 to US$68.6 billion or 75% of the total loans/banking claims on Indonesia by the end of December 2014 (see Figure 7).

Figure 7
Share of Global Banking Claims on Indonesia
(Q1 2005 – Q4 2014)

Source: https://www.bis.org/statistics/consstats.htm
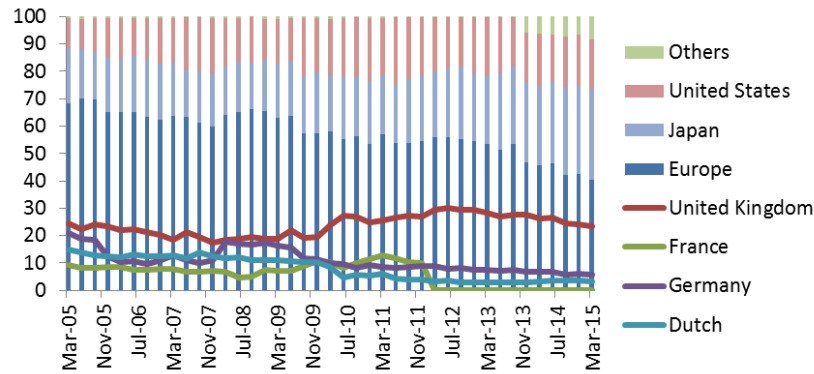
Given the large size of the banking claims on Indonesia from these countries and the lesson learnt from the GFC, we may expect a high potential disruption or reversal if a financial crisis recurs in these advanced economies or if their central banks implement a policy measure that will affect the global liquidity market and interest rate.

On derivative transactions, although they are insignificant compared to the other components (as can be seen in its share to the total as well as to GDP), the volume of derivative transactions between residents and non-residents has been growing. In 2014, they reached US$2.9 billion per day. Spot trades dominate the transactions followed by swaps and forwards. The share of spot, forward and swap transactions to the total derivative transactions accounted for 64%, 4%, 32% respectively in 2014. The dominance of spot transactions pose a challenge for central banks in maintaining exchange rate stability.

From the above analysis, we can determine the factors that could lead to sharp increases or decreases in capital flows. However, while sharp increases or decreases reflect volatility, there are further issues that need to be further assessed.

We observe that the volatility varies across components and periods (see Table 3). The Table shows that bank and money markets is the most volatile instrument on the asset side. Meanwhile, on the liabilities side, foreign portfolio equity and debt followed by bank and money market is the most volatile instrument. The Table confirms that FDI is the least volatile instrument both from the side of assets and liabilities.

The volatility of gross liabilities is almost the same with that of the net, suggesting that volatility of liabilities will directly affect the volatility of the net. This finding confirms that the share and impact of the liabilities side to capital flows and to the GDP is higher and more significant than the asset side.

A higher volatility on gross private capital flows (PKB) than gross of the sub- component suggest that there is a positive correlation amongst the components (see correlation table below that confirms the positive correlation amongst components).

The correlation among the components indicates that (i) the higher correlation of export as the asset side of the current account on GDP (0.97) than investments of Indonesian residents abroad (0.28) and the liabilities side of capital account to GDP (0.82), suggest that exports are the driver of the economy. In other words, the impact of a shock on exports to GDP will be more severe than a shock on capital inflows; (ii) higher correlation of both asset and liabilities side of the current account to GDP (0.97 and 0.98 respectively) than gross liabilities of capital account and its sub-components (0.82 and between 0.54 to 0.89 respectively) also suggest that the impact of a trade shock on GDP is more significant than that for capital flows. However, the correlation of net capital flows on GDP (0.75) and that of the current account (0.57) clearly indicates that, in general, capital inflows are much higher than the current account. These findings also confirm the gap between investments and savings in Indonesia; (iii) higher correlation of FDI to GDP than other components suggest that regardless of the investments abroad, mostly in currency and deposit, FDI of the residents abroad affect the GDP more; (iv) a high correlation amongst components, particularly between the FDI and portfolio debt equity instruments, suggest that residents may select subsidiary loans as the instruments to invest abroad.

Meanwhile, the liabilities side suggests that (i) imports, as expected, have a negative impact, while capital flows have a positive impact on GDP. The correlation of imports on GDP is higher that exports (the asset side of current account on GDP (0.98 and 0.97 respectively) reflect the conventional current account deficit faced by Indonesia; and, (ii) the less developed derivative market

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and lack of derivative instruments (majority spot transactions) and low investments abroad have led to the very low correlation between derivative instruments with other components including foreign reserves.

A much higher correlation between gross CAB and both assets and liabilities than the correlation between KAB to GDP suggests that a shock on external trade or current account will affect GDP more severely. However, the positive correlation which is much higher on the net, suggest that capital flows lead to the economy being better off.

Table 5
Correlation between Components

	Asset									Liabilities								
	GDP	CAB	KAB	FDI	PFE	BMM	DER	RES	PKB	GDP	CAB	KAB	FDI	PFE	BMM	DER	RES	PKB
GDP	1.00									1.00								
CAB	0.97	1.00								0.98	1.00							
KAB	-0.28	-0.30	1.00							0.82	-0.81	1.00						
FDI	-0.56	-0.56	0.55	1.00						0.89	-0.89	0.87	1.00					
PFE	-0.02	-0.04	0.56	0.22	1.00					0.54	-0.54	0.83	0.57	1.00				
BMM	-0.09	-0.11	0.85	0.14	0.24	1.00				0.56	-0.52	0.68	0.51	0.29	1.00			
DER	-0.32	-0.28	0.33	0.33	0.06	0.26	1.00			NA	NA	NA	NA	NA	NA	NA		
RES	-0.05	-0.03	0.01	0.05	0.21	-0.11	0.07	1.00		NA	NA	NA	NA	NA	NA	NA	NA	
PKB	0.95	0.98	-0.29	-0.55	-0.09	-0.08	-0.29	-0.24	1.00	-0.98	1.00	-0.98	0.89	0.54	-0.52	NA	NA	1.00

	Net							
	GDP	CAB	KAB	FDI	PFE	BMM	DER	RES
GDP	1.00							
CAB	0.57	1.00						
KAB	0.75	-0.52	1.00					
FDI	0.79	-0.61	0.81	1.00				
PFE	0.54	-0.34	0.72	0.56	1.00			
BMM	0.31	-0.21	0.59	0.26	-0.06	1.00		
DER	-0.32	0.39	-0.16	-0.36	-0.17	0.11	1.00	
RES	-0.05	-0.10	-0.17	-0.02	-0.12	-0.18	0.07	1.00
PKB	-0.33	-0.33	-0.22	-0.38	-0.13	-0.01	0.20	-0.77

Source: Author's calculation.
Correlation is measured based on nominal value (all in million US$) based on BOP quarterly data from Q1:1995 – Q4:2014.

## 5.2 Factor Affecting Capital Flows and Volatility

Based on our observation on three aspects, namely, the openness, the return on investments and the economy repayment capacity, the analysis is as follows:

5.2.1   Openness of the Economy

We observe the openness index from Q1:2005 (the time when capital flows started to record positive capital flows after the implementation of the new foreign exchange and exchange rate system) until Q4:2014.   We find that the volatility index is much higher after 2005 than prior to 2005 except for derivatives and reserves (see Figure 8 below). The higher maximum index after the year 2005 in comparison to prior to 2005 suggests that the economy has become more opened since 2005. The increase suggests that openness enhances the flow of funds on both the asset and liabilities side.

From a range of 0 (zero) as the minimum index and 100 or almost 100 for the maximum openness index (thus it can just equal zero in certain quarters, and 50 or even 100 in the next quarter or vice-versa), it can be seen that capital flows are becoming more volatile.

Figure 8
Openness Index of Capital Flows Q1 2005 – Q4 2014
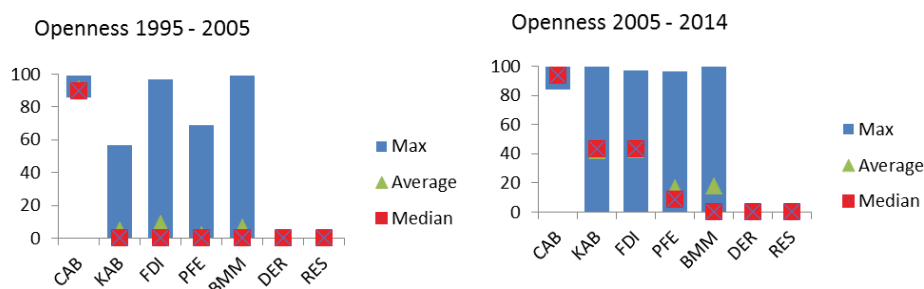
Q1:2005-Q4:2014							
	CAB	KAB	FDI	PFE	BMM	DER	RES
Max	100	100	97	96	100	0	0
Minimun	84	0	0	0	0	0	0
Average	93	42	43	16	18	0	0
Median	93	43	43	9	0	0	0
Q1: 1995 - Q4:2004							
Max	99	57	97	69	99	0	0
Minimun	86	0	0	0	0	0	0
Average	90	5	9	2	7	0	0
Median	89	0	0	0	0	0	0

Source: Author's calculation based on BOP quarterly data since Q1:2005-Q4:2014. Openness is measured as ratio of the absolute value of the sum of resident and non-resident flows to the sum of resident, non-resident and the net flows –see discussion on methodology.

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The increase of the average and median values also suggest that the trade and capital account have become more opened except for derivatives and reserves. The average and median of less than 50 suggest that capital flows still tend to be one sided, while openness stimulate more balanced transactions particularly for foreign direct investments. Meanwhile, the degree of openness is unchanged for derivatives and reserves (prior and after 2005 is still equal to 0) suggesting that derivatives and reserves are perfectly imbalanced. These transactions are recorded on one side only which in this case as assets, suggests that the derivative market/transactions and reserve management are not very active in Indonesia.

Combining the openness and volatility table (Table 4), we find that the degree of volatility is higher prior to the implementation of the new Act on foreign exchange and exchange rate system. In this regard, there are indications that openness affects the volatility of the capital flows. However, a higher volatility of the capital flows during 1998-2003 than that after 2005, suggests that there are factors other than openness that could affect the volatility of capital flows.

1. The world interest rate and policy implemented by the Fed. We observe that the Fed Fund Rate positively affects both short- and long-term LIBOR (London Inter-Bank Offer Rate) as the proxy for global interest rate. Both factors negatively affect stock prices (see Figure 9.a below). Meanwhile, the increase of global interest rate results in a decrease in the growth of banking claims on Indonesia – see Figure 9.b below. Since Indonesia is typically a net capital importer, an increase in global interest rate can lead to the repatriation of non-resident investments in Indonesia (in the search for better returns of investments). In this regard, the implementation of the normalization program (which means an increase of the FFR) will lead to a repatriation or at least decrease the growth of global banking claims for Indonesia. Considering the positive correlation among the components and the experience during the GFC, the flows of other components, namely, FDI and PFE is expected to decline.

2. Although the impact could be temporary (short-term, since it is likely that the authority will implement a tight monetary biased policy to maintain positive interest rate differentials), the impact of a continuous increase in the FFR (thus the LIBOR) is still worrisome as this will put pressure on the exchange rate through its effect on market liquidity. Pressures on the exchange rate (thus exchange rate volatility) could lead to the increase in external debt payment obligations (in term of local currency).

Figure 9
**Trend on World Interest Rate, Volatility Index and Foreign Banking
Claim on Indonesia, Q1 2005 – Q 4 2014**

a. Global Interest Rate and Volatility Index
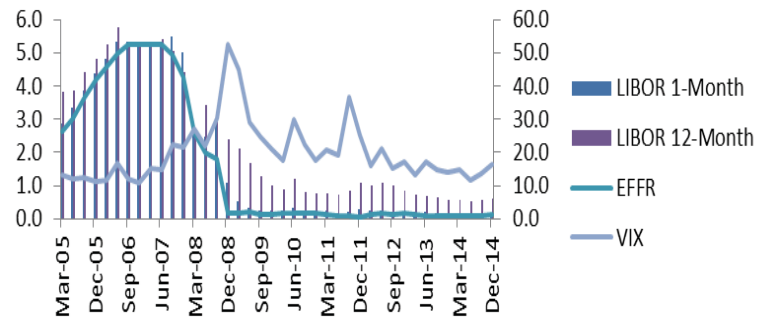
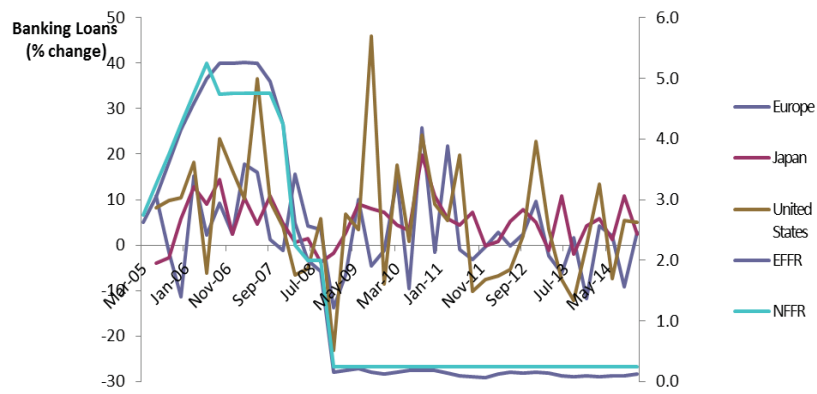b. Banking Claims/Loans to Indonesia and FFR

Table 7

Correlation Amongst Global Financial Market Indicators

		1 month	3 month	6 month	12 month	EFFR	NFFR	VIX
LIBOR	**1-Month**	1.00						
	3-Month	1.00	1.00					
	6-Month	0.99	1.00	1.00				
	12-Month	0.98	0.99	1.00	1.00			
	EFFR	0.99	0.99	0.98	0.97	1.00		
	NFFR	0.99	0.98	0.97	0.96	1.00	1.00	
	VIX	-0.25	-0.20	-0.17	-0.17	-0.17	-0.35	1.00

Source: Banking claims from http://www.bis.org, FFR from http://www.federalreserve.gov

3. The performance of reserves and GDP as a proxy indicator for the economy repayment capacity.   Although recent conditions suggest that reserves are built up largely by the surplus in the capital account, Indonesia's trade account which had conventionally recorded surpluses can be a potential source for the build-up of foreign reserves. Unlike capital flows that generate payment obligations in the future, exports do not impose such obligations.

4. We observe that exports and reserves give a mixed signal. With 6.4 months of imports and external debt servicing (which is above the 3 months of the international standard), foreign exchange reserves are deemed as adequate. However, the increase in debt service as a fraction of exports (DSR reaching 35%) suggests that the short-term repayment capacity of Indonesia is decreasing. The decreasing indicator can also be seen from the ratio of exports and net IIP to GDP (see Table 7 below).

Table 7

Trend on Indonesia Short-term Repayment Capacity, 1990-2014

Indicator	1990-97	1998-2006	2007-10	2011-14
Export/GDP (%)	24.6	41.2	28.5	24.7
Net IIP/GDP	4.7	3.6	2.1	3.3

Source: Author's calculation.

5.3 Policy Responses

From the above description, we may conclude that the domestic and external environments can affect the volatility of capital flows. The domestic environment, as the push factor of volatility, includes the openness of the economy, growth rate, current account performance, and reserves. Meanwhile, the external environment, as the pull factor of volatility, includes monetary policies undertaken by central banks of advanced economies which affect the world interest rate and the global liquidity market. Since the changes in the external environment are beyond the control of the national authority, we have focused our study on policy measures for addressing the unfavorable domestic environment which affects capital flows and their volatility as follows:

1. For addressing the negative impact of the increase in the current account deficit and volatility of capital flows on market liquidity, pressure on inflation and exchange rate; policy responses include:

   - Conducting normative tight monetary policy for addressing the impact, particularly, on inflation pressure.

   - Changing the auction mechanism for the reverse repo of government securities such as the SBI and Bank Indonesia Deposit Certificate, from variable rate tender to a fixed-rate tender.

   - Lengthening the tenor of government securities (to at least 3 months) and term deposit (up to 3 months).

   - Imposing a minimum holding period on government securities and BI certificates.

   - Impose a ceiling for spot and forward foreign exchange transactions and requirement to provide appropriate documentation for transactions above the permissible limit. For spot transactions, the ceiling is being reduced from US$100,000 to US$25,000 per customer per month. Meanwhile for the forward-sell, the ceiling is being raised from US$1 million to US$5 million per transaction and customer, with underlying transactions including foreign currency deposits held in the country and abroad.

   - Impose a ceiling for external debt and a permit mechanism to borrow abroad for financial institutions.

   - Adjusting the auction frequency of foreign exchange swap.

   - Provide foreign currency repo and deposits facilities.

- Increase the foreign liquidity requirement.

- Licensing/approval mechanism for financial/banking institutions to borrow abroad, and announcing regulations on reporting and prudential external debt management for corporate sector.

- Conduct bilateral swap arrangement or credit facility under the Chiang Mai Initiative for precautionary purposes.

2. For addressing the structural problem of the current account, stimulate investments, and export etc., policy measures include:

- Policies to stimulate exports such as:
  - Prohibiting (previously limiting) the export of raw and unrefined quarrying and mining products. The producers are also required to construct smelters in Indonesia. The provision is aimed at increasing the value-add of natural resource-based commodities as the predominant exports of Indonesia. The government announced the regulation on this in 2009 with the enactment of Act No.4 (the Act was effectively implemented in 2014).
  - Establishing the Exim Bank in 2009 with the primary task of providing financing, guarantee and insurance for export activities of Indonesian residents.
  - To stimulate trade on services (which typically record large deficits), the government announced the provision for the use of national (sea and air) carriers for the transportation of goods and residents of Indonesia (particularly the public and civil servants) to and from abroad. The government also undertook structural reforms on licensing and port storage-dwelling time.

- To attract and stimulate foreign and domestic investments and country-wide economic development, measures include:
  - Provision of tax exemptions and reductions for investments in disadvantaged/underdeveloped regions/areas, imports of machinery and capital good for developing product diversification. The government recently also provided tax exemptions for foreign exchange earnings that are maintained in domestic banking institutions.
  - Expediting licensing services through the implementation of "one-roof" licensing system.

Recent developments suggest that the combination of the increase in global uncertainty stimulated by policy measures taken by the Fed or The People's

Bank of China, have placed pressure on the exchange rate and market liquidity. The impact can be seen on the current account deficit that has shown slow increases.

In this regard, without changing the direction of liberalization and integration of financial systems, policies such as accumulating foreign reserves through the purchase of future export earnings, provision of export credit facility under the G to G arrangement for exports to non-traditional (but prominent) Indonesian export destinations, minimum maturity for external financing (except for trade purposes), prohibiting or at least limiting the use of external debt to finance consumption, establishing provisions on the obligation to provide reserves based on the remaining maturity of external debt (particularly for financial institutions and state owned enterprises and large corporate) need to be assessed further.

6. Conclusion

Indonesia - like other SEG developing countries which are facing IS gap - has benefited significantly from the implementation of outward looking policies to promote an open economy. Deregulation and liberalization policies to engender a more open economy and financial market have led to massive inflows of foreign fund into Indonesia, stimulating relatively high and sustainable economic growth and higher income per capita. As the domestic economy and financial system are becoming more integrated into the regional and global environment, capital flows are becoming more volatile.

The stylized facts on economic and capital flows include: (i) although there is a shift in the structure of the economy from agriculture and natural-resource based sector to manufacturing, the sector remains the dominant source of Indonesia's exports. Understandably, such commodities' contributions are relatively low value-added and are vulnerable to the changing world price and demand; (ii) the surplus in the trade account and large deficits in the trade service account have led to a persistent current account deficit; (iii) the large capital account surplus has often more than offset the current account deficit and thus increased foreign reserves; and (iv) Indonesia is natural destination for foreign direct investments.

From the literature, the domestic and external factors that affect the volatility of the capital flows include openness, weak macroeconomic policy or inconsistencies among institutions, worsening economic growth (or crisis), financial system vulnerability, trade, exchange rate, reserves, the global economic downturn and contagion crisis of advanced economies, policy measures undertaken by

advanced economies that affect the global liquidity financial market and global uncertainty risks, falling commodity prices, and the global interest rate. Deterioration in these factors adversely affect capital flows and their volatility.

Using the trend and event analysis, we analyzed factors that could affect capital flows such as sovereign ratings, contagion crisis of major trading partners, and change in expectations. The factors which affect returns on investments or economic repayment capacity such as economic growth, reserves and export, as well as policies undertaken by central banks of advanced economies that affect the global interest rate and market liquidity can also impact capital flows and volatility.

1. The trend analysis suggests that: (i) a more open economy and financial market not only stimulate trade and capital flows but also their volatility. A higher share of gross liability to GDP than the asset side implies that the country faces the I-S gap. Therefore, the effect of shock of the liabilities side on economic growth is much stronger than the shock on the asset side; (ii) higher volatility of gross private capital flows (PKB) the than sub-component implies a positive correlation among components; (iii) in terms of its share to total liabilities and GDP, FDI is the dominant component followed by portfolio equity and debt instruments. FDI is the least volatile and the fastest component to recover in comparison to other components. On the other hand, foreign debt and equity portfolio are the most volatile component. Banking and money market instrument as a component takes the longest time to recover; (iv) there is evidence that crisis affects the volatility of the capital flows. Volatility is greater when triggered by weaknesses in the domestic environment rather than the contagion effect; (v) there is a positive correlation between components, suggesting that a change in certain components could also influence other component to change; (vi) higher correlation of the gross term for both assets and liabilities of the current account rather than capital account with the GDP, suggests that the impact of external trade is more severe on the economy than a shock on the capital account. However, higher correlation of the net term suggests that the impact of the capital account, in general, is more severe than a shock on trade. The shock on the capital account is more risky for monetary and financial stability; (vii) policy measures undertaken by central banks of advanced economies could raise global uncertainty through the impact on global interest rate and market liquidity. Given the fact that European countries (especially UK), US and Japan are the major foreign investors in FDI and BMM (bank and money market), the implementation

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of the normalization plan could lead to the reversal of foreign investment flows into Indonesia.

2. Policy responses have been taken to deal with the structural problem of the economy and the sources of volatility such as: (i) measures for addressing the growing imbalances in the BOP such as the current account deficit, increased volatility of capital flows, which could affect market liquidity and put pressure on inflation and the exchange rate. The policy responses include tight-biased monetary policy, changes in the auction mechanism of reverse repos, lengthening the tenor of government securities, imposing ceilings on the foreign exchange net open position, expediting the licensing/approval process to borrow from abroad, enhancement of the reporting system and prudential external debt management for private-corporate sector; (ii) measures for addressing structural problems of the current account, stimulating resident and non-resident investments, stimulating international trade particularly exports, include prohibiting the exports of raw and unrefined quarrying and mining products, establishing the Exim Bank, mandatory use of the national (both sea and air) carriers for the transportation of goods by the residents of the Indonesia to and from abroad, streamlining the licensing and the port storage-dwelling time; (iii) measures to attract and stimulate investments, both foreign and domestic, for country-wide economic development which include tax exemption or reductions for investments in disadvantaged/underdeveloped regions/areas, import of machinery and capital goods for developing product diversification as well as on foreign exchange earnings that are kept in domestic banking institutions, expediting of licensing services through the implementation of "one-roof" licensing system.

However, unilateral policy measures would not be as effective as multilateral policy cooperation for addressing global economic and finance imbalances. Unfortunately, even the measures undertaken by the advanced economy favors their own domestic interests over the interests of other countries.

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List of Abbreviations

AEC	ASEAN Economic Community
BI	Bank Indonesia
BIS	Bank for International Settlement
BMM	Bank and Money Market (other investments on Balance of Payment)
BOP	Balance of Payment
CAB	Current Account Balance
DER	Derivative (type of market instrument)
DGE	Degree on Gross Exposure (fraction of asset and liabilities of a certain country to the total asset and liabilities.
DLE	Degree on Liabilities Exposure (fraction of liabilities on certain components or liabilities to certain major home country to the total liabilities)
DSR	Debt Service Ratio
FDI	Foreign Direct Investment
FFR	Fed Fund Rate (the monetary policy interest rate of US Federal Reserve Bank)
GDP	Gross Domestic Product
GFC	Global Financial Crises
G to G	Government to Government
IIP	International Investment Position
KAB	Capital Account Balance
LIBOR	London Inter-Bank Offer Rate
PKB	Private Capital Balance/Flows
PFD	Portfolio Foreign Debt
PFE	Portfolio Foreign Equity
SEG	SEACEN Expert Group on Capital Flows
SEACEN	South East Asian Central Banks (SEACEN) Research and Training Centre
SBI	Sertifikat Bank Indonesia/Bank Indonesia Certificate
UK	United Kingdom
US	United States
US$	United States Dollar (the US currency)

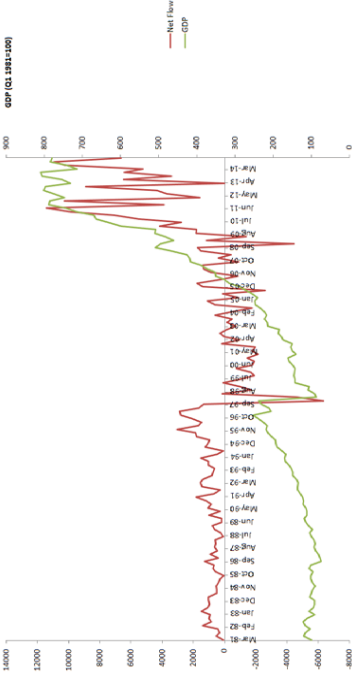**Appendix**

GDP and Capital Flow (Q1 1981 - Q4 2014)

a) Capital Inflow (Liabilities side) and GDP (Q1:1981=100)
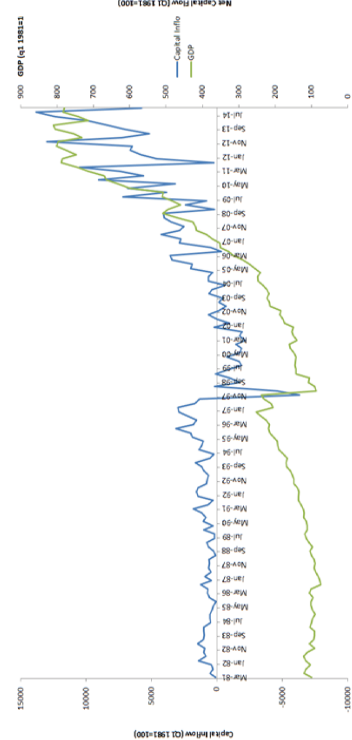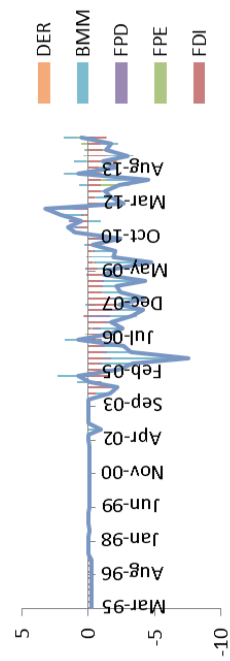
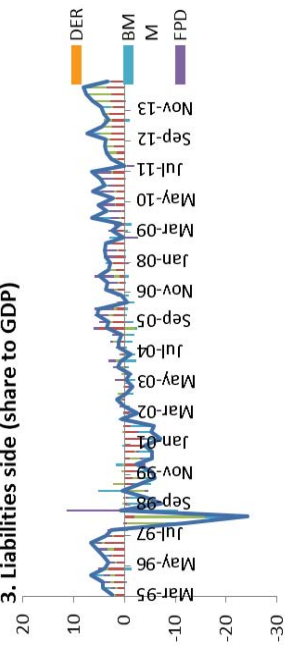b) Net Flow and GDP (Q1:1981=100)

Share of the Capital Flow to GDP (Q1:1995 – Q4:2014)

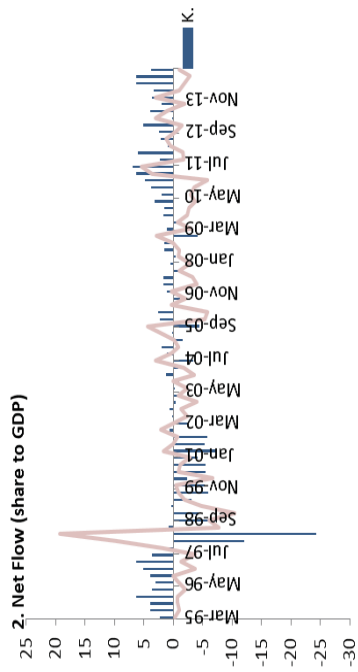1) by BOP Component (Asset, Liabilities and Net Flow)
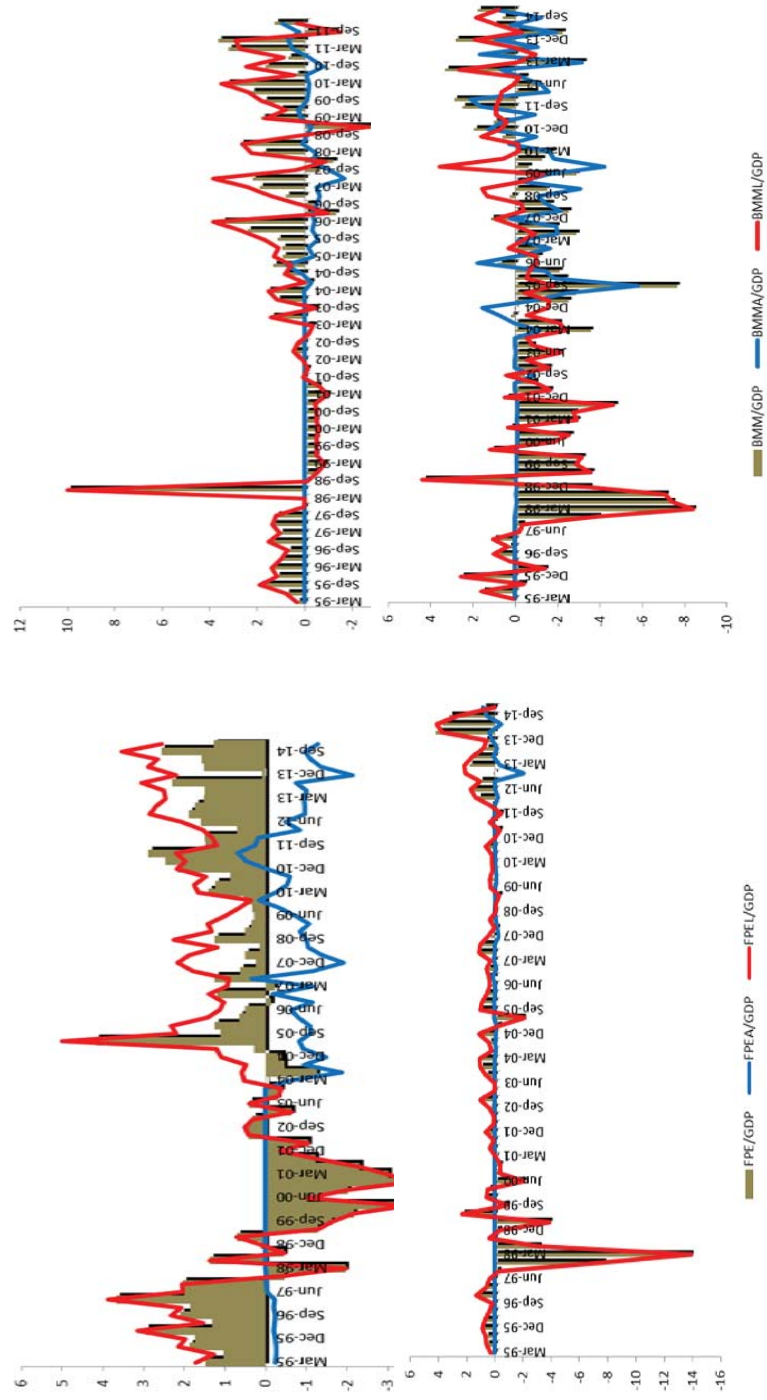
1. Asset side (Share to GDP)

3. Liabilities side (share to GDP)

2. Net Flow (share to GDP)

2) by types of instruments

Chapter 4

RECENT DEVELOPMENTS IN CAPITAL FLOWS: THE CASE OF SOUTH KOREA

By
Dr. Kim Young Ju[1]

1. Introduction

In this paper, we explore the broad trends of capital flows in South Korea since 1980. Korea is a good example for a case study because of its relatively long history of financial liberalization compared to other SEACEN economies. It began opening its capital markets as early as in the 1980s, and has continually liberalized its financial and capital markets since then. During its long journey to financial globalization, Korea suffered two financial crises: the Asian financial crisis of the late 1990s and the global financial crisis in 2008. In this paper, we seek to capture, based upon flow standards, the patterns of Korea's non-resident and resident capital flows, and its net flows from non-residents and residents combined. We also focus on how the composition of capital flows by type has changed. Although this paper is limited to simple analyses of the stylized facts of Korea's capital flows, we hope it will be of use to other SEACEN economies when designing schemes for financial liberalization and capital flow management. The data used in this note is yearly in US dollars, ranging from 1980 to 2014, retrieved from the Bank of Korea's Balance of Payment statistics.

2. Balance of Payments Composition

Before the Asian financial crisis in 1997, Korea had usually experienced annual current account deficits with the exception of the periods from 1986 to 1989, and in 1993. Since the crisis, Korea has recorded continued current account surpluses on a yearly basis. The magnitude of the current account surplus, as a percentage of GDP, has increased since the global financial crisis in 2008, and it surged to over 6% of GDP in 2013 and 2014.

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1. Capital Flows Analysis Team, International Department, Bank of Korea.

Figure 1
Current Account
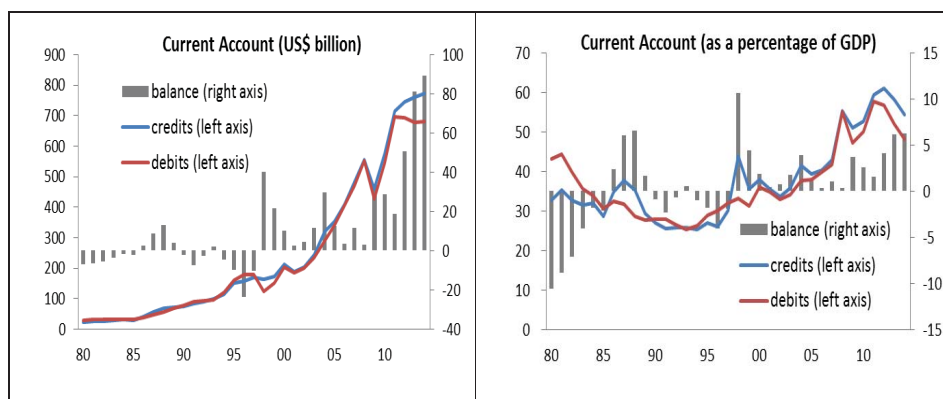
The flip side of the current account balance is the capital account balance. As shown in Figure 2, the overall balance excluding errors and omissions should be zero with the capital account moving in the opposite direction from the current account; the capital account is in surplus when the current account is in deficit. During the recent period of current account surpluses Korea has, therefore, been a net recipient of trade and income related flows (current account) and a net exporter of capital to the rest of the world (capital account).

Figure 2
Balance of Payment

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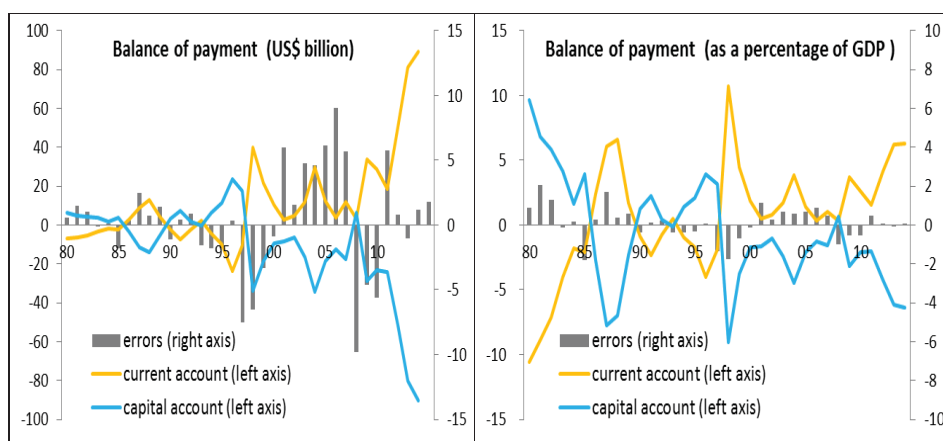
3.   Overview of Capital Flows in Korea

Before the Asian financial crisis in 1997, net capital flows were largely positive in line with the current account deficits. In other words, Korea imported capital before the crisis, with foreign capital financing domestic investments and, contributing to the long-term economic growth. After the crisis, however, Korea became a capital exporter. Figure 3 breaks down Korea's gross capital flows into residential and non-residential flows. Total gross capital flows in Korea's capital account can be largely characterized as "non-resident inflows" and "resident outflows". Non-resident capital flows have generally shown positive annual figures and resident capital flows, negative ones. Non-resident capital inflows have continued to expand greatly since the 1980s, interrupted by the two crisis periods: the Asian financial crisis in 1997 and the global financial crisis in 2008. Noticeably, non-resident capital inflows increased considerably in the periods leading up to both crises, and then decreased or even reversed during the crisis periods. They reversed sharply in 2008. Resident capital flows, at the same time, also reversed sharply, to offset the non-residential outflows. Specifically, while non-residents sold their Korean assets and repatriated the proceeds (capital outflows) during 2008, Korean residents were at the same time selling their international assets and repatriating those proceeds (capital inflows). Since the crisis, non-resident inflows have declined considerably, with resident outflows dominating the capital account movements. The increase in the resident outflows can be attributable to the Korean government's promotion of residents' active overseas investment beginning the mid-2000s to offset increases in the FX supply resulting from current account surpluses and foreign capital inflows. Meanwhile, the decrease in the non-resident inflows was mainly related to the surge in derivative outflows in the wake of the crisis.

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Figure 3
Capital Account
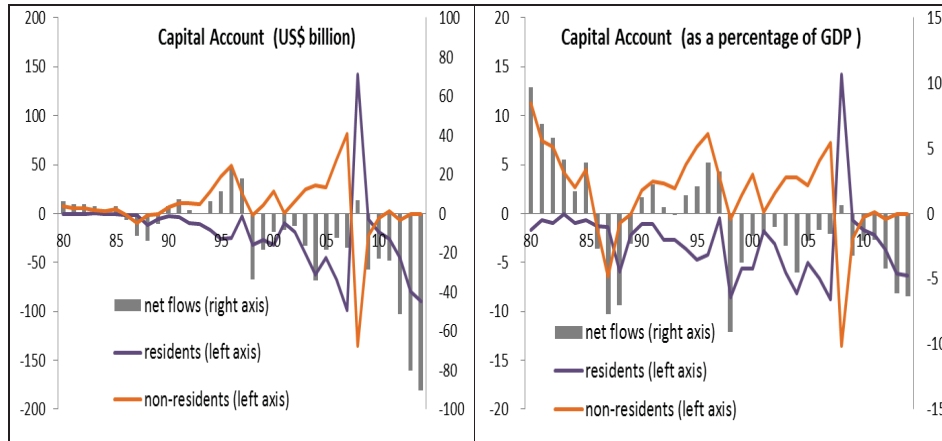
Before moving to the composition of capital flows, we will explore a brief history of Korea's financial liberalization policies. This is important because changes in composition of non-residential flows can be affected by those policies. In the 1980s, Korea adopted the pegged exchange rate system under which current account balances were determined autonomously. Thus Korea's policies on capital inflows were used to accommodate the overall balance of payments. When the current account was in deficit, the government took measures to liberalize non-resident inflows, while tightening regulations on resident outflows. In the early 1990s, the Korean government began to push forward financial liberalization and opening of the financial sector including the adoption of the managed floating exchange rate regime in 1990. Polices on non-resident capital inflows in the 1990s centered on lifting regulations on short-term overseas FX borrowing of domestic financial institutions (Bank loans), while partly liberalizing non-resident portfolio inflows. In the wake of the Asian financial crisis in 1997, the Korean government introduced regulations on short-term FX bank loan flows in order to prevent maturity and currency mismatch, which were widely blamed for the crisis. The government, on the other hand, pushed forward a far more extensive capital market opening to attract more non-resident FDI and portfolio inflows. The underlying idea of this policy mix (regulation on short-term bank loans inflows and further liberalization of capital markets) was to reduce systemic risk by restricting "bad inflows (short-term banks loans)" and liberalizing more

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"good inflows" such as FDI and portfolio inflows. This policy mix changed the composition of the capital account by increasing the portion of portfolio inflows and at the same time, reducing the portion of bank loans inflows in the 2000s and 2010s. Looking at the trends of non-resident capital flows by type (Figure4), we see that changes in the composition of the non-resident inflows can be explained by policy changes on financial liberalization. In the 1980s, non-resident flows were dominated by bank loans flows due to the lack of capital market development. The expansion in non-resident flows in the 1990s centered on bank loans, with portfolio investments on the rise. Entering the 2000s, the amount of foreign equity investment increased, in addition to the amounts of bond investments. More recently, derivative flows have become one of the main drivers of non-resident flows, together with bond and equity investment. Non-resident derivative flows were mainly related to FX forward contracts. Meanwhile, non-resident flows for direct investment have not been large in size, but have remained steady.

Figure 4
Non-resident Flows
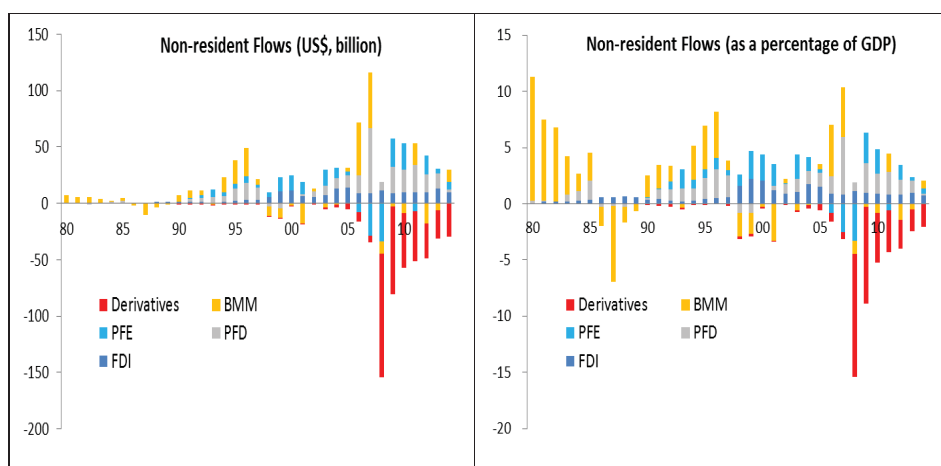

Viewing the trends of resident capital flows (Figure 5), we see that they showed the same patterns before and after the crises as non-resident capital flows. Resident capital outflows expanded in the periods before both of the two crises, but then contracted or reversed during the crisis periods. The magnitude of resident capital outflows was much bigger in the 2000s and 2010s than in the

1990s, a fact attributable to the Korean government's brisk promotion of active resident' overseas investment in the mid-2000s, to offset a surge in foreign capital inflows, at a time when both the current and the private capital accounts were in surplus. In terms of the type of resident capital flows, they were led by loans in the 1990s but increased, centering on equity and bond investments in the 2000s. More recently, resident derivative flows have grown considerably, as residents have engaged increasingly in FX forward contracts with non-residents. Meanwhile, resident outflows for direct investment have expanded steadily throughout the whole period.

Figure 5
Resident Flows
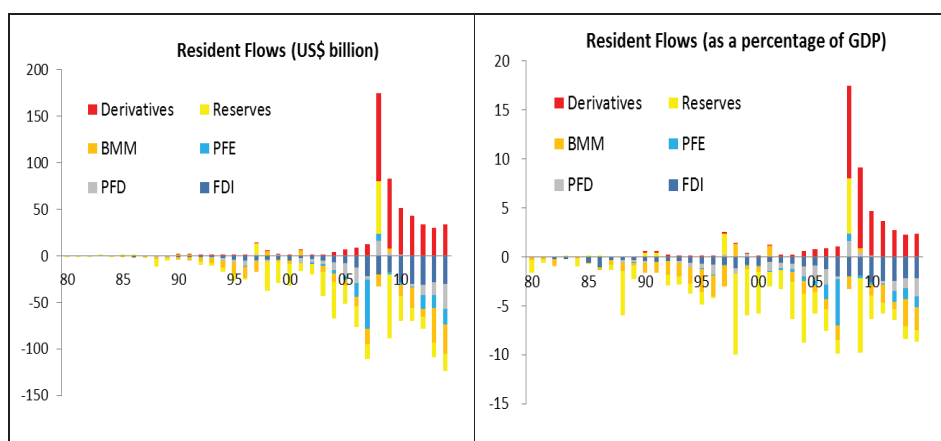
4. Openness to Capital Flows

To show the trends of openness to capital flows in Korea, we have constructed an openness index[2] for the aggregate capital account. As shown in Figure 6, the index began to rise starting the early 1990s, when the Korean government accelerated its capital account opening. Since the openness index for the aggregate capital account has been shown to be quite volatile, and evolved differently during different stages of Korea's economic and financial market development, the sample period is broken down into three sub-periods (1985-1990, 1991-1999 and 2000-2014) and e the average values of the index calculated for each period. As Figure 7 shows, the average openness index for the capital account in the 1990s turns out to be the highest among those in the three sub-periods. Figure 7 also explores the evolution of openness by capital flows types.

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2. The openness index is constructed as a 5-year moving average of annual ones.

Figure 6
Openness Index
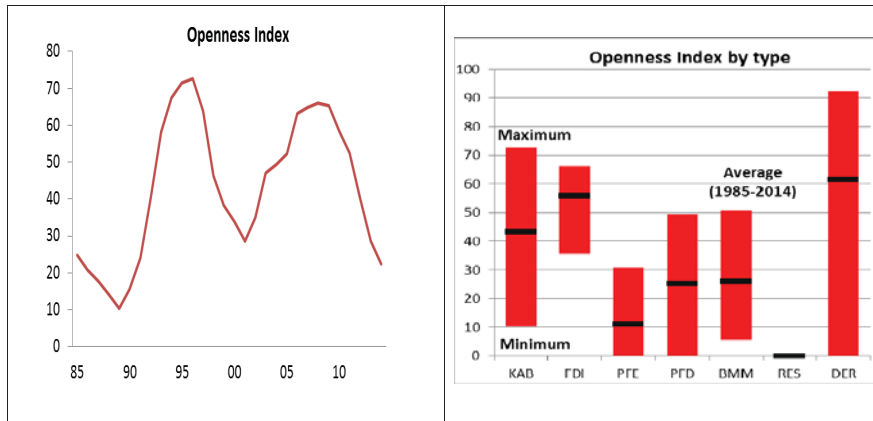
Figure 7
Openness Index

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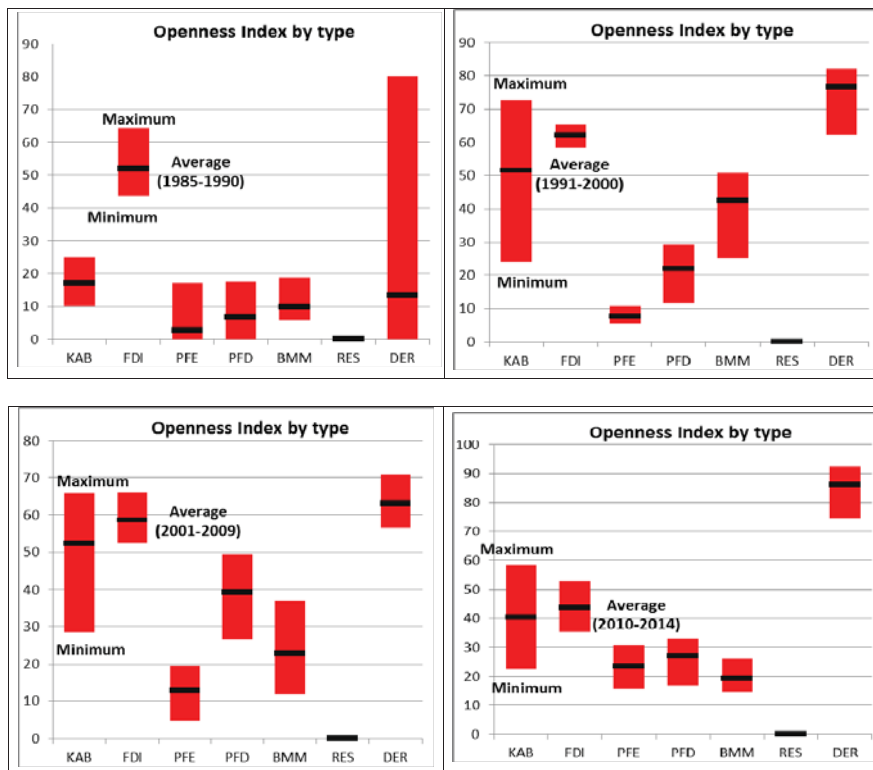
Composition of the Balance of Payments
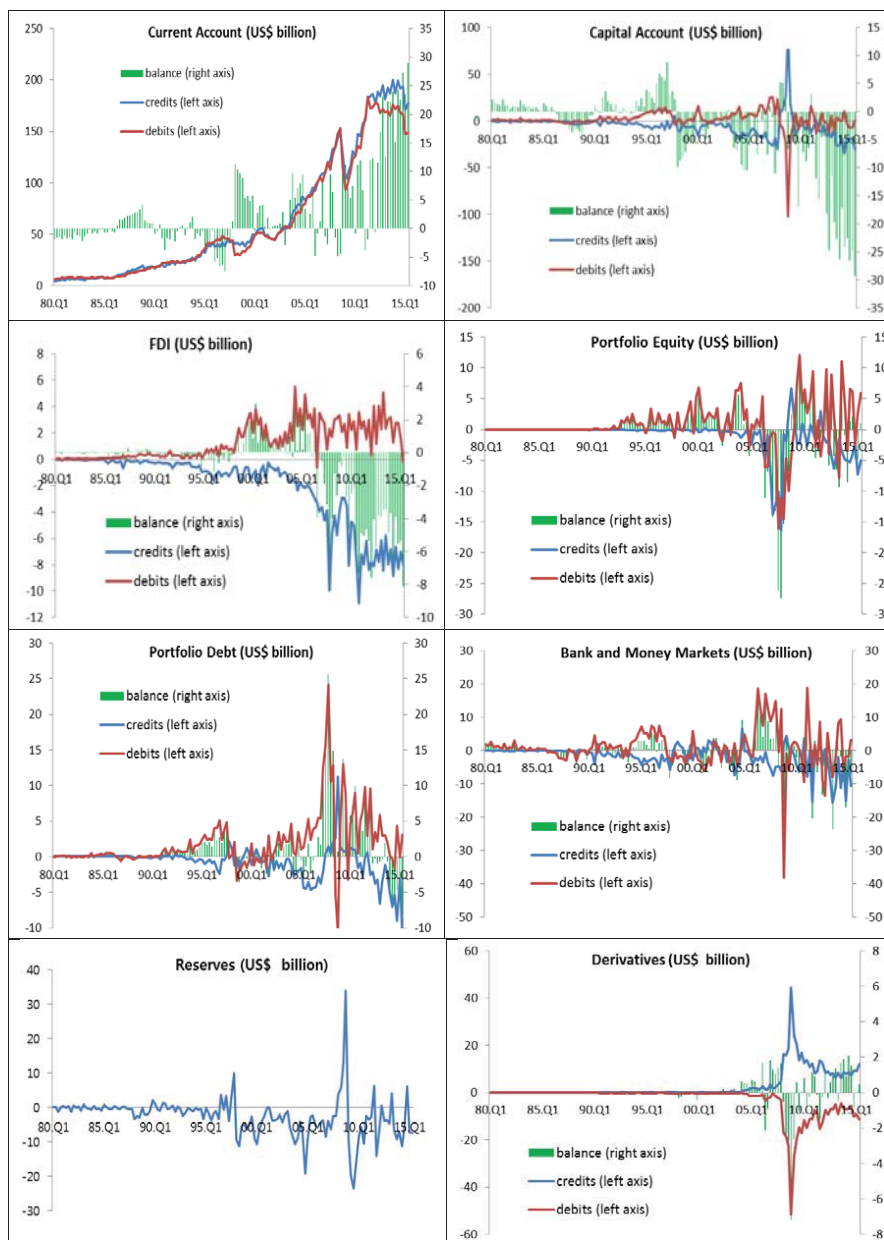
Chapter 5

MANAGING CAPITAL FLOW VOLATILITY: RISKS AND CHALLENGES IN MALAYSIA[1]

By
Sim Wee Haw
Tengku Muhammad Azlan Ariff

Introduction

The flow of international capital has always been an integral part of Malaysia's economic and financial market development. Possessing a highly open capital account, Malaysia has been both a large recipient and exporter of capital. This mobility has imparted substantial benefits in terms of growth, development, transfer of skill and technology as well as moving Malaysia higher up the global value chain.

Nevertheless, the transition to higher global trade and financial integration is not without risks. Certain types of flows remain highly volatile while some others are heavily susceptible to stress in the source countries. It is important for policymakers to be vigilant of the potential risks it may pose, as it can have adverse implications on the domestic economy and financial markets. It is enough to look to the recent decade for evidence, where coincidentally, Malaysia experienced large non-resident portfolio inflows in the years following the Global Financial Crisis (GFC), only to see it reverse at greater speed during times when there were spikes in risk aversion. The risks can be multi-faceted, starting from an outflow from the capital account and potentially spilling over into liquidity and financing conditions, asset prices and ultimately the real economy.

In this paper, we first explore some of the broad trends in capital flows to Malaysia to set the stage on how the different types of capital flows to and from Malaysia have evolved over the past decade. We then explore some of the issues surrounding capital flows to Malaysia and the attendant risks. The final section rounds up with some thoughts on implications for policy.

The paper will be structured in the following sections:

1. Capital flow developments and trends from the balance of payments perspective.

2. Issues surrounding capital flows.

3. Thoughts on implications for policy.

4. Conclusion.

Throughout, the balance of payments identity is employed:

$$CAB=KAB=FDI+PFE+PFD+BMM+RES+DER$$

where CAB is the current account balance, KAB is the capital account balance,[2] FDI is foreign direct investment, PFE is portfolio equity investment, PFD is portfolio debt investment, BMM is bank and money market flows,[3] RES is the change in official foreign exchange reserves, and DER is derivatives.[4]

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2. International standards specify that the 'financial' account is the main counterpart to the current account. However, since we are mainly discussing capital flows, we prefer to use the term capital account to avoid confusion. The actual item in the official statistics that is called the capital account is usually very small and adds little to the analysis at hand.

3. In the balance of payments, these flows appear under the category of 'other investment'. As bank loans and money market transactions are the main components of this category, we refer to these flows as 'bank and money market' flows to lend them a more meaningful label.

4. Capital transfers, flows associated with non-produced/non-financial assets, as well as errors and omissions, are ignored in this analysis.

1. Capital Flow Developments and Trends from the Balance of Payments Perspective

1.1 Current Account

Being an open economy with significant trade activities, Malaysia's current account evolution is a good starting point to understand the behavior of capital flows. Although the current account balance reflects the excess of exports over imports, it also mirrors the saving-investment surplus in an economy. In other words, the current account balance can be assessed in terms of both the international trade perspective and the saving-investment behavior in an economy.

Since the Asian Financial Crisis, Malaysia's current account balance has consistently recorded a surplus. Given this surplus, Malaysia remains a net capital exporter to the world. The saving-investment surplus reflects an economy that is saving more than it is investing and these excess savings can be used to accumulate reserves to provide a buffer against external vulnerabilities or channelled abroad to finance the consumption and investment activities of other economies, either in the form of extension of private sector loans or investments abroad.

The strong performance of Malaysia's exports was due, in large part, to the broad diversification of products and the expansion of trade in new markets. In particular, commodity exports, which have low import content, played an important role in contributing to the increase in the current account surplus. However, the GFC marked the beginning of a moderating trend in the current account surplus. Weaker global demand and lower commodity prices have resulted in lower exports for Malaysia in recent years. Imports, on the other hand, increased significantly, driven by stronger domestic demand, especially in private investment. The outcome of these trends has been the narrowing of the saving-investment surplus in Malaysia.

Figure 1

Malaysia: Current Account

USD billion

Credit

Debit

Narrowing of S-I surplus since GFC

CA Balance

Source: Balance of Payments Statistics, Department of Statistics Malaysia.

Figure 2

Malaysia: Balance of Payments

USD billion

Current account

Capital account

Source: Balance of Payments Statistics, Department of Statistics Malaysia.
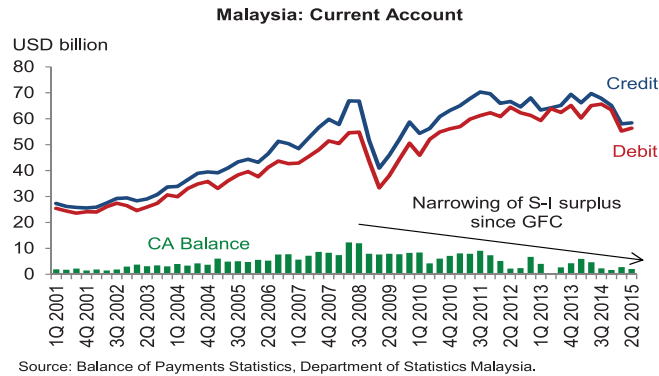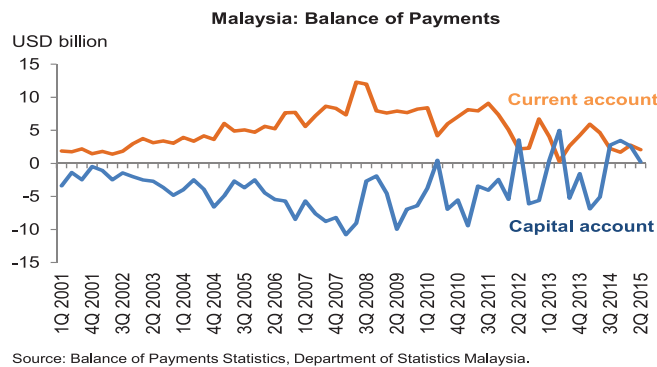
1.2 Capital Account: Overview

Being a country with a highly open capital account,[5] Malaysia's total gross capital flows have generally reflected two-way flows by residents and non-residents. Non-residents are free to invest in Malaysia by way of direct investments into the real sector or portfolio investments into the domestic financial market. At the same time, the growing needs of residents to expand globally,

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5.   See Appendix1 for a measure of capital account openness.

tap on international resources as well as seek for higher diversification and returns have encouraged residents' investment abroad. This was facilitated by the gradual and continuous liberalization of foreign exchange administration rules over the years which have allowed residents to increasingly channel Malaysia's surplus savings abroad.

Figure 3

Malaysia: Capital Account
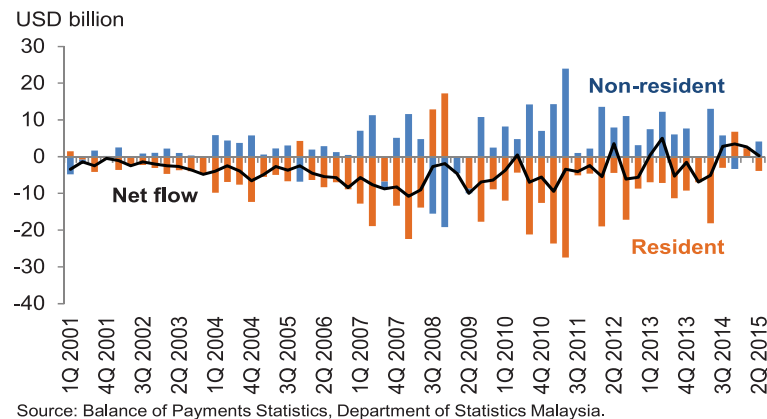
Source: Balance of Payments Statistics, Department of Statistics Malaysia.

Non-resident outflows are generally coupled with a rebalancing by residents who unwind their assets abroad and repatriate them back into the country. There are times, however, when the two-way trend was punctuated. During the height of the GFC in 3Q and 4Q 2008, while residents initially did adjust to non-resident outflows and ringgit depreciation by repatriating their investments from abroad, the recovery of two-way flows did not occur until 3Q 2009. This break in trend can also be seen in the most recent period of capital reversal and is more pronounced when we look at portfolio investment flows.

1.3 Capital Account: Non-Resident Flows

Figure 4

Non-Resident Flows

USD billion

Source: Balance of Payments Statistics, Department of Statistics Malaysia.
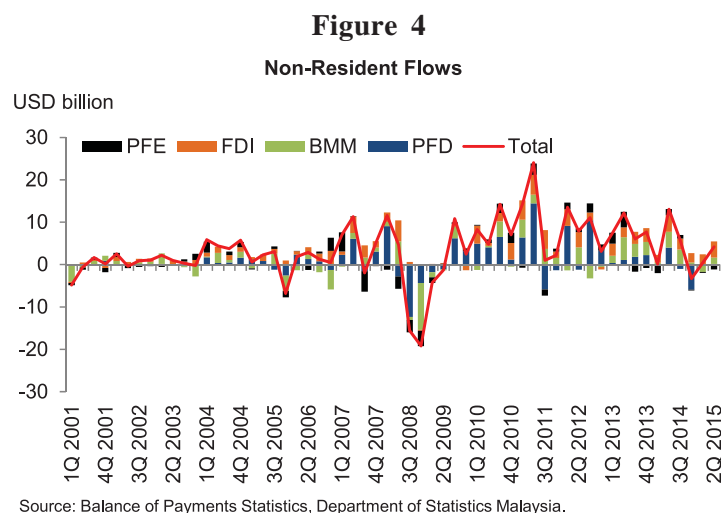
1.3.1 Foreign Direct Investment (FDI)

In the 1990s, inflows of net FDI into Malaysia were concentrated in the manufacturing sector, particularly the electrical and electronics (E&E) sub-sector. The recent decade, however, saw the rising diversification of FDI into the services sector, particularly into the financial services sub-sector. This includes investment in the Islamic finance industry. While FDI continues to pour into Malaysia, the magnitude moderated in the 2000s, averaging 3.2% of GDP for the period 2000-2014 (1990-1999: 6.6% of GDP). The moderation was due mainly to greater maturity and more established presence of multinational corporations (MNCs) operating in Malaysia; and the increasing share of FDI channelled into the services sector which is less capital intensive, yet tends to have higher value-added and are more skill intensive with higher labour productivity.

FDI flows have generally been stable in the recent decade and were only really affected after the GFC, when FDI moderated, particularly in the first half of 2009, due to the sharp deterioration in global economic conditions.

1.3.2   Non-resident Portfolio Investment (NR PFE and PFD)

A key development since the early 1990s has been the surge in non-resident portfolio flows into Malaysia. While portfolio flows have helped lower costs of financing and deepen the domestic financial markets, these flows are highly sensitive to both global and domestic developments. Since the early 2000s, Malaysia has experienced several episodes of large non-resident portfolio inflows and outflows. Prior to the peak of the GFC, Malaysia accumulated around US$28 billion of non-resident portfolio flows, amounting to 14.7% of GDP, between 2004 and the first quarter of 2008. These inflows were mainly driven by Malaysia's strong economic fundamentals as well as the prospects of better corporate outlook as the economy recovered strongly following the aftermath of the Asian financial crisis. In addition, the rapid development of the domestic bond market also attracted sizeable inflows of foreign portfolio investment into the debt securities market.

These inflows eventually reversed at the peak of the GFC, resulting in non-resident portfolio outflows of US$28 billion (-13.6% of GDP) from 3Q 2008 to 2Q 2009. The inflows recovered in the second half of 2009 amid stronger growth prospects in the region as well as further normalization of conditions in the international financial markets. At the same time, policy actions by central banks in the advanced economies, which led to an environment of low global interest rates and flush global liquidity, resulted in strong yield seeking behaviors among international investors. Since the introduction of the first quantitative easing measure (QE1) by the US Federal Reserve (Fed) in November 2008, Malaysia had accumulated around US$68 billion of non-resident portfolio flows (20.1% of GDP). Around 80% of these flows were investments into the Malaysian debt securities market.

Figure 5

Non-Resident Portfolio Flows by Instrument

Source: Balance of Payments Statistics, Department of Statistics Malaysia.

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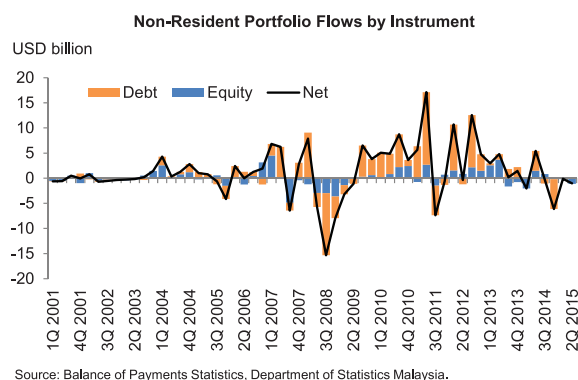
Post-GFC, Malaysia experienced intermittent periods of outflows, for example during the second half of 2011 due to the escalation of the euro area sovereign debt crisis (SDC) and during the US taper tantrum in May 2013. Recently, since September 2014, Malaysia is once again facing large portfolio reversals that have caused the ringgit exchange rate to depreciate by more than 20% against the US dollar to levels last seen in 1998 during the AFC. The recent outflows were mainly driven by external factors and are experienced by most countries in the region. These include the strengthening US dollar as a result of anticipation of rising interest rates in the US, rapidly declining global crude oil prices, and uncertainties on the global growth momentum.

1.3.3 *Non-resident Bank and Money Market Flows (NR BMM)*

BMM flows to Malaysia (other investment flows in the BOP) mainly reflect external loans undertaken by the public and private sector, interbank placements and deposits as well as trade credit flows. The growth in external liabilities of the banking system is expected for a country with a highly liberalized financial system. The presence of locally incorporated foreign banks and the expansion of domestic banks regionally have led to increased financial integration, and cross-border banking flows have become a norm. Part of the increase in banking system liabilities also reflect the liquidity management activities of domestic banks, where the surplus liquidity of its regional subsidiaries is placed in Malaysia for redistribution to regional subsidiaries facing a liquidity deficit.

Despite the strong financial position of Malaysian financial institutions, banking system liability flows can be volatile, especially during periods of stress in source countries. There was some evidence of this during the GFC in 2008 and during the euro area sovereign debt crisis in 2011 when international bank lending to Malaysia contracted. In this regard, BIS International Banking Statistics can be used to explore potential vulnerabilities from banking system flows. This will be covered in more detail in a later section. Thus far, despite the volatility in banking system liability flows, Malaysia's financial system has remained resilient and overall financing of the economy has not been affected.

1.4 Capital Account: Resident Flows

Figure 6

Source: Balance of PaymentsStatistics, Department of Statistics Malaysia.
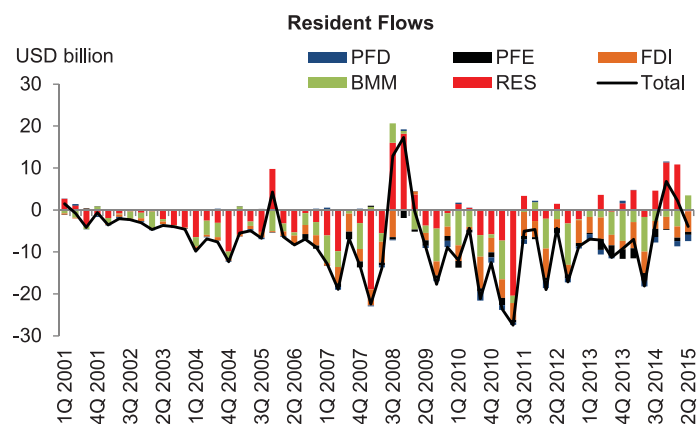
1.4.1 Direct Investment Abroad (DIA)

Being a highly open economy, Malaysia has over the past decade seen greater integration with the global economy, resulting in not only significant trade expansion, but also large investment flows. The growth in outward investment reflects Malaysia's current account surplus position and is in line with the growth and maturity of market players within the Malaysian economy. Coupled with liberalization initiatives, more players were able to channel these surplus savings abroad.

This led to a change in the nature of capital flows in the post-2000 period. The need to gain international market access and tap into international resources by domestic firms have led to growing direct investment abroad flows, especially from the mining, plantation and services sector (mainly financial services, utilities and telecommunications). Notably, Malaysian banks have expanded their regional presence through establishing subsidiaries in neighboring countries. These flows were partly facilitated by a key liberalization measure in 2005, which allowed residents to freely invest abroad in foreign currency with their own foreign currency funds. Over the years, direct investment abroad flows by residents have been growing steadily, averaging –US$12.5 billion (or -4.9% of GDP) within the last decade.

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1.4.2 Resident Portfolio Investment (R PFE and PFD)

Increasing portfolio investment abroad, especially by domestic institutional investors (DIIs), is a rather recent phenomenon and only gained momentum in 2009. This occurred as the investment mandates of Malaysia's DII expanded, seeking to both diversify assets and increase potential returns. DII investment activities received further support as FEA rules were progressively liberalized since 2005, allowing resident unit trusts, fund managers, insurers and takaful operators to use larger amounts of residents' funds to invest in foreign currency assets abroad.

Portfolio investment abroad has been steadily growing over the years, averaging about -2.1% of GDP during the period from 2005 – 2014, mainly by DIIs and in the form of equity investments. The increase in external portfolio assets resembles similar trends in other parts of the region, in which the build-up in external portfolio assets at the international level has become increasingly significant. These outflows, while important to provide two-way flows during periods of non-resident portfolio inflows, may pose some risks during periods of non-resident outflows, as this paper will later highlight.

1.4.3 Resident Bank and Money Market Flows (R BMM)

A large part of resident outflows also comprise bank and money market flows, which have in fact been driving the consistent net outflows of BMM from Malaysia, averaging -5.1% of GDP over the recent ten years. This reflects trade credit extensions, external loan repayments by the public and private sector as well as banking sector activities in the form of interbank transactions and placements of deposits abroad. These grew in line with the expansion in trade and banking sector activities over the past decade and can be fairly large and volatile as it is subject to the financing requirements and business decisions of the private sector.

1.4.4 International Reserves (RES)

The changes in net international reserves over this recent decade have been shaped by developments in both the current and capital accounts of the balance of payments, particularly movements in portfolio investments. Being a current account surplus economy, reserve assets in the balance of payments have consistently recorded outflows as it reflects the central bank's reserve accumulation.

The accumulation of reserves assets were interrupted in certain periods, particularly during the GFC between 3Q 2008 and 1Q 2009, where reserve assets recorded large inflows as the central bank unwound its holdings of reserve assets to intervene against any excessive exchange rate volatility. This was effectively a rebalancing against the large non-resident portfolio outflows during the period. As a result, international reserves fell by US$38 billion, from US$125.8 billion to US$87.8 billion. Shortly thereafter, non-resident portfolio inflows recovered and reserves grew by US$51.9 billion to peak at US$139.7 billion in 4Q 2012. More recently, the large non-resident portfolio outflows since September 2014, have led to strong depreciation and volatility in the ringgit, requiring the central bank to unwind its reserve assets. Malaysia's international reserves level fell from US$127.3 billion in September 2014 to US$94.1 billion as at the first half of October 2015.

2. Issues Surrounding Capital Flows

2.1 Volatility and Intensity of Movements in Non-resident Capital Flows

Being a country with a highly open capital account, Malaysia has always been affected by sudden and sharp swings in non-resident capital flows. To study this further, a measure of volatility and intensity is used to identify which type of non-resident capital flows have affected Malaysia the most. The volatility of capital flows is taken as one standard deviation of the quarterly flows to GDP. The intensity of movements in capital flows on the other hand, adopts a methodology used by Balakrishnan et al. (2012) and IMF (2007) that aims to identify surges in capital flows by employing a two standard deviation threshold from the trend of capital flows to GDP.[6]

Our findings are summarized in Table 1 below, while the set of figures that follow provide a visual representation. Non-resident flows (or gross inflows) appear to be more volatile than resident flows (or gross outflows). It also shows that non-resident gross flows are the ones driving the volatility in net capital flows. A further breakdown into the types of flow reveal that portfolio debt and

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6. An 8-quarter rolling average of capital flows as a percentage of GDP is taken as the trend and flows exceeding two standard deviations from the trend would indicate a surge. How we use the data differently is to compare the intensity of flows across the various types by taking the count of how many times a surge occurs (exceeding 2 s.d. from the trend), irrespective of the direction of the flows. A higher count typically indicates higher intensity in the movement of flows.

banking system flows are the most volatile and intense, as they have the largest count of surges over the last decade. This could reflect the fact that non-resident portfolio investments to Malaysia are mostly into debt securities while bank flows tend to be influenced by stress in the source country.

Table 1

	Volatility (1 s.d. of quarterly flows/GDP)[1]	Intensity Count of surges (>2 s.d. from trend)
Net capital flows (PKB)	10.5	11
Gross outflows (PKB Assets)	6.4	16
Gross inflows (PKB Liabilities)	11.9	15
Liability Flows by Type (Non-Resident)		
FDI	2.4	15
PFE	3.5	17
PFD	6.5	21
BMM	5.6	19

Note:
1. Sample period is from 1Q 2001 to 2Q 2015. The standard deviation of the whole sample is taken as a measure of volatility. Higher values for one standard deviation denote higher volatility.
Source: Department of Statistics Malaysia, staff calculations.

Figure 7
Measure of Capital Flow Intensity (By Type of Flow)
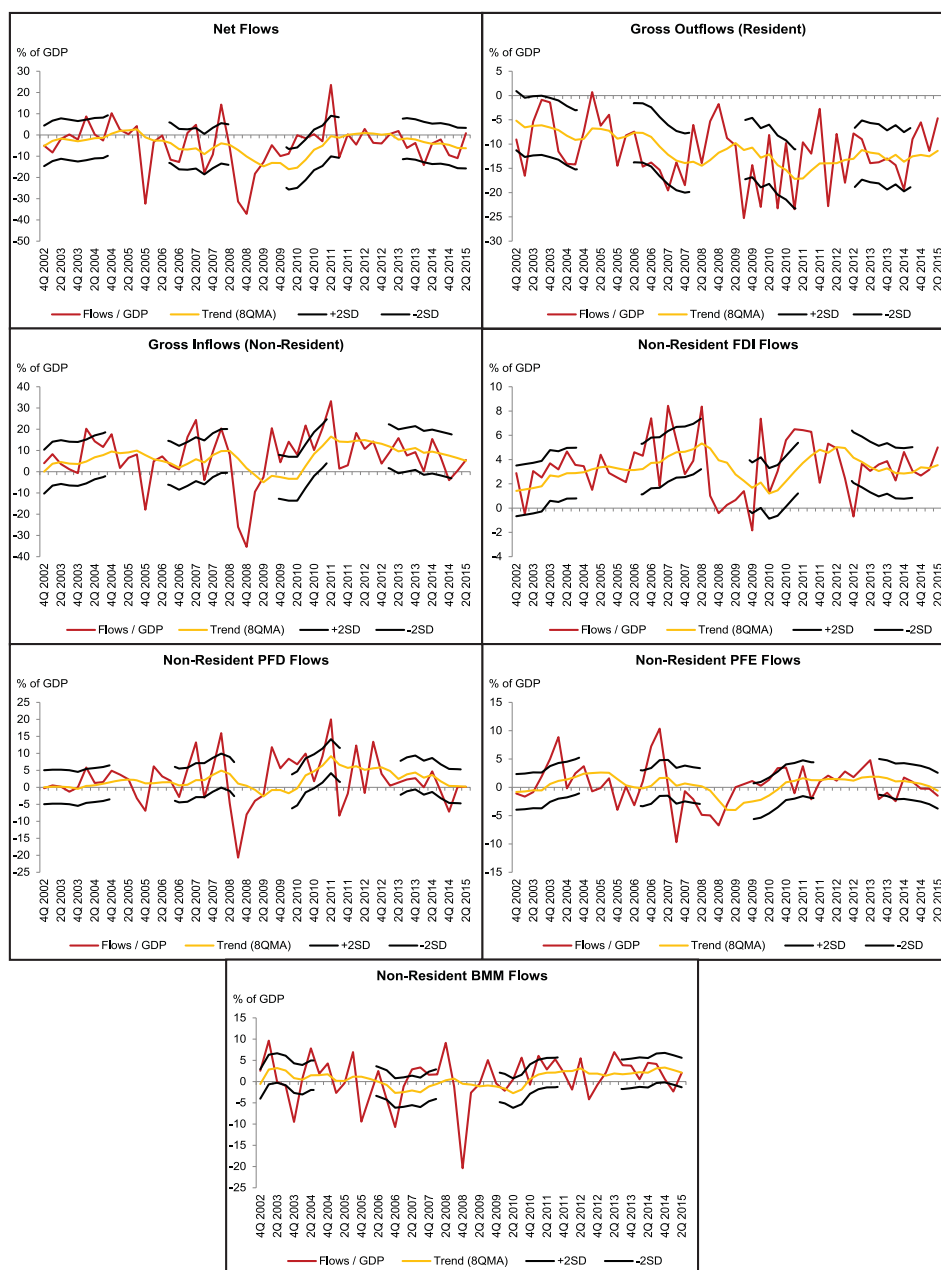
Source: Balakrishnan et al. (2012), IMF (2007) Balance of Payments Statistics, Department of Statistics Malaysia, staff calculations.

2.2 Prolonged Periods of Capital Outflows Could Exacerbate Real Adjustments

In the recent period, the sharp decline in global crude oil and commodity prices has added another layer of complexity in the already uncertain global environment. Most countries across the world have faced capital outflows and currency depreciation since September 2014 due to anticipation of higher interest rates in the US. However, countries with higher dependence on commodities faced larger adjustments. For Malaysia, this is not a new phenomenon as the ringgit has historically been highly correlated with global crude oil prices.

Figure 8
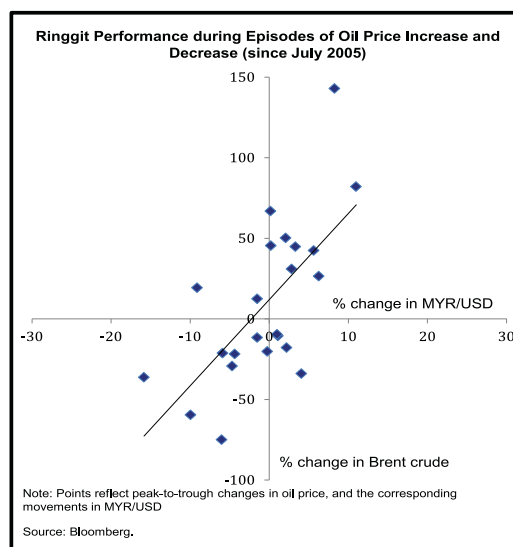
While the recent terms of trade shock from falling oil and commodity prices suggests the need for currency depreciation, especially for oil-exporting economies, the significant shifts in global capital flows and the uncertainty surrounding the global financial markets have led to a larger magnitude of depreciation beyond levels consistent with the adjustments in the terms of trade shock. For Malaysia, despite having lower commodity dependence relative to other commodity exporting economies, the magnitude of ringgit depreciation is disproportionately higher and is even comparable to currencies of countries with much higher commodity dependence, such as Australia and Norway. While this was partly due to the misperception on Malaysia's commodity dependence and its position as the only net oil exporter in the region (besides Brunei Darussalam),

global capital flow volatility in the current environment have exacerbated the adjustments.

Table 2
Commodity Dependence vs. Change in Exchange Rates since September 2014

	Nigeria	Russia	Norway	Aus	Uruguay	NZ	Brazil	Canada	South Africa	Malaysia
Commodity Dependence*	98.4	80.0	80.0	79.5	75.7	74.9	61.7	47.7	42.0	38.7
% change in Currency vs. USD (1 Sept '14 - 30 Oct '15)	-18.5	-42.0	-27.0	-23.9	-19.2	-18.9	-42.0	-16.8	-22.8	-26.6

*Commodity Dependence = Total exports of Primary Commodities/Total Exports (%) in 2013 Primary commodities include beverages and tobacco, crude materials, foods, fuels, oils and fats and metals.
Source: Bloomberg, BNM, UN Conference on Trade and Development.

2.3 Exposure to US Policy Normalization

After years of near-zero interest rates and the corresponding yield-searching portfolio investments into EMEs, the expectation of and eventual rise in interest rates in the US have and will continue to drive capital flows and financial market volatility in the EMEs, including Malaysia. Between the start of the Fed's QE in November 2008 until August 2014, Malaysia experienced a cumulative inflows of US$75.3 billion.[7] Since the heightened expectations of the interest rate normalization in the US beginning in September 2014, around 10% of these inflows reversed in three quarters.[8] As a result, the Malaysian currency also depreciated by 13.6% against the US dollar during the corresponding period.

While further quantitative easing measures by the Bank of Japan (BOJ) and European Central Bank (ECB) have added to global liquidity, monetary policy decisions by the Fed will still have greater implications on emerging economies' financial markets and currencies. A recent study by the International Institute of Finance suggested that the ECB's impact on EME portfolio flows is less than half of the Fed's while the impact from BOJ appears to be insignificant.[9]

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7. Using official quarterly BOP data, date is approximated from 4Q 2008 – 3Q 2014.

8. Using official quarterly BOP data, date is approximated from 4Q 2014 – 2Q 2015 (latest available point).

9. Capital Flows to Emerging Markets, October 2014, International Institute of Finance (IIF).

Economic developments and policy decisions in the US, therefore, have a particularly strong bearing on the movement of non-resident portfolio investments to Malaysia. The potential spillover effects can be observed by looking at the origination of portfolio investment funds to Malaysia. Historically, funds domiciled in the US make up the bulk of portfolio investments to Malaysia, averaging at around 24% in the last decade, with a notable increase since 2013. This would mean that any home-bias arising from the policies of the US, including the normalization of interest rates, is bound to have an impact on Malaysia in the form of portfolio reversal, notwithstanding the rebalancing that may be done by investors from other regions.

Figure 9
A Large Share of Portfolio Investments to Malaysia
Originated from the US
Total Portfolio Investment to Malaysia
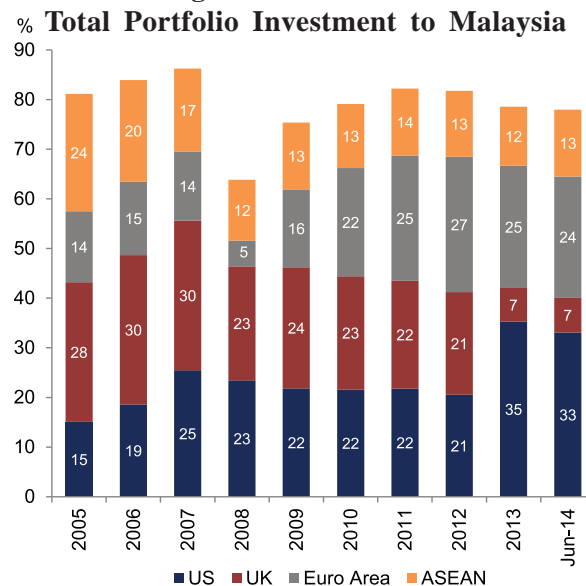
Source: IMF Coordinated Portfolio Investment Survey.

While the US matters significantly, investments from the Euro area and Japan could also respond to US monetary policy. As the rate of return in terms of growth and interest rate differentials begins to favor the US, some European and Japanese investors are likely to unwind their positions in Asia to invest in the United States.

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2.4 Potential Vulnerabilities through Banking System Flows

Since the Asian Financial Crisis, the Malaysian financial system has not been subject to the same degree of vulnerability due to the ongoing efforts to develop the strength of the banking system as well as diversify sources of financing. The external exposures of financial institutions expanded in line with the growth in domestic banks' overseas operations and regional trade and investment activities. Looking at the Malaysian banking system's external balance sheet (from the international investment position), as at 2Q 2015, the banking system's net external liabilities position amounted to US$37.8 billion (11.2% of GDP). Nevertheless, this does not indicate a growing reliance by banks on external funding for domestic operations.[10]

In addition to domestic sources of data, it is also worthwhile to look at the BIS International Banking Statistics as it provides some valuable insights into the lending behavior of international banks' to Malaysia. Shocks in the source country could lead to deleveraging activities, and it may affect lending to Malaysia. Although this is currently not a risk, a tail-event such as large scale deleveraging will ultimately affect global liquidity and could have spillover effects. To assess banking system flows by lender country, it would be useful to look at total foreign claims (although this data should be used with the usual caveat).[11] Most of advanced economy lending to Malaysia is from European banks (mainly UK and euro area) which make up around 35% of total foreign claims, followed by Japan (14%) and US (10%). This seems to suggest that deleveraging activities by European banks could have an impact on lending to Malaysia. Some of the cutback in lending was seen during several stress periods in the source countries, namely the GFC in 2008 and the euro area SDC in the second half of 2011,

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10. Local currency deposits remain the main source of funding for both the operations in Malaysia and overseas. In addition, corresponding with the significant presence of locally incorporated foreign banks (LIFBs) operating in Malaysia, the external liabilities also reflect higher capital funds maintained in the form of equity investment by overseas parents and retained earnings held with these LIFBs (about 12% of external liabilities).

11. Foreign claims data (ultimate risk basis) from the BIS Consolidated Banking Statistics has the benefit of breakdown by lender country but also include bank flows that do not necessarily cross borders. For example, HSBC's subsidiary in Malaysia's lending to residents is apportioned as claims by its country of origin, the UK. Domestic lending by LIFBs are not 'real claims' on Malaysia as LIFBs are required to raise funds domestically for onshore lending activities and are bound by domestic regulations. Therefore, this portion of foreign claims is not as 'reversible' as its cross-border flow counterpart, which makes up only 30% of total foreign claims.

where there was a clear contraction in lending by European banks. However, it should be noted that the potential impact on Malaysia from deleveraging activities by European banks may be significantly lower than implied by the BIS data. This is because the reported European banks' foreign claims on Malaysia include claims of locally-incorporated European banks (LIEBs) operating in Malaysia on all domestic financial institutions, corporations, individuals and public sector entities, which are mostly funded from ringgit-denominated liabilities.

Figure 10
During Periods of Stress, Lending to Malaysia by Banks in the Advanced Economies were Affected
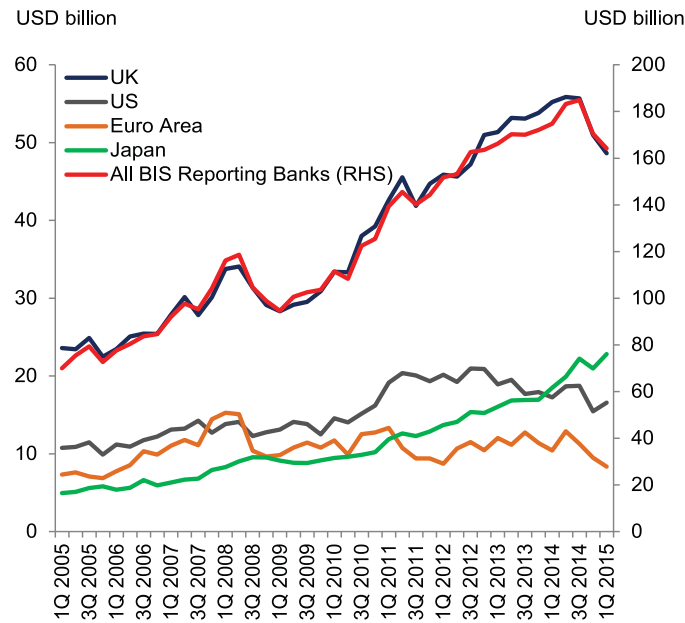
Source: BIS Consolidated Banking Statistics.

Another layer of information that can be obtained from BIS data is also to look at several vulnerability indicators, as established in Advjief et al. (2011) and McGuire and Tarashev (2008) in the BIS Quarterly Reviews. Utilizing the BIS International Banking Statistics, these papers came up with useful indicators to highlight the possibility of a sudden withdrawal of banking system flows:

i. **Foreign bank participation rate:** Gives an indication of the fraction of total credit to non-banks in a given economy that is provided by foreign-owned banks.

ii. **Cross-border claims as a percent of total foreign claims:** Signals the stability of funding from foreign banks since cross-border claims tend to be much more volatile than their locally booked counterparts.

iii. **Short-term international claims as a percent of total international lending:** Measures the degree to which an economy is exposed to a non-renewal of short-term foreign bank credit to its residents.

iv. **Proportion of cross-border claims held in the form of tradeable debt securities (as opposed to non-tradeable loans):** Quantifies the ease with which foreign creditors could dispose of the claims they have on the residents of a given country.

As highlighted in the paper, none of these four indicators is perfect on its own, but taken as a group, they can provide an informative picture of the vulnerability to sudden capital withdrawals. We employ the same combination of indicators and look at Malaysia's vulnerability across time in the following charts:

Figure 11

Measures of Vulnerability to Sudden Capital Withdrawals from the Banking System
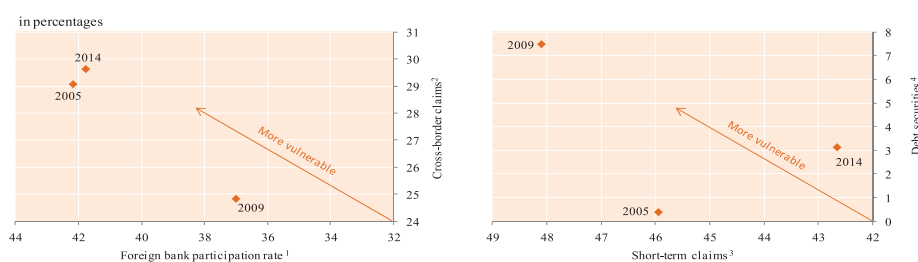
[1] BIS reporting banks' foreign claims on non-banks as a percentage of total credit to non-banks.

[2] BIS reporting banks' cross-border claims as a percentage of their total foreign claims.

[3] BIS reporting banks' international claims with remaining maturity of up to one year as a percentage of their total international claims.

[4] BIS reporting banks' debt securities as a percentage of their total cross-border claims.

Sources: Adijev et. al. (2011), McGuire and Tarashev (2008), BIS consolidated banking statistics (immediate borrower basis and ultimate risk basis); BIS locational banking statistics by residence, staff calculations.

The left panel shows that in terms of foreign bank participation rate, Malaysia's vulnerability has increased in 2014 (relative to post-GFC in 2009) as a larger portion of credit to the non-bank sector consists of foreign claims. Nevertheless, this figure may be overstated, as foreign claims also include bank flows that do not cross borders and hence are less reversible. This can be

observed in the other indicator which shows that that cross-border flow remains low at around 30% of foreign claims, indicating that Malaysia's vulnerability to a sudden bank outflows remains low. While this has increased relative to 2009, it remains very close to its historical average.

The right panel shows that the portion of short-term claims that are maturing within less than one year make up almost half of total international claims on Malaysia. This number is high, but is not surprising given that a large part of banking system liabilities in Malaysia is made up of short-term interbank loans, placements and deposits, which in part, reflect the liquidity management activities of domestic banks with its regional subsidiaries. This also explains the next indicator, which shows that the portion of debt securities in cross-border claims is almost negligible as most of it is in the form of loans, which are non-tradeable and less likely to reverse. For these two indicators, Malaysia's vulnerability is lower in the most recent period. All in all, these indicators show that Malaysia's exposure to a sudden reversal in banking flows is minimal. Nevertheless, these indicators give an idea of what to look out for in terms of potential vulnerabilities in the banking system, and in Malaysia's case, we should be vigilant of risks arising from short-term external liabilities.

2.5 The Role of Domestic Institutional Investors

The marked increase in investment abroad by domestic institutional investors (DIIs)[12] since 2009 has facilitated stronger two-way capital flows which act to partially offset large non-resident inflows. This behavior is being driven by a combination of factors. First, the fund size of DIIs has grown through an increase in both total asset size and total contribution to the fund (e.g. retirement contributions). At the same time, there are limited investible assets in the domestic market. Issuances of government securities have slowed, in line with the Malaysian Government's fiscal consolidation path. Second, DIIs are committed to a diversification strategy to generate consistent returns in the long-term. These investments have been highly profitable and have yielded higher returns, incentivizing them to continue investing abroad. Third, non-resident portfolio inflows into Malaysia, to some extent, have compressed returns in the domestic financial markets, also leading to some 'crowding-out' of resident investments.

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12. Domestic pension funds and financial institutions.

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During periods of non-resident outflows, DIIs can play an important offsetting role by divesting their assets abroad and re-entering the domestic financial market. While this has generally been the case, the price of financial market assets appears to be an important determinant. DIIs usually enter when prices of financial assets are sufficiently cheap and yields are sufficiently high. This could be seen during the taper tantrum episode in 2013, when rebalancing by DIIs took place. Despite the large outflows from May to August 2013, yields in the Malaysian sovereign bond market remained stable compared to regional peers; a result of large buying activities by DIIs.

In the most recent period, DIIs have continued to invest abroad despite the non-resident outflows as yields in the sovereign bond market have remained stable (i.e., yields have not adjusted to attractive levels). This is partly due to the non-resident outflows being mainly from central bank bills rather than sovereign bonds.

Figure 12

BOP: Portfolio Flows

Source: Balance of PaymentsStatistics, Department of Statistics Malaysia.
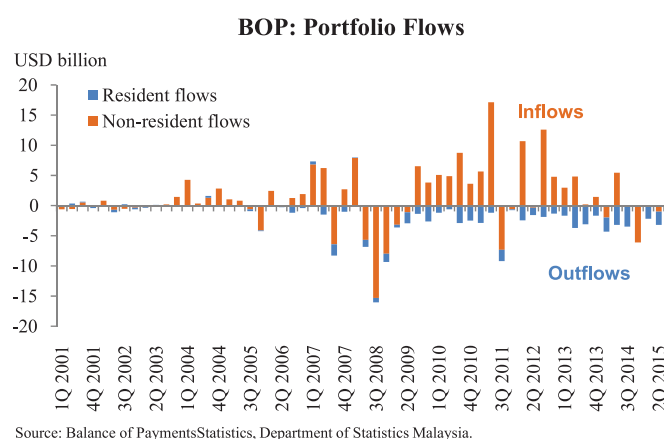
3. Thoughts on Implications for Policy

3.1 Pre-emptive Management of Capital Flow Repercussions

Since 2009, large capital flows into EMEs resulted in significant strengthening of currencies, rising asset prices and strong credit growth in EMEs.

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During this period, despite the growing recognition and implementation of capital flow management measures (CFMs) in the region, Malaysia did not reach the point where the implementation of CFMs was necessary. Nevertheless, efforts were focused on managing the implications of capital inflows such as the risk of build-up of financial imbalances in the domestic economy. Targeted approaches that combine both micro- and macroprudential measures became an important part of the policy toolkit. This included the introduction of limits on loan-to-value ratios to reduce speculative activity in the property sector, where the eligible amount that can be borrowed when purchasing the third and subsequent properties was limited to 70% of the value of the property. In addition, Bank Negara Malaysia (BNM) also pre-emptively normalized the interest rates in 2014 to reduce the risks of destabilizing financial and economic imbalances that could undermine economic growth.

3.2 The Importance of Resilience and Buffers

Having sound macroeconomic fundamentals in place are essential pre-conditions to deal with the risks of surging capital inflows and outflows. Apart from performing well in the key areas of macroeconomic performance such as growth, inflation, employment and balance of payments, countries build up greater resilience when the banking sector is sound and well managed, and the financial markets deeper and more diversified. These conditions provide a solid platform and the resilience to effectively deal with surges of capital inflows and the subsequent reversals.

While having the right underlying economic backdrop to deal with capital flows is crucial, an economy can still be overwhelmed by capital flow volatility without the necessary buffers. This is where the availability of foreign exchange reserves becomes important. Despite continuous debates on the adequacy of reserves and the costs of holding such reserves, the importance of accumulating reserves during inflow periods as precautionary safety net for future reversals is rising. Recent episodes of large capital flow reversals have demonstrated the importance of having this buffer.

Beyond individual country buffers, the continuous integration of the global economy and financial system point to the need to constantly improve and enhance the available safety net arrangements. The different elements of the global financial safety net should not be looked at by its individual capacities and how it might have competing roles, but how it can mutually coexist and contribute to safeguarding the stability of the international monetary system. Collectively,

they provide the stabilizing force to withstand economic and financial shocks at the domestic, regional and global level.

These complementarities are not new to Asia. Regional financial safety net arrangements provide an additional mechanism for economies to manage the impact of external shocks. The advantages of these regional arrangements are that they can be more attuned to the unique conditions prevailing in the region and be timely in implementation. One such arrangement is the Chiang Mai Initiative Multilateralisation (CMIM).

Finally, at the global level, multilateral financial arrangements provided by institutions such as the IMF play an important role to help affected countries cope with adverse shocks or provide another layer of insurance to members with sound policies. It is important to remember that regional liquidity arrangements are never intended to replace available global financial safety net arrangements. Rather, we should leverage on the unique comparative strengths of these arrangements. In this regard, greater coordination and cooperation between multilateral and regional financial safety net arrangements could be a constructive way forward to augment the available pool of financial resources and to resume a more comprehensive surveillance that better take into account regional and global linkages.

3.3 Array of Tools to Manage the Risks on Financial Markets and the Real Economy

During periods of sharp capital flows, it is important to have a wide array of policy tools and instruments to manage these flows. For example, Bank Negara Monetary Notes (BNMNs) were issued during the inflow period as a tool for sterilization purposes. BNMNs were a potent tool as the maximum amount of bills that can be issued is contingent on the size of reserves, and can be unwound should there be a reversal of flows. In addition, BNMNs provided an alternative investment asset for investors, and thus reduced distortionary pressure of capital flows on bond yields and equity prices. The impact could be seen in the recent period of capital outflow, when the BNMNs played an important role in absorbing the impact from the MGS market. The unwinding of BNMNs held by non-residents since September 2014 had contained the pressure on MGS yields and as a result, the adjustments in yields have been minimal. The relatively stable MGS yields had ensured that the private debt security market and other costs of financing were not disrupted, which prevented the effects of the capital reversal from spilling over to the real economy.

Figure 13

Non-Resident Portfolio Flows by Instrument

USD billion

Source: BNM.
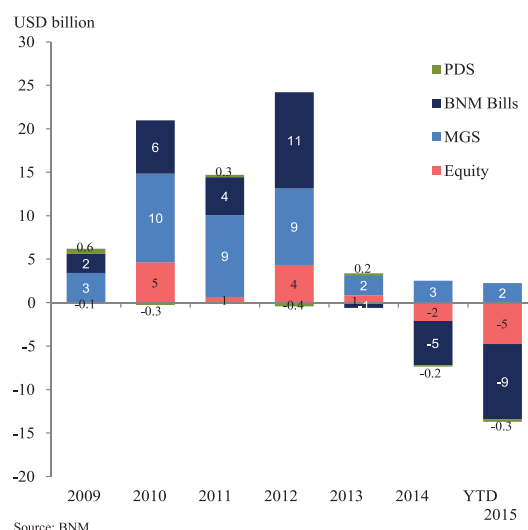
While the BNMNs have thus far been able to absorb the impact, risks remain. Non-resident holdings of BNMNs have declined from US$27.1 billion in September 2014 to US$6.4 billion as at 30 October 2015, and may no longer act as a cushion going forward.

Given the high participation of non-residents in the MGS market (46.3% of total outstanding or US$35.8bn), non-resident investors could unwind their MGS holdings which could lead to significant yield adjustments. In fact, in August 2015, MGS yields across tenors have increased by an average of around 30 basis points due to unwinding by non-residents. The presence of large DIIs, nevertheless, could cushion the impact on yields as they are expected to increase holdings of MGS given higher returns.

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Figure 14

Holdings of BNM Bills have Decreased
Non-Resident Holdings of BNM bills and MGS

USD billion

In August 2015, MGS yields across tenors have adjusted due to non-resident unwinding

Source: BNM.

MGS Yields

Source: BNM.

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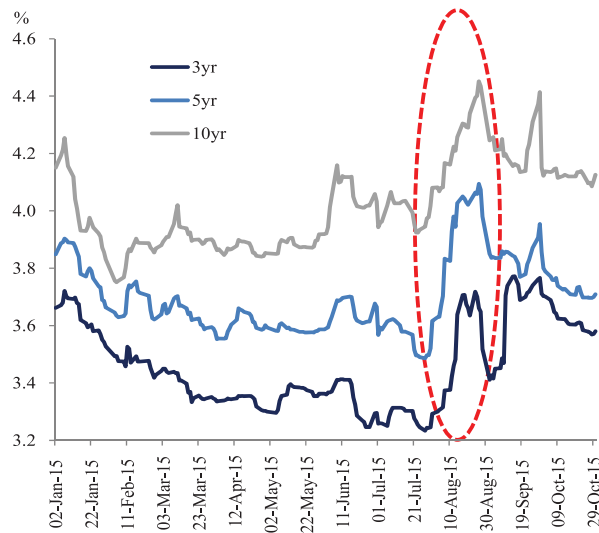
3.4 Strength of the Banking System is Important

As the banking system is paramount to the functioning of any economy, it is important to ensure that any adverse movements in the balance of payments do not spillover to the intermediation activities of financial institutions. This can be achieved through the building of buffers and constantly monitoring the health of the banking system to provide a strong foundation to withstand any external shocks to the financial system. Strong capitalization, diversified funding structure dominated by stable domestic customer deposits with low reliance on external foreign currency funding, and ample liquidity in the banking system will ensure that the intermediation function remains uninterrupted.

Given the volatile movements of banking system capital flows, it is important that the external balance sheet of the banking system be in check. As mentioned in the previous section on banking flows, external liabilities are prone to sudden cutbacks and the high amount of short-term claims, although well-accounted for by holdings of liquid external assets, can still pose a risk to the banking system. With regards to the external balance sheet of banks, it is important to monitor it from three angles: i) asset-liability mismatches; ii) maturity mismatches; and, iii) the external FX liability composition (currency mismatch leading to original sin problems).

4. Conclusion

For emerging and highly open economies like Malaysia, international capital flows will always play an important role for economic development and growth. Nevertheless, sharp movements in these flows could be overwhelming and could potentially stunt the development of domestic financial markets and economic activities. In the more recent period, with the impending interest rate lift-off in the United States, large and volatile non-resident portfolio flows that are driven by sentiments and speculation have come into focus. Bank flows have also been identified as a potential source of vulnerability. On top of these flows, continued investment outflows by residents, especially during periods of non-resident reversal could exacerbate the outflow situation.

Faced with these challenges, central banks' priority is to strengthen domestic fundamentals and continuously ensure that the financial system is resilient to shocks. Buffers such as international reserves are especially useful during periods of strong outflows. In achieving broader macroeconomic and financial stability, especially in the current environment of high uncertainties, countries cannot rely on a single policy tool. Instead, a more pragmatic policy approach is crucial. In

this regard, different policy instruments are used for different situations and objectives, depending on the nature of risks being confronted and the effectiveness of the policy. Ultimately, the key objective is to ensure that adjustments in the financial markets remain contained within the financial system and do not spill over to the real economy.

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Appendix 1: Measure of Capital Account Openness

We calculate a simple measure of the degree of openness to capital movements.[13] The summary measure is based on gross flows (Flow Openness). We create an index that depends on the ratio of the absolute value of the gross flows to the absolute value of the sum of gross and net flows as follows:

$$Flow\ Openness_{it} = \left[\frac{\left|resident\ flows_{it}\right| + \left|nonresident\ flows_{it}\right|}{\left|resident\ flows_{it}\right| + \left|nonresident\ flows_{it}\right| + \left|net\ flows_{it}\right|} - \frac{1}{2} \right] \times 200$$

When capital flows freely in both directions, we expect the sum of absolute gross flows to be large relative to net flows. In this case, the index tends towards 100. When capital flows are very one-sided, we expect gross flows to be smaller relative to net flows. The most extreme case would be where gross flows (either resident or non-resident flows) are the same size as net flows. This would occur if resident or non-resident flows were completely restricted. In this case, the value of the index would be zero.

Figure 15
Malaysia: Capital Account
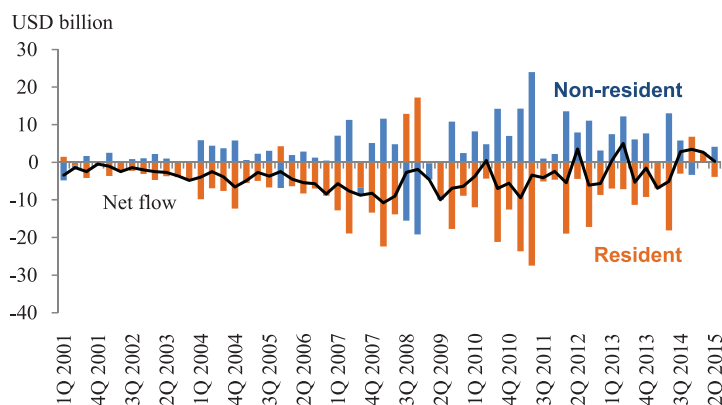
Source: Balance of Payments Statistics, Department of Statistics Malaysia.

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13. See also Becker and Noone, (2009), "Volatility in International Capital Movements," *Research Discussion Paper*, RDP 2009-09, Reserve Bank of Australia, Available at: http:/ /www.rba.gov.au/publications/rdp/2009/pdf/rdp2009-09.pdf

Figure 16

Openness Index
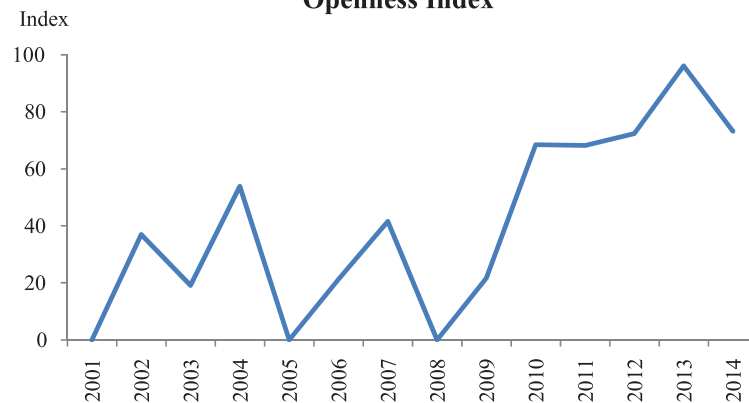
Index

For Malaysia, the capital account can be considered relatively open. Barring the sharp non-resident outflows in 2008 during the GFC, Malaysia's capital account openness has generally been on an uptrend since 2005. This is hardly surprising given the concerted effort to deepen the domestic financial markets and continuous foreign exchange liberalization. The openness reached a high of 100 in 2013, when large resident outflows offset the large non-resident inflows.

Looking into the components of capital account, there are a few observations. As with many Asian economies, the openness of the reserves component is by design zero as there are only movements of residents' assets abroad. Malaysia's foreign direct investments are relatively open as persistent inflows by non-residents are offset by large resident outward direct investments since 2005. For portfolio equity and debt flows, the openness index seems small given that there is higher non-resident participation in Malaysia's bond and equity market compared to outward investments by Malaysian residents. This is particularly true for the portfolio debt flows.

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Figure 17
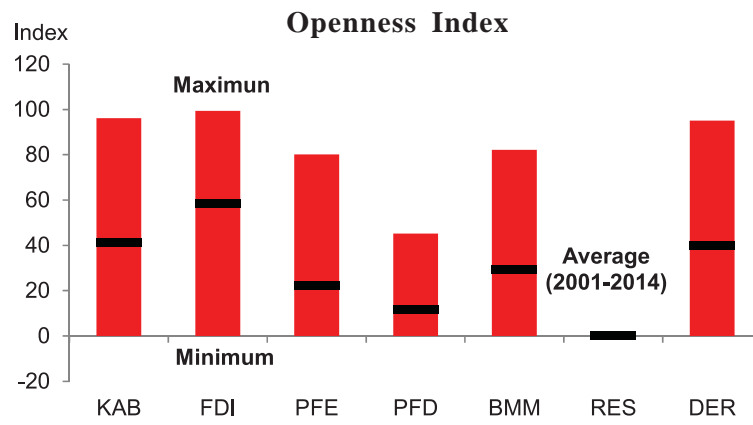
Source: Balance of Payments Statistics, Department of Statistics Malaysia.

Appendix 2: Composition of Malaysia's Balance of Payments
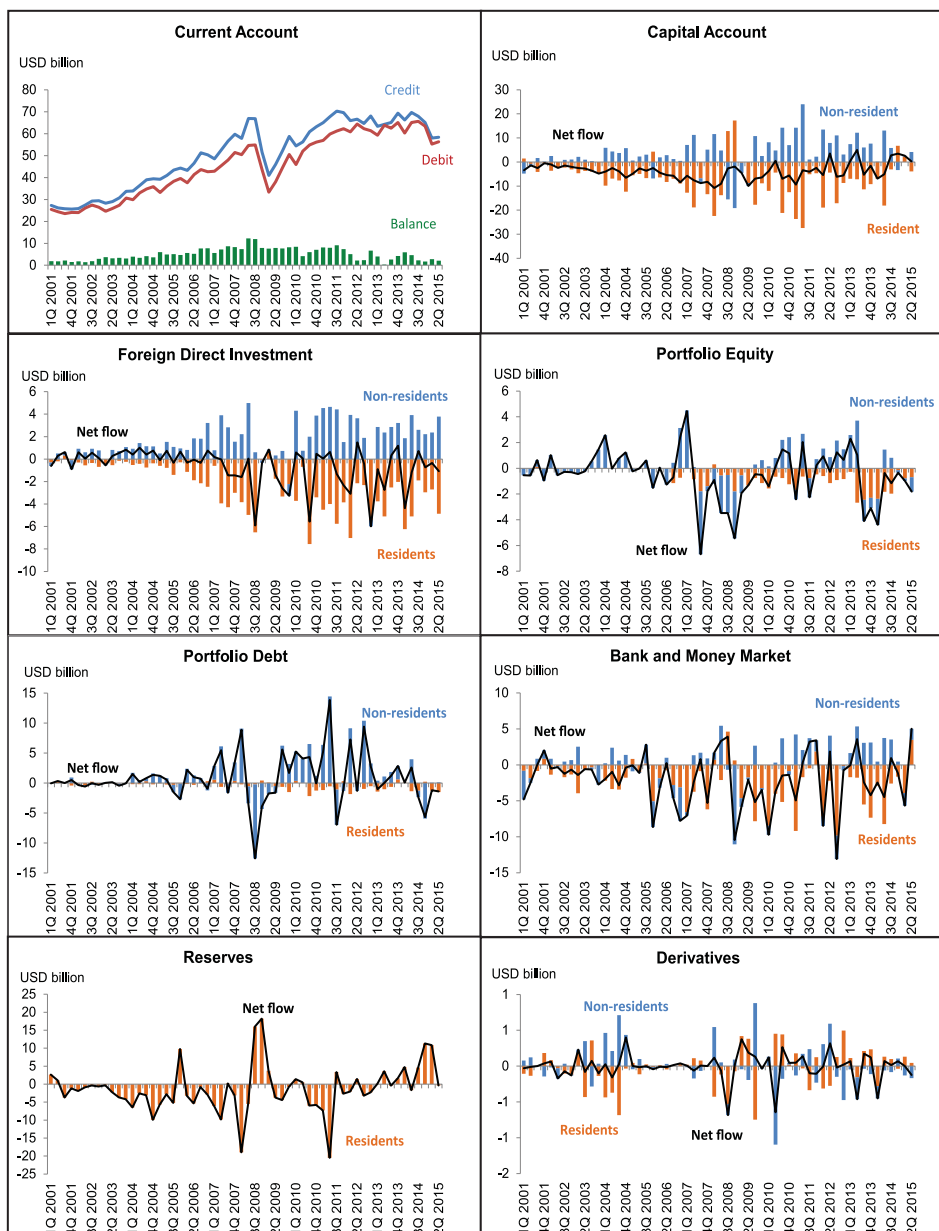
Source: Balance of Payments Statistics, Department of Statistics Malaysia.

Chapter 6

LIVING WITH VOLATILITIES:
CAPITAL FLOWS AND THEIR IMPLICATIONS FOR CENTRAL BANK POLICIES IN MONGOLIA

By
Munkhchimeg Sukhee
Tsenguunjav Byambasuren[†]

1   Introduction

Mongolia is a small open economy which transitioned to a market economy in the early 1990s. Over the last two decades, Mongolia privatized most of its public enterprises and assets, created a two-tier banking system, and liberalized its foreign trade and capital flows, opening its doors to both residents and non-residents to make private investment and operate in the FX market by creating basic regulations.

Although the residents are still limited to invest abroad due to their low level of capital accumulation, substantial growth of the non-resident investment inflows indicate deeper integration of Mongolia with the international markets. In Mongolia, the economic growth skyrocketed by reaching an all-time high of 17.3%, which was one of the highest across the region of the South East Asia in 2011 due to a FDI inflow surge ensued from a mining boom after the global financial crisis of 2008/09.

However, the country has been facing a number of challenges such as unsustainable economic growth, high fiscal deficit and external imbalance, inflation and exchange rate pressures, and financial instability as a result of the recent capital inflows volatility. Therefore, Mongolia is currently paying more attention in implementing the appropriate macroeconomic policies that will contribute to sustainable growth and sound economic and financial developments while mitigating the macroeconomic risks related to the capital volatility.

Thus, this paper aims to examine the nature and characteristics of the recent capital flows in Mongolia and the driving forces behind it. We focus mostly on the FDI flows because it is the most significant and persistent flows in Mongolia, and create the largest volatility. We also review the recent policy implications of the capital flows volatility in Mongolia. Finally, we provide some policy recommendations how to manage the volatile capital flows and to mitigate the adverse effects induced from the volatilities.

The paper is structured as follows. Section 2 briefly discusses the capital flows by describing its composition, volatilities, openness and determinants. Section 3 reviews the macroeconomic policy responses to the recent capital flows volatility and its policy challenges in Mongolia. Then, Section 4 concludes and discusses some of the policy recommendations for Mongolia regarding the capital flows management.

2. Nature and Characteristics of the Capital Flows in Mongolia

2.1 Recent Trends and Major Components

The gross capital flows[1] of Mongolia's balance of payments (BOP) were generally diversified with both non-resident inflows and resident outflows prior to the mining boom, which started in 2010. After transitioning to a market economy in the early 1990s, Mongolia privatized most of its state assets, but its residents have not accumulated enough capital to invest abroad in large amounts. Therefore, the resident outflows in Mongolia have been relatively small until today.

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1. International standards specify that the 'financial' account is the main counterpart to the current account. However, since we are mainly discussing capital flows, we prefer to use the term 'capital account' to avoid confusion. The actual item in the official statistics that is called the capital account is usually very small and adds little to the analysis at hand.

Figure 1
Mongolia: Capital Flows[2]
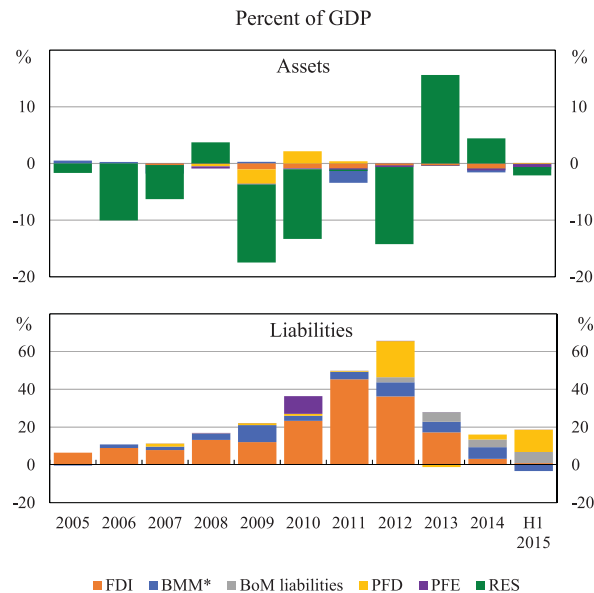
Percent of GDP

In contrast, the public and private sector loans and foreign direct investment (FDI) into the domestic economy have been more persistent and large. Thus, the capital flows of Mongolia had been mainly driven by the FDI and bank and money market inflows (BMM)[3] prior to the global financial crisis of 2008/09, but size of the flows was relatively small compared to the recent flows.

During the global financial crisis of 2008/09, Mongolia experienced an excessive foreign exchange (FX) shortage due to significant decline in exports and the FDI inflows, which resulted in a large exchange rate depreciation, substantial drop of international reserves, and economic and financial vulnerabilities. Therefore, Mongolia implemented an 18-month Standby

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2. Here, FDI is foreign direct investment, PFE is portfolio equity investment, PFD is portfolio debt investment, BMM is bank and money market flows, and RES is the change in official foreign exchange reserves.

3. In the BOP, these flows appear under the category of 'other investment.' As bank loans and money market transactions are the main components of this category, we refer to these flows as 'bank and money market flows' to lend them a more meaningful label.

Arrangement (SBA) program of the International Monetary Fund (IMF) which was amounted US$229.2 million to stabilize the economy in 2009.

Due to this economic difficulty, the Government of Mongolia (GoM) highlighted the importance of having long-term sustainable sources of FX and paid more attention to attract foreign investment into the domestic economy after the crisis. During that period, a number of untapped and already explored mineral deposits were ready to be exploited in Mongolia. The GoM rushed to start exploiting those mines, considering them as a sustainable source of FX through both exports and FDI inflows. The GoM approved a number of licenses on the mining sector from the owners of foreign-invested companies until 2012 when the license issuance was temporarily stopped. The period between 2010 and 2012 was known as a "mining boom" in Mongolia.

The FDI in the mining sector increased significantly in the years of 2010-2012 and became the biggest component of the capital inflows in Mongolia during the mining boom. It composed about 80% of total FDI inflows during the boom period while 70% between 2009 and 2014. The boom was mainly driven by a largest copper and gold project, Oyu Tolgoi (OT)[4] of which the total foreign investment was about US$6 billion (60% of GDP) for its first phase. Therefore, we also call the period, 2010–12 as a capital inflow surge period in the following sections.

Although the second phase of the OT investment which amounted to about US$4.5 billion was mandated to be started in 2013 according to the investment agreement, it was postponed for an undefined period due to political disputes. In addition, public demonstrations against foreign ownership of Mongolian strategic mines became a big social issue and the GoM temporarily stopped issuing licenses in the mining sector during 2012–15. A new law on the "Regulation of Foreign Investment in Business Entities Operating in Sectors of Strategic Importance" which was approved in 2012 also created an unpleasant environment for foreign investors. Consequently, the FDI declined sharply because of the adverse investment environment in the domestic economy accompanied by weak global financial conditions and decline in commodity demand and prices since the second half of 2012. Furthermore, the FDI inflows have become even negative because

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4.　OT is one of the world's most advanced mines and the project is a combination of open pit and underground mining in the south near the border with China. Oyu Tolgoi LLC is a strategic partnership between the GoM which owns 34% of the mine, Turquoise Hills Resources (Canada) and Rio Tinto (UK). The first phase or open-pit investment and constructions are finished and the second phase, the underground mine investment, is under negotiation between the GoM and Rio Tinto.

of the disinvestment or loss of those FDI-related mining companies since the end of 2014. Thus, we call the period since 2013 as a capital stop or reversal in this paper.

Figure 2
Mongolia: FDI Inflows

Percent of GDP
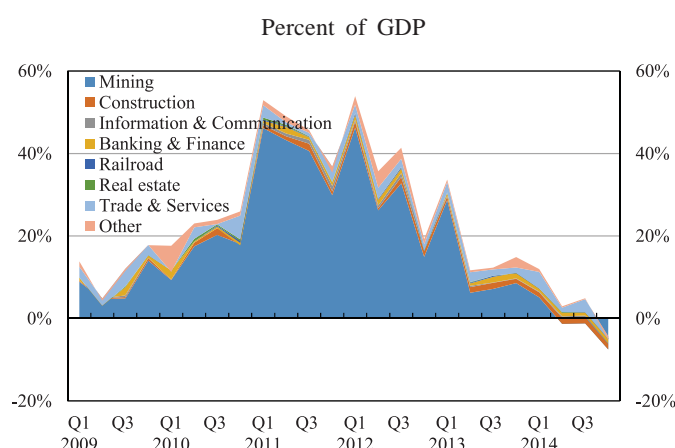
Note: When the foreign-invested companies operate with a net loss, it will be recorded in the FDI account of BOP as a disinvestment (negative FDI inflows).
Source: Bank of Mongolia.

The Mongolian foreign trade and financial accounts have been fully liberalised since 1990s, but the equity and bond investments were not been introduced in the economy until 2010. The non-banking sector is very small compared to the banking sector which makes up 95% of the financial markets in Mongolia. The equity market is also unattractive because the market has poor transparency and lack efficiency. Therefore any significant PFE inflows have not entered Mongolia until today. Furthermore, the Mongolian money market includes few and limited instruments, such as Central Bank bills, government notes and commercial certificates of deposit which are denominated in domestic currency and closed to foreign investors. However, pursuant to the foreign investors' optimism about the economic prospects since 2010, Mongolia became able to issue bonds in the international markets mainly owned and guaranteed by the GoM. For instance, the GoM, the state-owned Development Bank of Mongolia (DBM), some commercial banks and private companies raised a total of US$2.4 billion (25% of GDP) in 2012.

Initially, the bonds were issued to finance domestic infrastructure development and to provide short-term FX liquidity in the banking sector.[5] But the bond issuances and public sector external loan disbursements during the sudden stop of the FDI inflows tended to fill the balance of payments financing gap and short-term FX liquidity in the banking sector. Mongolia issued bonds amounted to a total of US$1.6 billion between 2013 and the first half of 2015 (see Table 1 for details). As a result, the PFE flows have become the second major source for the capital inflows in Mongolia.

Table 1
Mongolia: Successfully Issued Bonds and Equities

Between 2007–15

	Type/Name	Issuer	Issued date	Currency	Amount	Coupon	Maturity	Duration (years)
1.	International bond	DBM	2012/03	USD	580 million	5.8%	2017/03	5
2.	Sovereign bond	GoM	2012/12	USD	500 million	4.1%	2018/01	5
3.	Sovereign bond	GoM	2012/12	USD	1 billion	5.1%	2022/12	10
4.	Samurai bond	DBM	2013/12	JPY	30 billion	1.5%	2023/12	10
5.	Dimsum bond	GoM	2015/06	CNY	1 billion	7.5%	2018/06	3
6.	International bond	TDB	2007/01	USD	75 million	8.6%	2010/01	3
7.	International bond	TDB	2010/10	USD	175 million	8.5%	2013/10	3
8.	International bond	TDB	2010/11	USD	25 million	12.5%	2015/11	5
9.	International bond	TDB	2012/09	USD	300 million	8.5%	2015/09	3
10.	Dimsum bond	TDB	2014/01	CNY	700 million	10.0%	2017/01	3
11.	International bond	TDB	2015/05	USD	500 million	9.4%	2020/05	5
12.	IPO (Equity)	MMC	2010/10	USD	650 million	7.0%		
13.	International bond	MMC	2012/03	USD	600 million	8.9%	2017/03	5

Note: GoM = Government of Mongolia, DBM[6] = Development Bank of Mongolia, TDB = Trade and Development Bank, MMC[7] = Mongolian Mining Corporation
Source: Bank of Mongolia.

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5. In December 2012, the GoM issued US$1 billion and US$500 million sovereign bonds which have two different maturities (10 and 5 years, respectively), and it reflects a large PFD increase in 2012.

6. In 2011, the government established the state-owned DBM in order to finance large mining and infrastructure projects and to stimulate greater impact on the current development of Mongolia.

7. MMC is the largest privately owned coal mining company in Mongolia. Established in 2005, it listed on the Hong Kong Stock Exchange in October 2010.

For the BMM, the public sector concessional loans from the international financial institutions, such as World Bank, Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), and the banking sector commercial loans composed the significant part of the BMM and total capital inflows prior to the mining boom. However, these inflows became less significant after the mining boom. In addition, the specific foreign ownership structure of the biggest mining projects has been one of the main sources of the BMM outflows in the recent years. The foreign-invested mining companies started to export their products. However, Mongolia has not received its export income in full amount as the investors purposed not to save their income in domestic banks. Instead, they kept their export receipts in their bank accounts abroad and its balance of payments entry in the 'currency and deposits account' suggests that there have been large capital outflows for the past three years. Therefore, it should be noted that a large part of the BMM outflows are the BOP entries mentioned above.

2.2 Volatility in the Capital Flows

In this section, we calculate the volatility of gross and net capital flows in Mongolia by types as a simple standard deviation. We consider three timeframes: 2005–07, 2008–09, and 2010–15.Q2 in order to show the variations of capital flows as illustrated in Table 2.

According to the calculation, volatilities of all types of the flows were relatively low prior to the global financial crisis. However, it increased during the turmoil of the crisis during 2008–09. After the crisis, the volatility of non-resident capital inflows (liabilities) increased substantially because of the capital flow surge and sudden stop. We also found that non-resident flows are more volatile than the resident flows due to the small international investment position of the residents as discussed in the previous section.

As mentioned before, the FDI inflow is the most volatile capital flow among the different types of capital flows in Mongolia due to the strong dependence on the mining sector and commodity cycles. The fact that a few mining projects (OT and others) started and completed their investment stages almost at the same time was another factor that increased the volatility of the FDI inflows. Furthermore, the portfolio debt (PFD) and portfolio equity (PFE) inflows had a significant fluctuations during 2010–15.Q2 due to the bond and equity issuances that is represented in Table 1.

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Table 2
Mongolia: Volatility of Capital Flows by Type

percent of GDP*

	Assets							Liabilities							Net						
	FDI	PFE	PFD	BMM	RES	DER	KAB	FDI	PFE	PFD	BMM	RES	DER	KAB	FDI	PFE	PFD	BMM	RES	DER	KAB
2005-07	0.2	0.0	0.0	4.7	7.5	0.0	7.6	4.2	0.0	2.8	2.0	0.0	0.0	5.3	4.1	0.0	2.8	4.7	7.5	0.0	7.8
2008-09	1.5	0.4	3.3	4.0	11.4	0.0	14.5	4.5	0.2	2.1	6.8	0.0	0.0	6.9	5.4	0.4	4.9	7.4	11.4	0.0	11.7
2010-15.Q2	0.7	0.2	2.1	8.8	14.6	0.0	17.9	18.1	6.4	11.8	8.0	0.0	0.0	25.7	18.2	6.4	12.1	12.1	14.6	0.0	15.3
Total	0.8	0.2	2.1	9.0	12.4	0.0	14.9	15.0	4.6	8.9	6.8	0.0	0.0	22.0	15.0	4.6	9.5	10.8	12.4	0.0	15.8

1	2	3	4	5	6	7

Lower ← → Higher

* Volatility is measured as the standard deviation of the quarterly flows as a percent of GDP.
Source: Authors' calculations.

The BMM flow has fluctuated significantly over time for both asset and liability sides, which is a reflection of the two-sided flow in Mongolia. On the outflow side, the reserve flow was the most volatile. The reason is that the BoM intervened actively in the domestic FX market through its international reserves, creating the high volatility in the reserve outflows in periods of 2013–15. It showed that the BoM has a fear of floating like many other emerging market economies (EMEs).

2.3 Openness to Capital Flows

Another measure that helps us understand the characteristics of capital flows and their volatility is a measure of the openness to capital flows. As discussed by Becker and Noone (2009), openness to capital flows is one of the important factors that encourage the volatility of capital flows and we calculate a very simple measure of the degree of openness to capital movements in Mongolia. The index is defined as a ratio of the absolute value of gross flows to the absolute value of the sum of gross and net flows as follows:

$Flow\ Openness_{it}$
$$= \left[\frac{|Resident\ Flows_{it}| + |Nonresident\ Flows_{it}|}{|Resident\ Flows_{it}| + |Nonresident\ Flows_{it}| + |Net\ Flows_{it}|} - \frac{1}{2} \right]$$
$$\times\ 200$$

According to the formula, we expect the sum of the absolute gross flows to be large relative to the net flows when the capital flows of the particular country flows freely in both directions. In this case, the index tends towards 100. In contrast, we expect the gross flows to be small relative to the net flows

when the capital flows are very one-sided. The most extreme case would be where the gross flows (either assets or liabilities) are of the same magnitude as the net flows. This would occur if either resident or non-resident flows were completely restricted. In this case, the value of the index would be zero.

Figure 3
Mongolia: Openness to Capital Flows

index
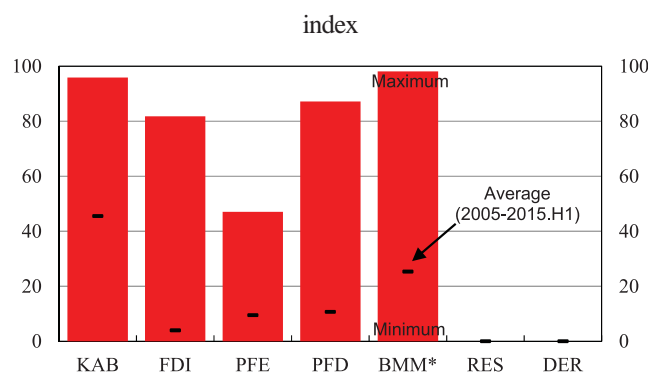
* BMM includes all the inflows and outflows of the 'other investment' account.
Source: Authors' calculation.

According to the calculation for Mongolia, the indices are relatively small for all types of flows reflecting that the capital flows of Mongolia are one-sided as mentioned in the previous sections. In details, the portfolio equity, portfolio debt and FDI flows are mainly driven by non-resident inflows. The change in foreign exchange reserves is by definition always one-sided[8] and Mongolia has no derivative investments. But, the openness index for the total capital flows (KAB) is higher due to the asset flows of reserves and liability flows of other accounts. We also consider the flows might have a low openness because either resident or non-resident flows are inhibited due to a lack of domestic financial market development.

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8. Foreign exchange reserves are resident assets and have no corresponding non-resident liability. Hence the gross flows are always entirely due to changes in resident assets and equal to net reserve movements. The index is anchored at zero by definition.

2.4 Determinants of Capital Flows: Push and Pull Factors

The clear understanding of the behavior of the capital flows is beneficial for policy makers to implement appropriate policy responses to their changes. Investigating the main drivers of the capital flows is thus an important policy issue, which is reflected in significant academic interest since the early 1990s (Koepke, 2015). The reason is that the appropriate policy response to the capital flows depends on the driving forces behind them.

The seminal work by Calvo, Leiderman and Reinhart (1992) and Fernandez-Arias (1996) introduced the distinction between country-specific "pull" factors and external "push" factors and provided a theoretical framework. Fernandez-Arias (1996) and Taylor and Sarno (1997) found that capital inflows are generally driven by external factors. However, Ghosh and Ostry (1993) and Förster, et al. (2014) argued that domestic economic fundamentals were the major driver of capital flows for a large group of EMEs. The push-pull framework provides a simple and intuitive classification of capital flow drivers. Although the framework certainly has limitations (for example, international investors' behavior and contagion effects are not included in this framework), it continues to be a useful analytical perspective for structuring the discussion on the determinants of the EMEs' capital flows.

Another corresponding dimension in the discussion of country—specific and global factors is the distinction between cyclical and structural forces that affect capital flows. The cyclical factors are naturally shorter term and often vary across different phases of the business cycle. On the contrary, the structural factors are more long term and related to the macroeconomic fundamentals, institutions, and policy and regulatory frameworks (Koepke, 2015).

The characteristics of capital flows also differ between *net* and *gross* flows. The net capital flows are the mirror illustration of the current account balance. In contrast, the gross capital flows consider resident outflows and non–resident inflows separately (i.e., the changes in assets and liabilities in the financial account). For the purpose of understanding capital flow movements, the gross capital flows are more relevant. When explaining the gross capital flow movement, there has been much more focus on the cyclical factors, especially in the most recent period since the global financial crisis of 2008/09.

Figure 4
Determinants of Capital Flows

Push factors	**Pull factors**
Cyclical factors	Cyclical factors
⊠ Global risk aversion	⊠ Domestic output growth
⊠ Interest rates in advanced economies	⊠ Asset return indicators (domestic interest rate)
⊠ Output growth in advanced economies or countries that have a financial contagion	⊠ Country risk indicators
⊠ Commodity prices	

Capital flows

AEs ▬▬▬▬▬ EMEs
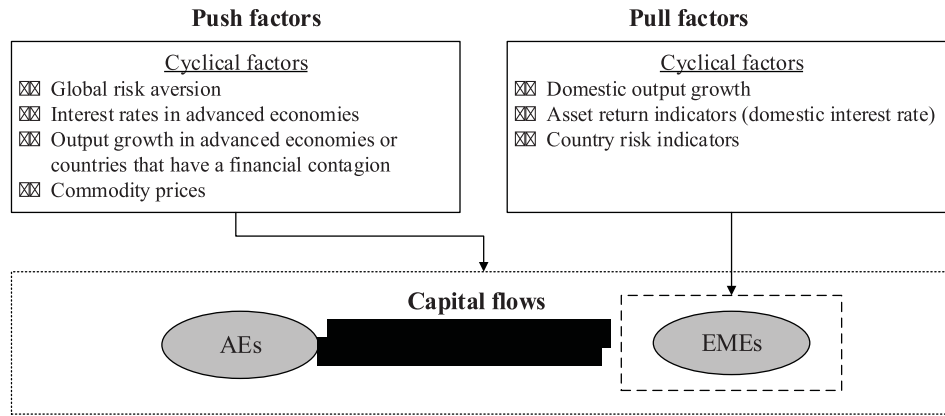
Source: Koepke (2015); Authors' view.

In addition, Cerutti, Claessens and Puy (2015) conclude that global push factors in the advanced economies mostly explain the dynamics of aggregate inflows to the EMEs by conducting a systematic analysis of the sensitivity of 34 EMEs to global push factors for periods of 2001–13 and also using the factor model of Kose, Otrok and Whiteman (2003).

Koepke (2015) suggested that driving factors of capital flows differed across types of capital flows. For example, global risk aversion, mature economy interest rates and country risk have clear negative relationships with the PFE, PFD and BMM flows, while advanced and domestic economy growth, and domestic asset return have some positive relationships with these flows. Only domestic output growth and country risk have clear relationships with the FDI flow in EMEs.

The panel estimation,[9] factor model[10] and the SVAR model[11] are widely used in the pull-push framework. However, simple methods such as a residual-based cointegration approach proposed by Engle and Granger (1987) and the Johansen VECM method are applied in this paper to determine push-pull factors of the capital flows of Mongolia.

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9. See Alleyne and Mecagni (2014), Brana and Lahet (2008) to study further in this direction.

10. The readers who wish to study further, please see Cerutti, Claessens and Puy (2015), Förster, et al. (2014), and Fratzscher (2012).

11. For the papers in which the SVAR model is used to investigate the push-pull framework, see Çulha (2006), Korap (2010), and Boschi (2012).

Since the capital flows in Mongolia are largely one-sided and the FDI inflow is the most significant and sustained in Mongolia, we concentrate more on the determinants of the FDI inflows. The recent sudden stop of the capital inflows in Mongolia is related to the decline of the FDI, thus investigating the driving forces is crucial for policy analysis.

Table 3
Data Definition

	Indicators	Choice of Variable	Notation	Source
	Capital Inflows			
1.	Foreign direct investment	FDI (share of GDP)	FDI	IMF-ICS database; BoM; NSO
2.	Bank and money market investment	BMM (share of GDP)	BMM	IMF-ICS database; BoM, NSO
3.	Portfolio debt investment	PFD (share of GDP)	PFD	IMF-ICS database; BoM, NSO
4.	Portfolio equity investment	PFE (share of GDP)	PFE	IMF-ICS database; BoM, NSO
	Push Factors			
1.	Global risk aversion	VIX index	VIX	IMF
2.	Advanced economy output growth	U.S. GDP growth	GDP_US	BEA
3.	Output growth of a country that has a financial contagion	China GDP growth	GDP_CHN	Bloomberg
4.	Commodity prices	Copper price	COPPER	IMF
		Coal price	COAL	Bloomberg
		Gold price	GOLD	Bloomberg
	Pull Factors			
1.	Domestic output growth	GDP growth	GDP_MNG	NSO
2.	Interest rate differential (domestic rate minus advanced economy rate)	Domestic interest rate: Interbank weighted average rate minus CPI inflation Advanced economy interest rate: 3 month Libor minus U.S. CPI inflation	RATE_DIF	Bloomberg; BoM; authors' calculation
3.	Country risk indicators	Government external debt-to-GDP ratio	DEBT_GOV	BoM; NSO

Notes: BoM = Bank of Mongolia, NSO = National Statistical Office, BEA = Bureau of Economic Analysis

Figure 4 presents all the possible factors that might have affected the FDI inflows of Mongolia and the data used in the empirical analysis is defined in Table 3. Our data sample covers the period between 2006Q1–2015Q2.

Table 4
Drivers of Mongolia's Capital Flows

Type	Driver	FDI	BMM	PFD	PFE
Push	Global risk aversion (VIX index)				
	Advanced economy output growth (U.S.)				
	Outpu growth of the country that has financial contagion (China)				
	Copper price	Positive			
	Coal price	Positive			
	Gold price	Positive			
Pull	Domestic output growth				
	Interest rate differential (domestic rate minus foreign rate)	Positive			
	Country risk indicator	Negative			

Positive relationship
No relationship
Negative relationship

Source: Authors' illustration.

According to unit root test, only FDI inflow is non-stationary among the types of capital inflows in Mongolia. Thus, we do not apply the cointegration methodologies for the other types of flows. For the determinants, all the variables were non-stationary or $I(1)$ processes except the U.S. GDP growth. The integration orders of the variables estimated by the ADF test are illustrated in Table 6.

Table 5
OLS and VECM Estimation Results

Dependent Variable: FDI Inflows-to-GDP Ratio

(a) Vector Error Correction Estimates			(b) OLS Estimates		
Cointegrating Eq:	CointEq1			Coefficient value	t-statistics
FDI(-1)	1.00				
			DEBT_GOV	-75.28	-9.10
DEBT_GOV(-1)	89.64		COPPER	15.95	3.22
	-9.45		COAL	19.71	4.04
	[9.48]		GOLD	15.57	2.44
Error Correction:	D(FDI)	D(DEBT_GOV)	D1*	-16.56	-2.78
CointEq1	-0.75	0.00			
	-0.17	0.00	Adj. R-squared	0.87	
	[-4.31]	[-1.05]	Number of observations	38 after adjustment	
COPPER	23.69	-0.02			
	-5.81	-0.04	* D1 is the crisis dummy that takes a value of 1 in the third quarter of 2008.		
	[4.07]	[-0.35]			
COAL	12.95	-0.02	Note: The residual of the above equation is stationary process, thus these variables have long-run relationship or cointegration with the FDI inflows.		
	-4.76	-0.04			
	[2.72]	[-0.50]			
GOLD	2.84	0.13			
	-7.76	-0.06			
	[0.36]	[2.30]			
RATE_DIF*	0.47	0.00			
	-0.18	0.00			
	[2.59]	[0.49]			
Adj. R-squared	0.36	0.06			
Number of observations	37 after adjustment				

* The real interest rate differential was $I(1)$ process, thus we include it in the equation as an exogenous variable.

Note: 1 Standard errors in ( ) & t-statistics in [ ]
  2 According to the trace test of Johansen cointegration, it has 1 cointegrating eqn(s) at the 0.05 level.

Table 4 shows the brief results of the estimations that we executed and some estimation outputs are shown in Table 5. As a small economy, Mongolia is unable to influence the international commodity prices and mature economy interest rates. Thus, those indicators are illustrated as exogenous variables in the VECM. The Johansen cointegration technique is used to determine the number of cointegrating vectors in a VECM framework. The trace test is used in this respect and the trace test indicates the presence of one cointegrating equation at the 5% significance level. On the other hand, the residual of the OLS estimation was stationary from which we can conclude there is cointegration. The results of two model estimates are consistent with each other and the estimates satisfy the summary statistics and diagnostic tests. The residual tests show that there is no significant serial correlation and heteroscedasticity in the residuals. Recursive estimation (CUSUM test and CUSUM of Squares test) of the OLS model also suggests that the regression coefficients are stable over the sample period. This implies that the OLS estimation is stable.

The result approves that the FDI inflows in Mongolia is only one source of the sustainable and volatile flows. Furthermore, the Granger causality test shows that the commodity prices affects the domestic GDP growth, and we remove the indicator of domestic GDP growth from the pool of determinant variables in order to avoid multicollinearity. In this paper, we also propose to analyse the importance of the commodity prices for capital flows volatility in Mongolia. Below, we mention all the push and pull factors in detail and separately.

2.4.1 Push Factors of the FDI

Since the U.S. GDP growth rate is usually used as an indicator of the advanced economy output growth (Hernández, 2015) and the VIX[12] is used as an indicator of global risk aversion, we applied these indicators to our estimation as push factors to the FDI. However, we find no clear relationships of the global risk aversion and advanced economy growth with Mongolian FDI inflows, which shows a similar result with the illustration of Koepke (2015) obtained by over 40 empirical studies of the EMEs. In addition, our estimation suggests that China's GDP growth affects the FDI negatively, which is theoretically insignificant, thus we eliminated this variable from the equation.

We find that prices of copper, coal, and gold which are the main export commodities of Mongolia to be the most important determinants of the FDI inflows, and impact the same positively. Ghosh and Qureshi (2012) also consider

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12. See Forbes and Warnock (2012), Byrne and Fiess (2011), etc.

commodity price as a global factor for capital flow surges and conclude that a positive shock to the commodity price index raises the surge probability by about 7%. However, commodity price booms have statistically insignificant effect. The surge in commodity price supports the large FDI inflows to the extractive sector in many African countries (Rangasamy and Mihaljek, 2011). Additionally, Bastourre, et al. (2012) suggest that the increase in commodity price has an effect on the availability of external financing in EMEs that rely strongly on commodities.

Mongolia is highly dependent on export revenue[13] in which the mining exports (copper, coal, gold, crude oil, iron ore, zinc, etc.) constantly make up about 90% of its total exports. The mining commodities of Mongolia are also comparatively competitive due to low costs, high quality and close proximity to the Chinese markets, which attract massive foreign investments into the sector. Furthermore, the high growth performance of Mongolia fueled by strong commodity prices increases the investment even further. The GDP growth was on average 12.0% in the periods of commodity price surge between 2010–12, but it decreased to 9.7% during 2013–14 when the prices declined significantly.

Figure 5
FDI Inflows and Commodity Prices
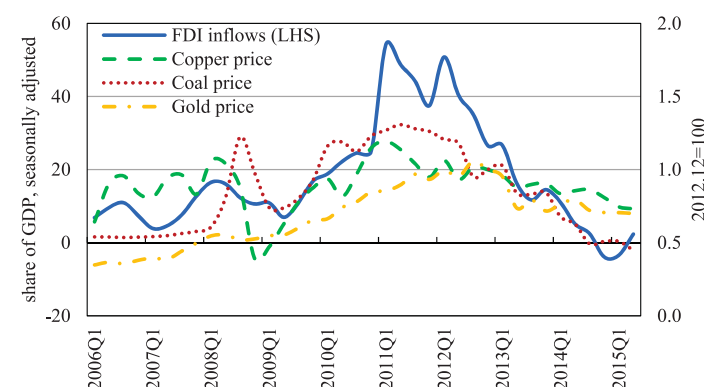
Source: Authors' illustration.

In contrast, sharp declines in the commodity prices due to weak demand for commodities in the world economy following China's economic slowdown since the second half of 2012 also led to decrease in the capital inflows of

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13. In Mongolia, the average share of exports of goods in GDP was about 40% for the last decade.

Mongolia. Between mid–2012 and mid–2015, the refined copper price at the London Metal Exchange and Mongolian border price of coking coal fell by over 26% and 57%, respectively, when the copper and coal exports make up 50% of Mongolia's total exports. Combined with the lack of export diversification that China accounts alone for 90% of Mongolia's total export, the drop of the prices also reflected in the significant decline in GDP growth. Thus, we suggest that the main push factors of the FDI inflow were the copper, coking coal and gold prices.

2.4.2 Pull Factors of the FDI

As a result of the econometric estimation, a measure of country risk (government external debt-to-GDP ratio)[1] and real interest rate differential (domestic rates minus foreign rates) was found to be statistically significant for the FDI changes in Mongolia, affecting the debt-to-GDP ratio negatively while the interest rate differential positively. Ahmed and Zlate (2013), Suttle, Huefner and Koepke (2013), Kabadayi, et al. (2012) and Fratzscher (2012) suggest similar results for EMEs. IMF (2015b) points out that the expected interest rate hike in the U.S. economy might attract more capital flows from EMEs.

Figure 6
Mongolia: FDI Inflows and Pull Factors
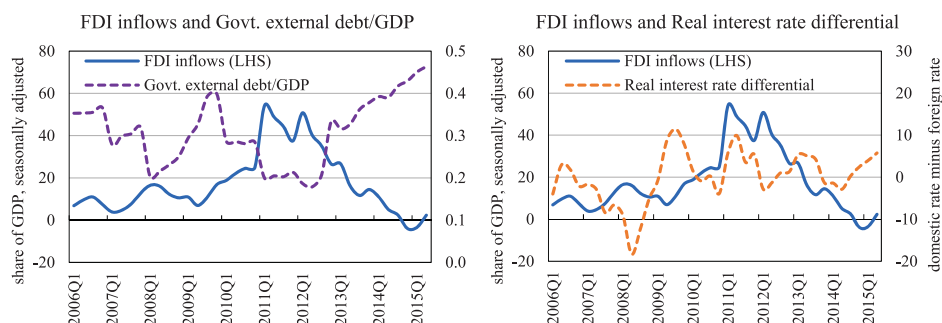
Source: Authors' illustration.

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14. For the papers that consider government external debt-to-GDP ratio as a country risk pull factor, see Brana and Lahet (2008), etc.

3. Consequences and Policy Challenges of Capital Flows Volatility in Mongolia

Poorly managed large capital inflows can expose three main risks to capital-recipient countries. Firstly is the macroeconomic risk where the capital inflows can accelerate domestic credit growth, overheat the domestic economy, increase inflation pressure and cause real exchange rate appreciation, affecting the macroeconomic performances in a way not consistent or compatible with domestic policy objectives, such as sustainable economic growth with price stability. The second risk is financial instability. The capital inflows can create maturity and currency mismatches in the balance sheets of commercial banks and private corporations. In addition, massive capital inflows push up equity and other asset prices and are able to reduce the quality of the assets, thereby establishing a greater financial fragility. The third risk is related to the capital flow of sudden stops and reversals. Capital inflows can stop suddenly or even reverse within a short period, resulting in depleted reserves or sharp currency depreciation (Kawai and Takagi, 2010).

There are also common impacts of the capital surges in EMEs, such as deterioration of the current account, widening of fiscal deficits, appreciation of real exchange rate, and inflationary pressure (Claessens and Ghosh, 2013). Thus, the volatile capital flows encourage domestic cycles and contributes to macroeconomic vulnerabilities through overheating pressures. However, the composition and size of the capital inflows and their impacts on the domestic economy and financial systems are influenced by financial market development (Rangasamy and Mihaljek, 2011).

Mongolia is a country which has less developed financial markets. Therefore, the capital inflows come to Mongolia, mainly in the form of FDI which affects the economy directly through investment and increases output and hardly transfers through financial system. In addition, the macroeconomic consequences of the recent capital inflows in Mongolia have been highly affected by the macroeconomic policies implemented in the recent years.

3.1 Monetary and Exchange Rate Policy Challenges

According to the Law of Mongolia concerning the Central Bank (BoM), the main objective of monetary policy is to ensure the stability of the national currency. At the same time, the law also states that the exchange rate policy

is to follow the principles of keeping the exchange rate floating. However, maintaining price stability requires the BoM to intervene in the domestic FX market in order to soften the pass-through effects of exchange rates on inflation which is relatively high in Mongolia. Also it prevents high exchange rate fluctuations that can weaken the financial and real sectors.

The inflation rate is also highly vulnerable from supply shocks of several consumer goods in Mongolia. Sudden shortfalls of domestic production of wheat and meat due to harsh weather or harmful disease and trade limits of gasoline in the main supplier countries create high inflationary pressure in some periods. Therefore, Mongolia has been experiencing high inflation rate in the past years. It was about 9.6% on average between 2001 and 2008 reaching the highest level at 23.2%. Although the inflation dropped to 2.0% in 2009, it has increased back to 14.3% in the following year and reached 12.0% on average between the periods of 2010–14. For the exchange rate, the nominal exchange rate tends to depreciate over the time since foreign exchange demand has been continuously increasing for residents. However, the real exchange rate is likely to appreciate due to the high domestic inflation rate. The real effective exchange rate (REER) appreciated by 7% annually during 2001–08 while it has dropped to 2% during 2010-14 because of the high nominal depreciation.

The recent volatile capital flows have been having a number of implications on the monetary policies. During the capital inflow surges, the BoM decided to buy the foreign exchanges in order to prevent large nominal appreciations which could be harmful for the domestic industries in the early stages and build up foreign reserves by the excess foreign exchanges in the FX market. However, the BoM faced a challenge of ensuring low and stable inflation when the excess liquidities in domestic and foreign currencies accumulated in the banking sector. Therefore, the BOM conducted offsetting open market operations to sterilize the interventions in the period. As a result, the reserves increased from 8.0 months of goods imports to 9.8 months of goods imports and the nominal exchange rate appreciated by 26% between 2009 and 2012.

However, the FX interventions and sterilizations highly affect the balance sheets of the Central bank and at the same time, they allow the build-up of large excess liquidity in the banking sector in light of concerns about the large sterilization costs and/or weak capital positions of the BOM. The expansionary fiscal policies in this period weakened the condition even further. Therefore, the BoM tightened its policy by increasing its policy rate by 2.25 percentage point to 13.25 and reserve requirement from 5% to 12% in the period between 2010 and 2012.

Furthermore, the BOM faced more challenges during the sudden stops and reversals of the capital inflows regarding the high BOP deficits, large nominal depreciation, inflationary pressure, significant decline of international reserves, worsening financial stability induced from asset price drops and liquidity shortage in the banking sector. Since the banking sector liquidity shortage causes the financial instability and the real economy to lead to economic slowdown and unemployment, the authorities in Mongolia needed to promote the real economy, keep the employment, mitigate the sudden impacts of declining FDI and boost the credit growth. Thus, the BoM softened its policy in 2013 by cutting its policy rate three times by a total of 2.75 basis points to 10.5%; and also provided substantial loans to commercial banks at below market rates through the "Price Stabilization Program" (PSP) and "Mortgage Lending Program" (MLP).

Figure 7
Mongolia: Monetary and Exchange Rate Policy

At the end of Aug, 2015
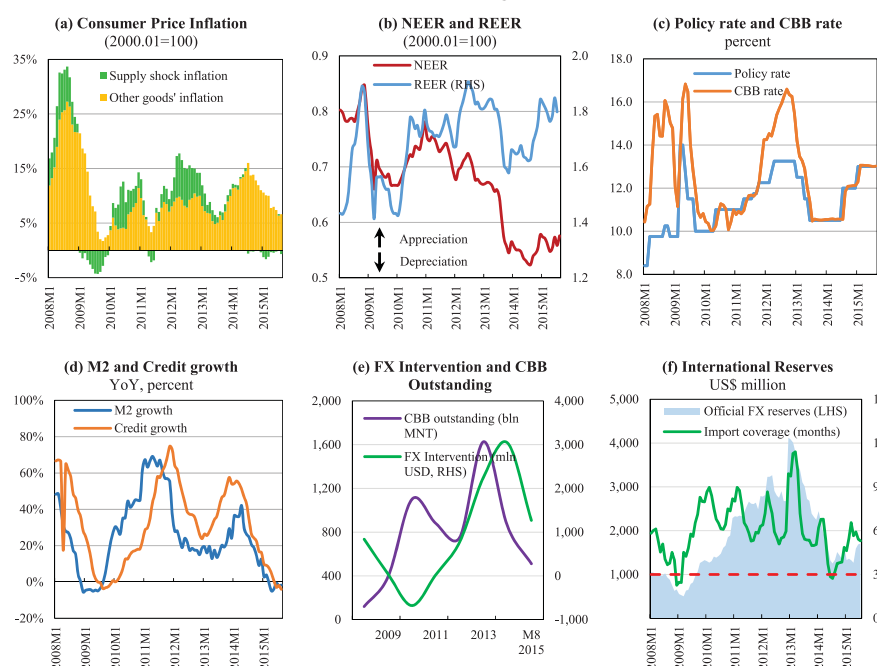
Note: [1]   Supply shock inflation includes the prices of meat, petroleum and cement (Figure 7(a)).
       [2]   Both foreign currency injections through auction and non-auction instruments are included in the FX intervention in Figure 7(e).
Source: Bank of Mongolia.

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In addition, the negative shocks to both FDI and commodity prices have weakened the BOP of Mongolia substantially. Thus, the exchange rate depreciated significantly since the second half of 2012. The BOP pressure also compounded with the expansionary monetary and fiscal policies of the period that encouraged the imports into economy and worsened the conditions. As a result, the exchange rate depreciated by 12% and 19% against U.S. dollar in 2013 and 2014, respectively.

The exchange rate depreciation created further challenges regarding inflation pressure through the exchange rate pass-through effects since early 2013. Although the inflation fell to a two-year low of 7% in July 2013 due to moderate food and gasoline prices as a result of the PSP, the exchange rate depreciation started to push up the inflation again. Therefore, the BoM sold foreign exchanges in the domestic FX market in order to smooth the speed of exchange rate depreciation, prevent short-term imbalances of supply and demand of foreign exchanges in the domestic FX market, and correct market expectations about the exchange rate. As a result of the continuous intervention in the FX market, the gross international reserves subsequently declined by $2.5 billion between 2012 and the first half of 2015.

When the economy encountered substantial negative external shocks, sufficient international reserve was crucial to mitigate the negative risks of the shocks in the economy. Thus, BOM built up the official foreign reserves in the recent years in several ways. Besides, the interventions, the foreign exchange sources of Sovereign bonds and Samurai bonds were managed by the Central bank in its functions of reserve management. Additionally, in order to provide short-term liquidity in the domestic FX market and to promote the bilateral trade with China, the BoM signed "Bilateral Currency Swap Arrangement between the People's Bank of China and the Bank of Mongolia" in May 2011. The maximum amount of it was RMB5 billion, but it has increased to RMB15 billion during 2011–14.

3.2 Macroprudential Policy Challenges

The volatile capital flows also weakened the financial stability of Mongolia. Procyclical systemic risks through financial linkages have been rising through the fiscal, export, credit and housing channels, given the strong cross-border capital inflows in the form of the FDI and the rapid increase in the domestic intermediation of the capital flows (Maino, Imam, & Ojima, 2013). Fueled by the loose fiscal policy alongside rising capital inflows, the situation has given rise to overheating pressures in Mongolia. Furthermore, the buoyant mineral exports

stimulated a high record of real GDP growth and contributed to a positive output gap. Then, the general optimism in the market has led the banking sector to lend more freely during the surging period. When combined with easy access to foreign financing, it also created an upsurge in private sector loans that amplified the boom even further. Therefore, the credit growth tended to be high when there is complacency regarding associated risks. Some standard precautionary measures are no longer observed or are loosened.

Housing has been playing a special role for macroeconomic policies in Mongolia and it has been a major component of the credit channel risk. During the good times, commercial banks competed in their loan extension with one other and it led to generous mortgage borrowing in the housing market of Mongolia. Furthermore, Mongolia's authorities were always eager to stimulate housing market development over time due to the high pollution problems in the capital city area. During the period of 2007–11, the volume of mortgage lending and construction finance in the context of four programs by the Government— "40,000 units", "100,000 units", "4,000 units" and "Housing for Veterans"— accounted for 25% of total loan origination and 30% of the unit construction in Mongolia (Milyutin, 2012). Because of easy lending during the capital inflow surges period and the promotional programs, housing demand increased significantly which also led to a boom in housing price. On the other side, the banking liquidity shortage during the capital inflow stop and reversal caused a decrease in mortgage loans which led the price to decrease because of surplus in housing markets. Therefore, the housing price in Mongolia has tended to be strongly correlated with the capital inflows. We can state that the recent volatile capital flow had a similar effect through the asset price volatility on the banking system which led to further increase in the systemic risk.

In conclusion, the procyclical fiscal policy, rising credit growth, asset price boom, and heightened risk appetite of the banking sector during the capital inflow surge have been posing significant risks to the financial stability of Mongolia.

Therefore, the BoM introduced several macroprudential measures that prevent both procyclical and market risks in order to manage the excessive short-term liquidity and mitigate its negative impacts on domestic banking system. Some of them are listed below:

- Increase in the liquidity ratio (18% to 25% in 2011)
- Increase in the capital adequacy ratio (12% to 14% for 5 systemic banks)
- Limits on exposure concentration (not exceed 20% of the capital of the bank)

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- Limits on net open currency positions (not exceed 15% of the bank's equity capital)
- Limits on maturity mismatches
- Setting a reserve requirement on all deposits
- Reducing provisioning at the time of crisis

In addition to these, the BoM has recently started to adopt some macroprudential measures in order to promote the private sector's capital inflows especially to the banking sector. To this purpose, the BoM has decided to exempt new long-term loans and bonds with three or more years of maturity drawn by commercial banks from the international market's reserve requirement. Furthermore, the BoM has introduced an instrument of the long-term swap with the Central bank to hedge the exchange rate risks of the banks' foreign loans and bonds with one or more year maturity. The swaps eventually reached a total of US$436 million by the end of 2014. Lastly, the BoM has increased the risk weight of the loans denominated in foreign currency in order to lower the exchange rate risk of private firms and individuals since the beginning of 2015.

3.3 Fiscal Policy Challenges

In addition to the monetary policy, the volatile capital flows have had many implications for the fiscal policy of Mongolia. The procyclical fiscal policy driven by huge capital inflows led to substantial fiscal expenditures and therefore high fiscal deficits during the capital surges period and increased the government debt in the sudden stops and reversal periods. With the combination of the external imbalances which made the real sector worse and created an unsustainable economic growth path.

When the capital flows fluctuated substantially, the procyclical fiscal policy exacerbated the cyclical effects of the capital volatilities on the economy. In the surge period, the budget revenue increased significantly through tax income collected from the commodity exports, new projects' activities in the mining sector and investment goods imports financed by the FDI. However, it dropped sharply in line with the deterioration of the foreign trade and FDI, as well as economic slowdown during the sudden stops. The budget revenue fluctuated from 32% of GDP in 2010–12 to 28% in 2014. When the revenue started to expand substantially, the fiscal policy became highly expansionary due to the coincidence with the government spending patterns in the year preceding the parliamentary election of 2012 and that induced strong political business cycle. The direct cash distribution to the households, one of the political promises shifted up the budget spending by 4% of GDP and the total spending increased by

nearly 5% of GDP between 2010 and 2012. Furthermore, the DBM financed a number of public infrastructure projects, such as local paved roads, railroads and industrial constructions on behalf of the GoM. As a result, the total budget deficit (including DBM spending) has increased to 10% of GDP (Figure 8).

When the commodity price declined and FDI dropped, the fiscal deficit was at a high level where Government debt increased significantly. The elevated debt ratios also raised a market concern and the risk profile of the public debt became less favorable — with the credit rating agencies downgrading Mongolia's sovereign rating and its outlook several times since the late 2012— and the sovereign spreads of Mongolia has increased. In addition, substantial refinancing risk has emerged for Mongolia since the most of the public sector debt is denominated in foreign currency. The external public debt in nominal terms increased to 38% and 43% of GDP in 2013 and 2014, respectively, compared to 2011 of 21%.

The Parliament of Mongolia approved the Fiscal Stability Law (FSL) in 2010 for running countercyclical fiscal policy and offsetting the long-term adverse effects of commodity price volatility. The FSL spelled out the vital fiscal rules that the structural budget deficit shall not exceed 2% of the GDP and the public debt-to-GDP ratio in terms of net present value (NPV) had to be at most 40% from 2013. For the fiscal year of 2013, the budget deficit was less than the limit set out by the FSL; however, the DBM spending was not included in the budget. Therefore, many public projects were financed off-balance sheet that had to be accounted to the budget deficit. In 2014, Mongolia experienced a huge budget revenue shortfall where the deficit exceeded the legal limit that eventually resulted in a FSL amendment increasing the deficit ceiling up to 4% in 2015. Consecutively, due to a surpassing of the government debt ratio, the ceiling increased to 55% by the new amendment. Furthermore, by the FSL, the GoM founded the "Fiscal Stabilization Fund" in 2010 for accumulating excess revenue from the mining sector. Since its establishment, it has reached 430 billion MNT (2% of GDP) by 2013. Unfortunately, the Government had utilized the fund asset following the sharp decline in commodity prices in 2014. In fact, due to the futile implementation of the FSL, the Parliament loosened the strict fiscal disciplines that would result in increasing the budget deficit in the medium term.

Figure 8
Mongolia: Budget and DBM Spending

Billion MNT; Percent of GDP
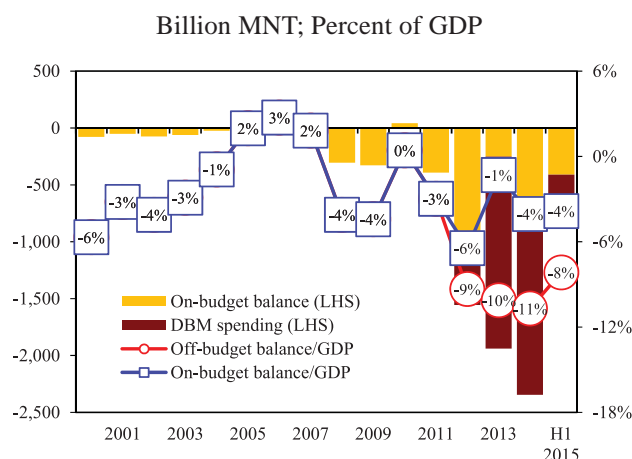
Note: Off-budget balance refers to a fiscal balance of the
        central government, including DBM spending.
Source: Ministry of Finance, DBM, NSO.

Finally, the sudden stop and reversal of the capital inflows created major vulnerabilities in Mongolia, such as twin deficits of fiscal, balance of payments and unsustainable debt pattern. Thus, it required significant monetary and fiscal tightening which also has substantial negative impact on further economic growth. In 2011 to 2013, the average annual economic growth of Mongolia was 13.8%. However, it has continuously decreased to 7.8% in 2014 and 2.5% in the third quarter of 2015.

4. Concluding Remarks and Policy Discussions

Mongolia literally liberalised its financial accounts during its transition to a market economy in 1990s. However, the capital flows of Mongolia have been relatively moderate until the mining boom and sovereign bond issuances in 2010. Additionally, the non-resident flows have been more persistent and significant compared to the resident flows. Thus, the movements of the capital flows are mainly driven by the non-resident flows. It has already been proved by the calculation of the openness index of the capital flows which shows that all types of the flows are largely one-sided in Mongolia. In addition, the capital inflows have been less diversified across the types and are mainly driven by the mining FDI inflows which compose two-thirds of the total FDI inflows of Mongolia during the period of 2010–14.

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The capital flows volatilities of Mongolia differ by periods and types. The volatilities measured as simple standard deviations increased due to the turmoil of the global financial crisis of 2008–09. However, the mining boom-and-bust during 2010–15 fueled the volatilities even more, specifically the volatility of FDI inflows became the highest among all the flows. On the asset side, the reserve flows have been the most volatile. The strong volatility of the FDI inflows are reflected by the strong dependency of Mongolia solely on the mining sector and commodity price, while the active FX intervention induced by a fear of floating creates the volatility of the reserve flows.

According to our empirical analysis, the main determinants of the FDI inflows in Mongolia are world market prices of the main export commodities, such as copper, coal, gold, interest rate differential and country-risk indicator which is represented by the public sector external debt to GDP ratio. This result indicates that the Mongolian economy is highly dependent on the commodity prices through both the revenue and capital flow channels. In addition, higher domestic interest rates relative to foreign interest rates encourage the capital inflows while high build-up of public sector external debt negatively affects the inflows as it increases the local country risk.

The recent substantial and volatile capital flow has been having a number of implications to the Mongolian economy, notably inflationary pressures, exchange rate fluctuations, inadequate foreign reserve, high fiscal deficit and public debts, external imbalances, and unsustainable economic growth. In addition, it has weakened the financial sector instability and has created asset price boom-and-bust cycle. The past capital inflow was transitory, stopping and reversing after three years, then it had much cyclical consequences on the economy. The procyclical fiscal policy during the time also amplified the cyclical effects on the domestic economy which also decreased monetary policy rooms. The Central bank needed to tighten its policy to prevent overheating pressure during the surge period and to soften its policy during the capital stop and reversal periods in order to promote economic growth, defend employment and prevent a credit crunch and liquidity shortfall in the banking sector. Furthermore, some macroprudential measures were implemented by the Central bank to prevent banking sector risks arising from the hot money and encourage capital inflows in response to the sudden stops.

Although the Parliament approved the FSL and established the Stability fund in 2010, it moderated the strict fiscal disciplines with the futile implementation of the FSL in following years. The government increased the budget spending substantially and the deficit became high creating substantial public sector debts

and weakening the country's risk profile. Thus, Mongolia should reconsider the macroeconomic policies systematically, providing for their consistency and amortizing the externalities and risks of the volatile capital flows in the domestic economy. An appropriate capital flow management and macroprudential framework should also be considered for Mongolia.

For Mongolia, allowing a flexible exchange rate is an appropriate policy choice since it helps to smooth the negative effects of external shocks to the domestic economy, playing the role of shock absorber and, most importantly, preventing the depletion of the international reserves. Even the economy having high pass-through effects of exchange rate on inflation, flexible exchange rate also provides the opportunity for the adjustment of the trade balance through the cost channels for the BOP to be balanced again and decrease the exchange rate pressure to be depreciated. However, high exchange rate appreciation can be harmful for industry in small developing countries that are commodity-based, such as Mongolia. To avoid the Dutch disease in the early stage of industrialization, such countries are also to consider buying excess foreign exchanges in FX market during the period of capital inflow surges. Huge capital inflows are assumed to affect the domestic exchange rate, causing it to appreciate and weaken the country's competiveness. Therefore, the high exchange rate appreciation is inconsistent with the long-term economic development policy of the countries.

Macroprudential policy measures are important to manage the volatile capital flows and to soften its negative impacts on the financial sector in Mongolia. The huge capital inflow impacts on banking lending causing it to increase substantially and lead to asset price boom. On the other side, it also creates high banking sector liquidity and credit risks and asset price boom-bust cycle when the capital inflow stops. Moreover, macroprudential measures are preferable to prevent these risks of the financial sector in the framework of capital flow management.

The fiscal discipline and sovereign welfare fund is also crucial to mitigate the high cyclical effects of the volatile capital flows. The budget should be countercyclical and able to soften the negative effects of the volatile capital flows on the economy. Therefore, it promotes long-run sustainable growth. In addition to this, the sovereign fund is helpful to prevent high government debt positions when the economy has significant negative shocks. Furthermore, deep financial integration with the international financial markets and central bank swap agreements are the possible solutions during the capital inflow stops and reverses. However, the authorities should be concerned about the sources for

the repayment of the debts because debt repayment management is a crucial part to the economy.

Mongolia needs to develop its own financial markets to attract other types of inflows. For example, Mongolia can develop a secondary market for financial assets such as mortgage-backed securities and open access for non-residents to buy these products. In addition, the development and deepening of the local capital and bond markets are also helpful in promoting and strengthening the financing base of Mongolia, and the strong financial markets are beneficial for absorbing the substantial capital inflows into the domestic economy efficiently by not creating overheated risks and maintaining financial stability. In fact, more sophisticated financial markets tend to attract more capital inflows and, thus, can reduce the risks of sudden outflows and decrease the risks of financial instability.

In conclusion, some macroeconomic policies should promote a diversified economy and attract FDI inflows into the non-mining sectors of Mongolia, such as agriculture, construction and tourism, which would decrease the risks of high dependence on the commodity prices and diversify the FDI inflows.

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Appendix 1 – Composition of the Balance of Payments

(a) Current Account

(b) Capital account

(c) Foreign Direct Investment

(d) Portfolio Equity

(e) Portfolio Debt

(f) Bank and Money Markets

(g) Reserves

(h) "Capital" account

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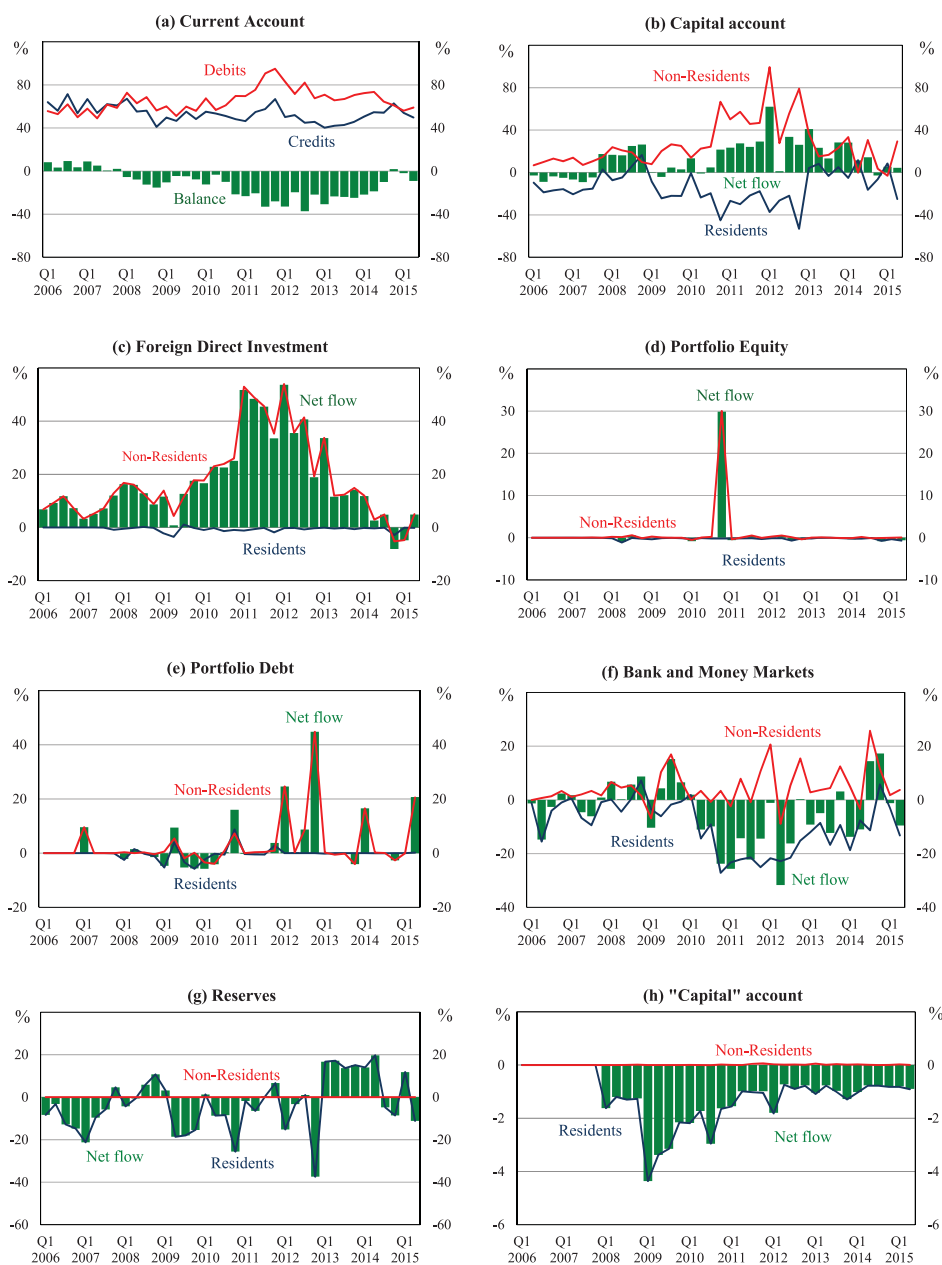
Appendix 2 – Data Analysis

Table 6
Unit Root Tests, ADF

		Test Statistic by Unit Root Test					
		ADF: intercept & trend		ADF: intercept		ADF: none	
		Level	1st diff.	Level	1st diff.	Level	1st diff.
Variables	FDI	-1.15	-6.08	-1.33	-5.99	-0.92	-6.07
			***		***		***
	BMM	-7.08	-9.22	-5.96	-9.35	-4.47	-9.49
		***	***	***	***	**	***
	PFD	-5.84	-5.58	-5.59	-5.75	-5.00	-5.86
		***	***	***	***	***	***
	PFE	-6.04	-10.00	-6.13	-10.15	-6.03	-10.30
		***	***	***	***	***	***
	VIX	-2.88	-7.81	-3.14	-7.87	-0.99	-7.99
			***	**	***		***
	RATE_DIF	-2.74	-3.44	-2.09	-4.81	-2.13	-4.88
			*		***	**	***
	GDP_US	-5.70	-4.56	-2.75	-4.59	-2.19	-3.71
		***	***	*	***	**	***
	GDP_CHN	-4.08	-3.72	-2.40	-3.78	-0.89	-3.79
		**	**		***		***
	GDP_MNG	-1.73	-5.90	-1.80	-5.89	-1.19	-5.97
			***		***		***
	DEBT_GOV	-1.53	-5.97	-1.17	-5.76	0.12	-5.82
			***		***		***
	COPPER	-2.87	-5.52	-2.93	-5.62	-0.36	-5.71
			***	*	***		***
	COAL	-0.84	-5.37	-1.18	-4.92	-0.48	-4.99
			***		***		***
	GOLD	-0.59	-6.78	-1.65	-2.81	0.48	-2.76
			***		*		***

Notes: H0: Unit root process for ADF.
*, **, *** refers to the rejection of H0 at .10, .05, .01 significance level, respectively.

Table 7
Descriptive Statistics

	FDI	VIX	GDP_US	GDP_CHN	COPPER	COAL	GOLD	GDP_MNG	RATE_DIF	DEBT_GOV
Mean	17.77	20.55	1.38	9.08	0.89	0.85	0.68	9.64	0.10	0.31
Median	12.50	17.67	1.80	9.05	0.90	0.82	0.71	10.36	0.30	0.31
Maximum	54.13	44.14	3.20	12.40	1.19	1.31	1.06	20.59	11.50	0.46
Minimum	-3.93	11.39	-4.10	6.20	0.39	0.45	0.35	-2.28	-18.30	0.18
Std. Dev.	15.01	8.83	1.87	1.73	0.17	0.29	0.21	5.73	6.08	0.08
Skewness	0.95	1.44	-1.77	0.26	-0.88	0.22	0.00	-0.23	-0.69	0.03
Kurtosis	3.05	4.17	5.26	1.80	4.36	1.56	1.95	2.99	3.94	1.97
Jarque-Bera	5.75	15.34	27.90	2.71	7.87	3.60	1.74	0.34	4.37	1.67
Probability	0.06	0.00	0.00	0.26	0.02	0.17	0.42	0.84	0.11	0.43
Sum	675.34	781.00	52.40	344.90	33.71	32.17	25.98	366.20	3.67	11.73
Sum Sq. Dev.	8,341.6	2,884.6	129.6	110.83	1.02	3.05	1.58	1,215.75	1,368.51	0.24
Observations	38	38	38	38	38	38	38	38	38	38

Table 8
Correlation Matrix

	FDI	VIX	GDP_US	GDP_CHN	COPPER	COAL	GOLD	GDP_MNG	RATE_DIF	DEBT_GOV
FDI	1	0.10	0.12	-0.02	0.62	0.83	0.69	0.69	0.18	-0.76
VIX	0.10	1	-0.61	-0.17	-0.35	0.35	-0.01	-0.05	-0.16	-0.36
GDP_US	0.12	-0.61	1	0.24	0.53	-0.07	0.20	0.51	-0.15	0.08
GDP_CHN	-0.02	-0.17	0.24	1	0.30	-0.08	-0.54	0.14	-0.24	-0.17
COPPER	0.62	-0.35	0.53	0.30	1	0.43	0.44	0.67	-0.03	-0.42
COAL	0.83	0.35	-0.07	-0.08	0.43	1	0.65	0.55	0.13	-0.69
GOLD	0.69	-0.01	0.20	-0.54	0.44	0.65	1	0.46	0.34	-0.29
GDP_MNG	0.69	-0.05	0.51	0.14	0.67	0.55	0.46	1	-0.22	-0.65
RATE_DIF	0.18	-0.16	-0.15	-0.24	-0.03	0.13	0.34	-0.22	1	0.30
DEBT_GOV	-0.76	-0.36	0.08	-0.17	-0.42	-0.69	-0.29	-0.65	0.30	1

Chapter 7

LIVING WITH CAPITAL FLOW VOLATILITY IN THE PHILIPPINES

By

Justin Ray Angelo Fernandez
Angelo Paolo T. Kalaw[1]

1. Introduction

The free flow of capital as a feature of trade and financial globalization has been a significant part in the growth and development process in the Philippines. As the country continues to liberalize its markets and embrace greater integration, it has opened its doors to international capital to unlock new sources of potential growth. Capital flows have provided additional sources of funding for the domestic economy and supported output expansion and financial market development over the recent years. However, this openness is accompanied by its own risks and challenges, as capital flow is inherently volatile and sensitive to uncertainty and shifts in the global outlook. In the post-Global Financial Crisis (GFC) era, episodes of rapid capital flows could complicate the formulation of monetary and financial policies by the Bangko Sentral ng Pilipinas (BSP) as it could challenge the Philippine economy's track of sustainable growth. Surges in capital flows could exert pressures on the exchange rate, disrupting financial intermediation, and creating vulnerabilities in the balance sheets of economic agents.

At the height of the US Federal Reserve's quantitative easing (QE) program, the Philippines, like many emerging market economies, became a net recipient of capital inflows as yield-seeking prevailed in an era of ultra-low global interest rates and parallel improvement in the domestic economic prospects of the Philippines. Non-resident investments in the country have grown in importance but were accompanied by mounting appreciation pressures, rapid expansion of domestic liquidity and build-up in household and corporate leverage. The period

of inflows changed the dynamics of the balance of payments (BOP) for the Philippines, and increased the sensitivity of balance sheets to external fluctuations.

However, the slight hint of a withdrawal of the QE program sparked bouts of volatility and proved that portfolio inflows could easily reverse, as witnessed in the massive withdrawal of capital in May 2013. This persisted until the end of the asset purchase program in 2014 and sent out a wake-up call for policymakers that accommodative policies cannot remain forever and volatility is inevitable.

Together with trade, capital flows appear to be the channel through which global developments are transmitted to the Philippines. The prevailing atmosphere of global uncertainty continues to drive capital flow movements, and could easily swamp domestic measures by authorities to maintain stability. With the normalization of US policy rates, the resiliency of emerging economies including the Philippines is under scrutiny to ensure that vulnerabilities can be managed and the economy can weather heightened volatilities. New, responsive and proactive measures are needed to be introduced to complement the existing policy toolkit and live with this new reality.

In this paper, we aim to analyze recent trends in capital flow movements in the Philippines, and its impact on the broader economy and financial system. We provide an analysis of the behavior and volatility of sub-components, and delve deeper into the most volatile component of the BOP. In the final section, we discuss the policy implications and imperatives for the Philippines and the BSP to live with capital flow volatility.

2. Patterns of Capital Flow in the Philippines

In this paper, we use the standard BOP data sourced from the BSP's External Accounts Statistics on a quarterly basis. The data are stated in United States dollars (US$) and scaled by nominal GDP. We note that the BSP uses the IMF Balance of Payments Manual 6 (BPM6) in compiling external accounts statistics and the earliest data available under the BPM6 format is 2005. The data used from 1999-2004 is compiled following the BPM5 format.

We assume that the current account balance (CAB) is equivalent to the difference between domestic savings and investments (S – I). Low savings and/ or high investments imply a current account deficit whereas high savings and/ or low investments suggest a current account surplus. A country's borrowing to finance the deficit or lending to invest the surplus will constitute as a flow of

capital and will reflect in the capital account balance (KAB). Hence, it follows conceptually that:

$$CAB = S - I = KAB$$

$$KAB = FDI + PFE + PFD + BMM + RES$$

KAB further refers to the financial account and consists of foreign direct investments (FDI), portfolio equity (PFE), portfolio debt (PFD), bank and money market flows (BMM),[2] and official reserves (RES) flows. This disaggregation is used in this paper.[3]

2.1 Size and Composition

2.1.1 Current Account

The Philippines' BOP shows that the country has registered a consistent annual current account surplus since 2003, which implies that it is a net exporter of capital to the rest of the world (Figure 1). The generally strong performance of the current account is largely attributable to the significant inflows of remittances from overseas Filipinos (OFs).[4] The robust deployment of OFs, backed by continued strong demand for Filipino manpower abroad, play an important role in complementing higher receipts and narrowing deficit from trade, thus anchoring the BOP's surplus.

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2. The data on BMM used in this paper is equal to the transactions classified as "other investments" under the BPM6 framework.

3. This identity and the terminologies used are consistent with the framework used in the main integrative paper of the research project. We note, however, that under the BPM6, there is a distinction between capital account and financial account. "Capital account" refers to acquisition/disposal of non-produced/nonfinancial assets and capital transfers between residents and non-residents. The use of the term capital account in BPM6 is designed to be consistent with the System of National Accounts (SNA), which distinguishes between capital and financial transactions.

4. Overseas Filipino remittances dominate personal transfers under the secondary income account of the current account balance. For instance, in 2013, the share of workers' remittances to personal transfers stood at 98%, on the back of continued strong demand for skilled Filipino manpower abroad.

Figure 1
Philippines Current Account Balance, 1999-2014
Percent of GDP, Quarterly

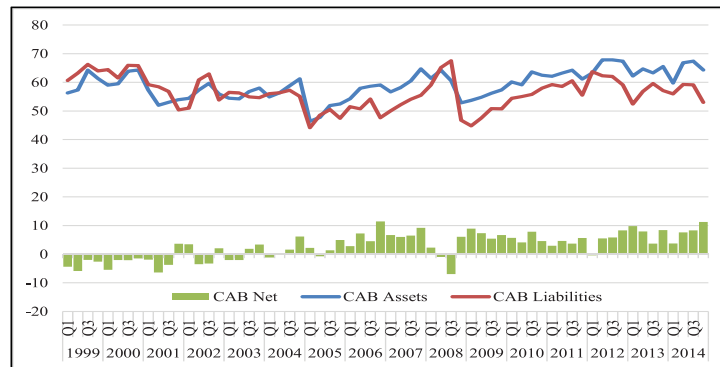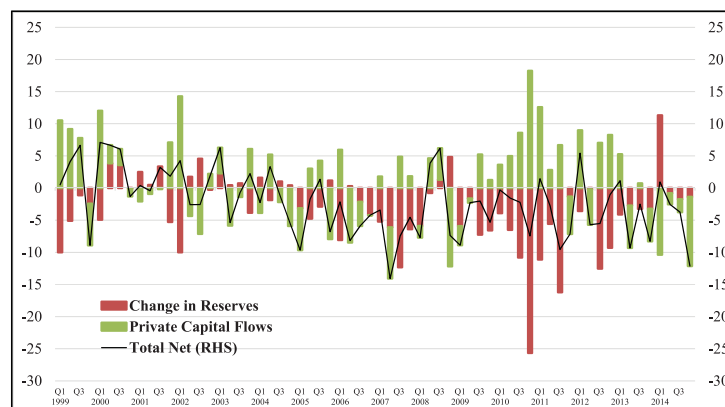**Figure 2**
Philippines Capital Flows, 1999 – 2014
Percent of GDP, Quarterly

Source: BSP, authors' calculations.

2.1.2   Capital Account (KAB)

The capital account balance on the other hand reflects a two-way flow that highlights the openness of the capital account (Figure 2). The country has been a recipient of inward flows from non-residents via direct or portfolio investments,

while residents were also allowed to channel surplus savings abroad, facilitated also by the several waves of liberalization in foreign exchange policies of the Philippines. It could be noted, however, that despite the structural surplus, the country has been a net importer of 'private' capital. The export of capital surplus is seen through changes in reserves.

The growth and behavior of capital flows in the Philippines have also been uneven across periods and types of flows. It generally tracked global developments as a consequence of financial openness, experiencing both periods of inflows (post-1998 and 2008 crises) and outflows (2008 GFC and 2013 taper tantrum).

In terms of size, the increase in capital inflows after the GFC in 2008 is notable, with the volume of gross inflows peaking at 16% of GDP in 2010 (US$5.4 trillion), exceeding levels previously seen in 2002. On the average, the share of gross inflows (liabilities) to nominal GDP from 2009-2014 stood at 4.8%, up from 2.9% prior to the crisis (1999-2007).

Gross outflows (assets) to GDP, on the other hand, are larger at 8.8%, largely owing to changes in reserves. Annual growth in reserves was still positive even during the 2008 crisis. The current account flows provided an opportunity for reserve accumulation but financial inflows contributed and even accelerated this on several occasions (i.e. 2000, 2010-2012). It only slowed and posted negative growth in 2013 to 2014 as the BSP used reserves to manage the impact of capital outflows on the capital account.

The episode of strong inflows from 2009 to 2013 provided an opportunity for the central bank to accumulate reserves at faster pace since the 1997 Asian financial crisis. From 2000 to 2014, the average build-up in gross international reserves stood at 15.3%, which peaked at 47% in 2007. This puts the Philippines' reserve position at a level that could more than adequately cover its imports and short-term external debt.[5]

The dominance of reserves in resident flows also reflects the reserve accumulation policy of the BSP, and contributed to the smoothing out of net flows for the Philippines. Similar to many emerging market economies, the accumulation of reserves was seen as a self-insurance against future crises and an anchor to ward off future speculative attacks (Dominguez et al., 2012).

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5. In December 2014, the GIR of the Philippines stood at US$79.54 billion, which can cover 9.9 months' worth of imports of goods and payments of services and income.

Moreover, in general, it can be argued that the dominance of reserves in net capital movements is a consequence of the level of development of the domestic financial system, entailing difficulties for private capital flows by residents to be channeled from savings to foreign investment, rather than an effect of crowding out (Blanchard and Milesi-Ferreti, 2011).

2.1.3 Private Capital Flows[6]

Once the change in reserves is taken out, a decomposition of the net private capital flows reveals that the majority of non-resident flows (liabilities) takes the form of foreign direct investment since 1999, but has been offset by outward direct investment by residents (Figure 3). Outward direct investments of residents jumped to an average of 2.5% of GDP in 2008-2014, from 0.2% in the period 1999-2004. This could be explained by the liberalization measures adopted by the government to encourage outward-oriented FDI (Aldaba, 2012).

The majority of foreign direct investments was in the form of debt placements, and went to the manufacturing sector. This was followed by the placement in electricity, gas, steam and air-conditioning supply, and the financial and insurance sectors. Most foreign direct investments contributed to the pickup in the industrialization process in the Philippines, and reflected the increase of debt issuance by local firms and affiliates.

After the 2008 GFC, the bulk of net private capital flows shifted to portfolio debt investment on the average, from previously being dominated by bank and money market flows in the period 2004-2008. The surge in capital flows in this period was also predominantly portfolio inflows to peso-denominated securities and other inflows to the nonfinancial private sector, accounting for a higher share of nominal GDP (0.6%) than bank and money market flows.

The sectoral breakdown of portfolio equity investments shows that the majority was placed in property, holding firms and financial institutions. Most portfolio debt, on the other hand, went to general government debt, the dominant issuer in the local debt market.

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6. In this paper, private capital flows were computed as the capital account excluding flows or changes in the reserves. We note, however, that under the BPM6, such figures may include transactions of the national government and other public sectors, as well as non-reserve-related transactions of the central bank, which are public in nature. Nevertheless, consistent with the framework of the main integrative paper of the project, we assume that the significant majority of private capital flows are non-government.

Figure 3
Composition of Net Private Capital Flows, 1999-2014
Percent of GDP, Quarterly
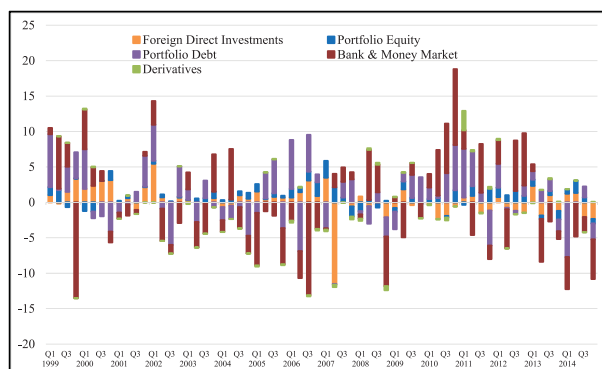
Source: BSP, authors' computation.

This shift from bank and money market flows to portfolio debt in the Philippine capital account reflects the dynamics of global liquidity. Shin (2013) observed that global liquidity went through two phases, first as cross-border bank loans and, secondly, as investments in emerging market debt securities. The first phase (2003-2008) had at its center, the leveraging activity of global banks that drove banking sector capital flows across borders. The second phase (starting 2010) revolved around the search for yield of global investors, mostly in the portfolio account and in the form of emerging market debt securities. Furthermore, the achievement of investment grade status for sovereign issues of the Philippine Government starting 2012 attracted additional interest and non-resident inflow into the portfolio account.[7]

Finally, financial derivatives have a limited effect on movements in private capital flows, given the relatively low level of development of the domestic derivatives market.

2.2 Volatility

We also analyze the volatility of individual components to further understand the dynamics of the capital account. In Table 1, we divide the dataset into three sample periods, namely: i) full sample; ii) pre-crisis (1999 Q1 –2006 Q4); and,

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7. The Philippines first received its investment grade status in March 2013 from Fitch. At present, it is rated one notch above investment grade by the three major credit ratings agencies.

iii) GFC to post crisis (2007 Q1 – 2014 Q4). The average flows and standard deviation is computed to show the relative magnitude and volatility of the components of capital flow.

Table 1
Relative Magnitude and Volatility of the
**Capital Account Balance, 1999-2014**

Period	Capital Account	Foreign Direct Investment	Portfolio Equity	Portfolio Debt	Bank & Money Market	Derivatives	Reserves	Private Capital Flows
Full Sample								
Average Capital Flows (US$mn)	-739.11	20.15	137.86	175.31	-95.21	5.20	-982.42	243.31
Average Share to Nominal GDP	-0.02	0.00	0.00	0.01	0.00	0.00	-0.03	0.01
Standard Deviation (US$mn)	1,487.08	605.65	258.73	976.95	1,399.71	122.20	1,771.83	1,947.89
Coefficient of Variation	2.01	30.06	1.88	5.57	14.70	23.50	1.80	8.01
1999 Q1 - 2006 Q4								
Average Capital Flows (US$mn)	-158.48	245.22	104.17	136.48	-333.10	-8.00	-303.25	144.77
Average Share to Nominal GDP	0.00	0.01	0.00	0.01	-0.01	0.00	-0.01	0.01
Standard Deviation (US$mn)	1,087.52	298.44	159.89	878.59	1,097.44	23.77	842.25	1,370.18
Coefficient of Variation	6.86	1.22	1.53	6.44	3.29	2.97	2.78	9.46
2007 Q1 - 2014 Q4								
Average Capital Flows (US$mn)	-1,319.75	-204.92	171.55	214.14	142.67	18.40	-1,661.59	341.84
Average Share to Nominal GDP	-0.04	-0.01	0.01	0.01	0.01	0.00	-0.05	0.01
Standard Deviation (US$mn)	1,617.23	742.84	328.84	1,079.17	1,631.07	171.53	2,172.17	2,411.12
Coefficient of Variation	1.23	3.62	1.92	5.04	11.43	9.32	1.31	7.05

Source: Authors' calculations.

To further capture the evolution of volatility among net flows over time, we calculate the standard deviations of quarterly share to GDP of each component flow over a one-year rolling period. The results are shown in Figure 4. The average volatility of asset, liabilities and net flows for the period 2009-2014 is shown in Table 2.

The volatility of capital flows is a relevant policy concern for monetary authorities especially in relation to its mandates of maintaining broad stability in the domestic macroeconomy. While there are multiple variables that influence the volatility in the behavior of capital flows, it is important to point out which particular subcomponents tend to exhibit highest variability, and implement measures to lessen the impact of volatility on other flows and the economy in general.

Figure 4
Volatility of Capital Flows as Percent of GDP
(in Standard Deviations)
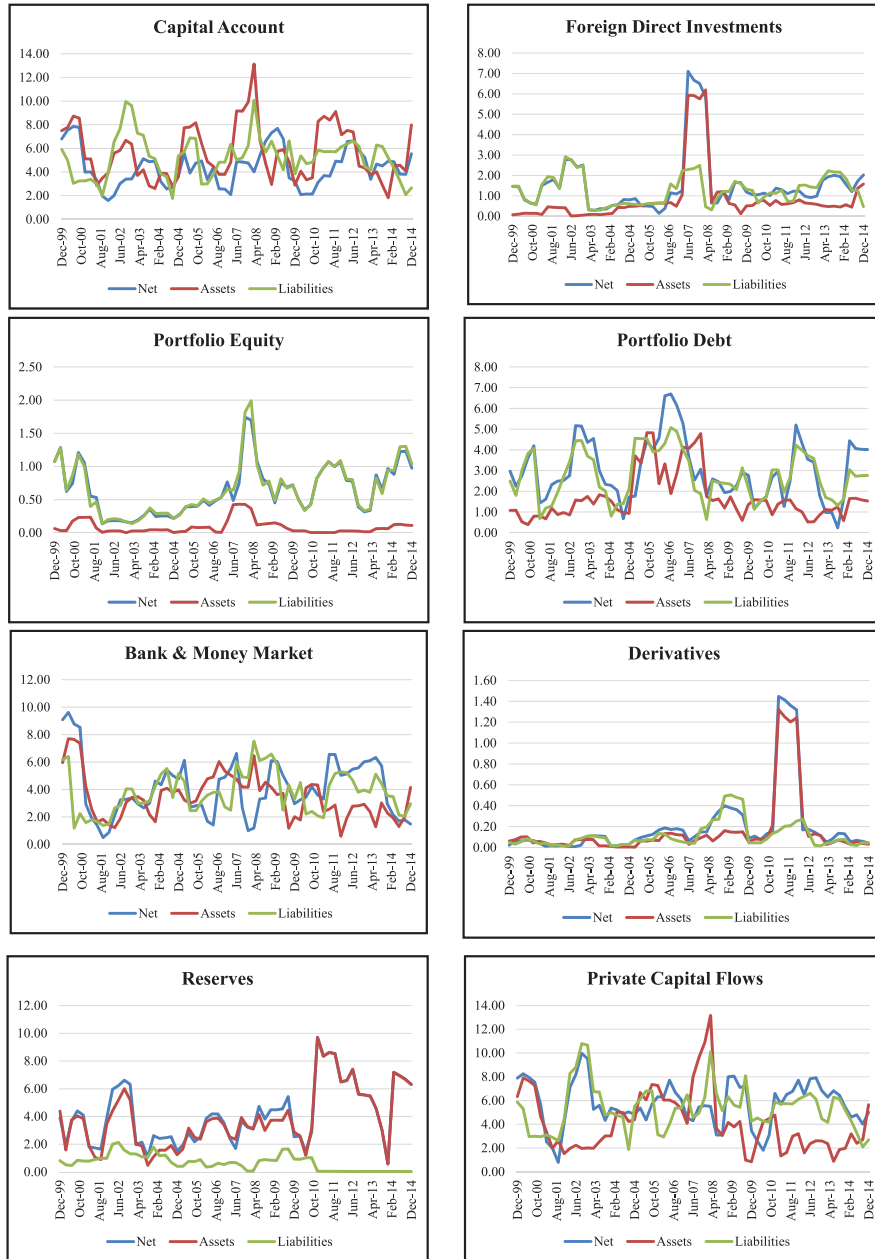
Source: Authors' calculations.

For the Philippines, the volatility of the overall capital account is lower than private capital flows, to a large extent reflecting the role of reserves in smoothing the balance. This shows that while flows in the capital account are generally bi-directional, the international investment position of private residents cannot fully offset that of non-residents, hence public resident flows through changes in reserves act as a stabilizer of the capital account. This difference in the international investment position also manifests in the evidence that across all types, liabilities also tend to be more volatile than assets.

Table 2
Volatility of Capital Flows as Percent of GDP
Average 2009-2014 (in standard deviations)

	Assets	Liabilities	Net
FDI	0.65	1.37	1.37
PFE	0.05	0.77	0.76
PFD	1.23	2.51	2.60
BMM	2.60	3.71	4.36
DER	0.29	0.14	0.35
RES	5.39	0.36	5.48
PKB	2.73	5.13	5.80
KAB	5.39	5.08	4.48

Source: Authors' calculations.

It appears however, that much of the variability of the Philippine private capital flows and the overall capital account comes from bank and money market flows and portfolio debt investments. Bank and money market flows have displayed the highest volatilities among flows across the three periods. This has been previously observed among emerging market economies, wherein there is typically a greater reliance on bank-intermediated finance and local capital markets are in a developing stage (Becker and Noone, 2009).

The conventional understanding that foreign direct investments are the most stable flows can also be observed in general. This occurred except during the period Q3 2006 to Q2 2008, when ample foreign exchange liquidity and the

strong peso encouraged some public and private borrowers to prepay some of their external obligations.[8] There was also retrenchment in the period of the GFC, as both residents and non-residents repatriated capital at the height of the GFC.

Another interesting feature of the data is the one-sidedness of the volatility of some flows. Volatility of portfolio equity appears to be largely tracking movements in the liabilities side or non-residents, which still reflects the smaller outward portfolio equity investment of residents. Financial derivatives, on the other hand, are driven by the asset side given the limited opportunity for non-resident participation in the Philippines.[9] In contrast, the volatility of reserves is quite expected to be driven by resident flows, especially in periods of surges and retrenchment where the BSP utilizes its reserves to smooth out excessive volatility in the foreign exchange market.

3. Risks and Implications for Macroeconomic Stability

Emerging markets (EMs) like the Philippines face greater risks and challenges in dealing with international financial integration, cross-border flows, and by extension, its inherent volatility. Among others, the relative size of flows to EMs, even in net terms, could overwhelm domestic economies and overall absorptive capacity especially relative to the size and depth of financial systems. Second, EM resilience to volatility shocks could be weaker, in part because their economies are smaller and less diversified. Finally, volatile capital inflows, of which much are intermediated through banking systems, tend to spillover, interact with and amplify the domestic financial and real business cycles (Claessens and Ghosh, 201]).

Capital flows need to be managed carefully to contain risks to macroeconomic and financial stability. In the post-GFC period, capital flow movements contributed to shifts in domestic liquidity, credit and asset price conditions, further reinforced also by a period of consistent positive domestic growth and outlook. On one hand, strong macroeconomic fundamentals - such

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8. In 2006, huge resident transactions include repayment of bonds and notes by the National Government (US$2.7 billion) and loan repayments by the BSP (US$538 million), NG (US$1.3 billion), banks (US$1.4 billion) and private corporations (US$2.6 billion).

9. The spike in the volatility of the derivatives account in 2010-2012 was due to the complete turnaround of trading gains. It registered a net loss of US$191 million in 2010, then snatched a net gain of US$1 billion in 2011, before plunging to a significantly lower net gain of US$13 million in 2012. The fluctuation in gains arises from the increased volatility in exchange rate which reduced the gains in forward transactions.

as a low inflation environment, healthy balance of payments position, manageable external debt and high potential growth - have been identified as important pull factors that increased demand for Philippine assets and also an important defense to retain capital in times of volatility (Ghosh et al., 2012). On the other hand, certain flows cannot be fully related to fundamentals and new insights pointing to the role of global factors in shaping capital flow movements have been documented.

In this section, we aim to focus on the impact of capital flows on liquidity and the real economy, and the challenges it presents on monetary policy implementation. We also devote a discussion to portfolio debt and equity flows, two of the most volatile subcomponents of the capital account, and the impact of US Federal Reserve normalization on portfolio inflows.

3.1 Impact on Domestic, Bank Liquidity and Credit Growth

Capital inflows result in increased liquidity, and boost domestic demand and asset prices (Gupta; Nabar and Peiris, 2010). In the Philippines, there has been positive correlation between capital inflows and the growth of liquidity particularly for banks.

The sustained foreign exchange inflows, over the past years, have expanded the structural liquidity in the banking and overall financial system. When viewed from the point of view of the BSP's balance sheet, the structural liquidity in the Philippines increased from below PhP2.5 trillion in 2009 to around PhP4.0 trillion in 2014.[10] Figure 5 shows that this was mainly driven by the change in the net foreign assets, which led to structural liquidity hovering around the PhP2.0 trillion mark since November 2010 and peaking at PhP2.95 trillion in February 2013. At this amount, the banking system is in a surplus position, which is estimated at about PhP2.7 trillion as of March 2015, or around 20.8% of nominal GDP.

With the abundant liquidity, market interest rates have also significantly diverged from the BSP's policy rates - putting pressure on the monetary policy implementation of the central bank. Figure 6 depicts the current state of BSP

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10. In the Philippines, the structural liquidity can be computed as the sum of required reserves, reserve repurchases, and the Special Deposit Account (SDA, deposit facility) placements, consistent with the general definition used by central banks in defining the structural position of the banking system with respect to the central bank. This is also consistent with the IMF's definition of structural liquidity.

policy rates and money market rates in the country. The interbank money market rate (IBCL) has diverged from the policy rates of the BSP, the overnight RRP rate, and instead closely tracks the SDA rate (term deposit facility).[11] The 91-day T-bill rate, which has been traditionally the benchmark reference rate in the country, lies completely outside the BSP policy rate corridor, despite the increase in primary auction rates, in line with the expected US Fed normalization and full award of primary offers of the National Government.

Figure 5
Drivers of Structural Liquidity in the Philippines
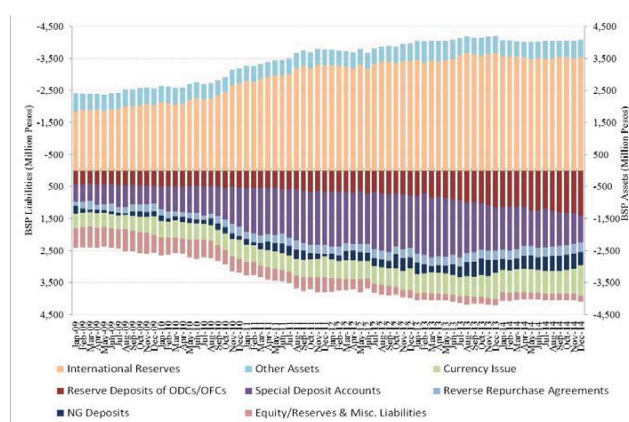
Source: BSP.

The periods of strong capital inflows could be associated with the expansion of structural liquidity and the divergence between policy and market rates. Given the capital position of the BSP relative to the amount of liquidity in the system and generally small opportunities for short-term placements, it results in pressures on the existing instruments of the central bank to be inadequate in siphoning the large liquidity overhang and guiding market rates closer to the policy rate. At times, it also implies higher sterilization costs for the central bank, which leads to losses and negative equity on the BSP's balance sheet.[12] This liquidity overhang

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11. Prior to 2013, the SDA rate is computed as the headline reverse repurchase (RRP) rate plus a spread.

12. For example, in 2012, similar to many emerging market central banks, the BSP incurred heavy financial losses in its efforts to temper currency fluctuations and mop up excess liquidity amidst strong foreign exchange inflows. This stabilization measures were implemented to maintain order in the foreign exchange market and promote price stability in the Philippine economy.

and divergence in rates needs to be addressed in order to strengthen the transmission of monetary policy to the market and key economic variables.

Over the years, the BSP has fine-tuned its absorption operations to respond to these pressures, such as the increase in reserve requirement by 2 percentage points and fine-tuning of access to the SDA facility in 2014. The BSP is also set to implement an interest rate corridor system by the second quarter of 2016, in order to improve the framework of monetary policy implementation of the Philippines and generally address also the evolving challenges to monetary policy, such as capital flows.

Figure 6
Policy and Market Interest Rates in the Philippines
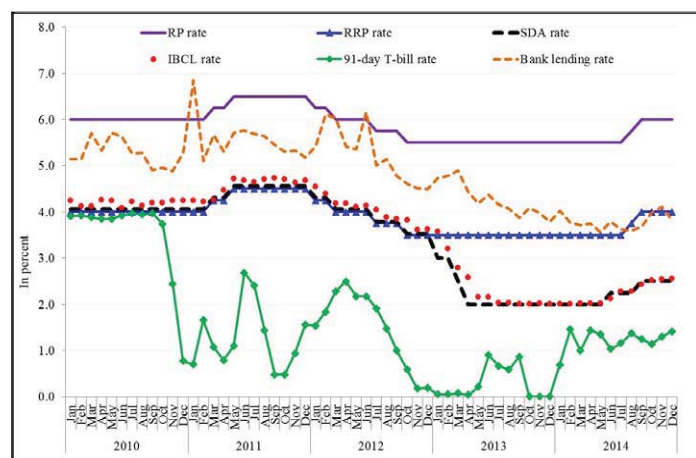
Source: BSP.

The BSP is also vigilant on how the banking system deploys its liquidity surplus. Similar to experiences in other countries, the relative abundance of funds may encourage banks to invest in high yielding but riskier assets, such as loans to real estate sector and consumers. Volatility in capital flows may result in destabilized asset prices and sudden contraction in liquidity both for banks and firms involved in the corporate sector. It is thus imperative to maintain vigilance on the financial system's usage of liquidity, and ensure adequate buffers and fundamentals against these shocks.

3.2 Portfolio Investments and US Fed Normalization

Our data on volatility showed that portfolio debt and equity has displayed one of the highest levels of volatility among the sub-components of capital flows. Increased cross-border flows to the Philippines affected domestic financial markets, specifically the exchange rate and the stock market. In particular, data from the BSP-registered portfolio investments surged by 53.7% from 2012 to US$28.4 billion, the highest level since 1999. This had an immediate impact of feeding through the movements of financial market prices.

With respect to exchange rate, under the inflation targeting framework for monetary policy, the behavior of the peso-US dollar exchange rate has been broadly consistent with the direction and magnitude of foreign exchange flows. In the stock market, foreign participation in the Philippine Stock Exchange has surged as a consequence of the inflows. Foreign transactions as a proportion of total value traded peaked at 56.3% in Q1 2014, significantly higher than the 40.3% in the wake of the GFC. From the period 2009-2014, foreign investors posted an annual average net buying of PhP48.14 billion worth of stocks.

This relationship calls into attention the potential risks of disruption and abrupt fluctuations in the Philippine financial markets due to negative surprises or sudden reversals in capital flows. The Fed's May 2013 signal of tapering and the most recent Chinese yuan devaluation are examples of the sensitivity of financial markets to fast changes in market sentiments: outflows ensued, depreciation pressures were felt and the stock index declined.

The normalization of the US Federal Reserve or the announced increase in interest rates after prolonged period of near-zero policy rate and QE program, poses challenges to the Philippine capital flow dynamics. As the normalization proceeds, certain flows that entered into the Philippine economy motivated by search-for-yield could eventually reverse and rush to the exit as foreign interest rates move up and change the interest rate differential.

To assess the impact of US monetary policy on gross portfolio capital inflows to the Philippines, we employ a vector autoregression (VAR) model similar to Fernandez (2015) and Bruno and Shin's (2011) framework. The following reduced-form VAR model of order p was used:

$$\begin{bmatrix} FEDRATE_t \\ VIX_t \\ USSPREAD_t \\ TOTFLWS_t \end{bmatrix} \equiv \mathbf{Y}_t = \mathbf{\mu} + \sum_{i=1}^{p} \mathbf{\Phi Y}_{t-i} + \mathbf{\epsilon}_t$$

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where y_{t-i} is the vector containing the ith lag of y, μ is a vector of intercepts Φ is a matrix of coefficients, and ε_t is a vector of disturbances with covariance matrix $E[\epsilon_t \epsilon_t'] = \Sigma$.

The vector of endogenous variables include the following:

1. US Fed's Effective Federal Funds Rate (FEDRATE). This is the interest rate at which depository institutions lend funds maintained at the Federal Reserve to another institution overnight. It is an influential interest rate and has been viewed by many analyst as the most prominent driver of capital flows to EMs (Calvo et al., 1993; Fernandez-Arias and Montiel, 1995).[13]

2. Chicago board options exchange volatility index (VIX). The index is calculated from a weighted average of implied volatilities of various options on the S&P 500 Index.

3. US Term Spread (USSPREAD). The USSPREAD is computed as the difference between the US 10-year constant maturity rate and US three-month constant maturity rate. It has been widely used as a proxy for QE in the literature (Chen et al., 2012; Miyajima et al., 2014).

4. Gross Portfolio Inflows (TOTFLWS). The paper uses total gross portfolio inflows, which are non-resident portfolio placements on equity and government securities in the Philippines. Previous empirical studies suggest that gross portfolio flows have been the most sensitive to QE (Ahmed and Zlate, 2013; Lim et al., 2014).[14]

In this section, we employ monthly data of time series financial variables from January 2000 to March 2015. In particular, the data was sourced from the BSP-registered foreign portfolio investments compiled by the BSP International Operations Department. We perform three separate runs on the model using three different sample periods namely: i) full sample (January 2000 – March

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13. The FEDRATE adjusted for the US inflation rate computed as the growth rate of Consumer Price Index for all urban consumers for all items sourced from Bloomberg to take into account that the US Fed rate has been near its zero lower bound.

14. We focus on equity and government securities since these consist the bulk of gross portfolio inflows to the Philippines and are the most volatile components of the capital account.

2015); ii) pre-crisis (January 2000 – December 2006); and, iii) crisis to post crisis (January 2007 – March 2015).[15]

Details of the model including data description, test of assumptions and additional robustness checks are included in Annex B.[16] It is recognized that the focus on "push" factors and the exclusion of "pull" factors could possibly lead to omitted variable bias. Thus, care should be undertaken in the interpretation of the results. However, extensive list of empirical studies have given primacy to external factors over domestic factors as the most important drivers of capital flows to EMEs including the Philippines (Calvo et al., 1993; Fernandez-Arias and Montiel, 1995; Reinhart and Reinhart, 2009). The limitations of the model are further discussed in the Annex.

3.2.1 Model Results

The interpretation of the VAR model is based on the impulse response functions (IRFs) and historical variance decomposition. The IRFs trace the effect on TOTFLWS of a one standard deviation shock to FEDRATE, VIX, USSPREAD, and TOTFLWS over a 48-month horizon. Meanwhile, the historical decomposition measures the contribution of the above mentioned shocks to the observed TOTFLWS series (Luetkepohl, 2011). The results are presented in Figure 9 below.

The figures below depict the IRF from the VAR(2) with 95% confidence bands over a 48-month horizon. The figure shows the response of TOTFLWS to FEDRATE, VIX and USSPREAD for the three sample periods.

In the full sample, the IRFs show that, a positive one-standard deviation shock (or increase) to the FEDRATE will have an immediate positive effect on the TOTFLWS. The significant impact appears to dissipate on the 7th month, with TOTFLWS reverting back to its pre-shock value after approximately 20 months. The positive effect on Philippine gross portfolio inflows of an increase in FEDRATE is inconsistent with the existing literature that an increase in US real policy rate increases the real return of assets in the US relative to the Philippines and, therefore, should lead to an outflow of capital from the latter.

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15. A dummy variable for the US crisis period (equal to 1 during June 2007 – June 2009) was included in the full sample and crisis sample as an exogenous variable.

16. A lag length of 2 was used for all three models based on lag-length criteria and autocorrelation tests performed.

It should be noted that the FEDRATE has barely moved during the covered sample period, hence has less variation and instead, the IRFs are capturing the impact of inflation rather than the FEDRATE. In addition, the positive impact of an increase in FEDRATE could be taken as an indication of positive outlook on the US economy, especially during the period of prolonged recession in the US following the crisis in 2008. A positive US economic outlook could indicate better global prospects and boost investor appetite for riskier Philippine assets.[17]

Comparing between the pre-crisis and crisis periods, the direction of impact of FEDRATE on TOTFLWS are similar. However, the impact is only significant during the crisis and post-crisis periods.
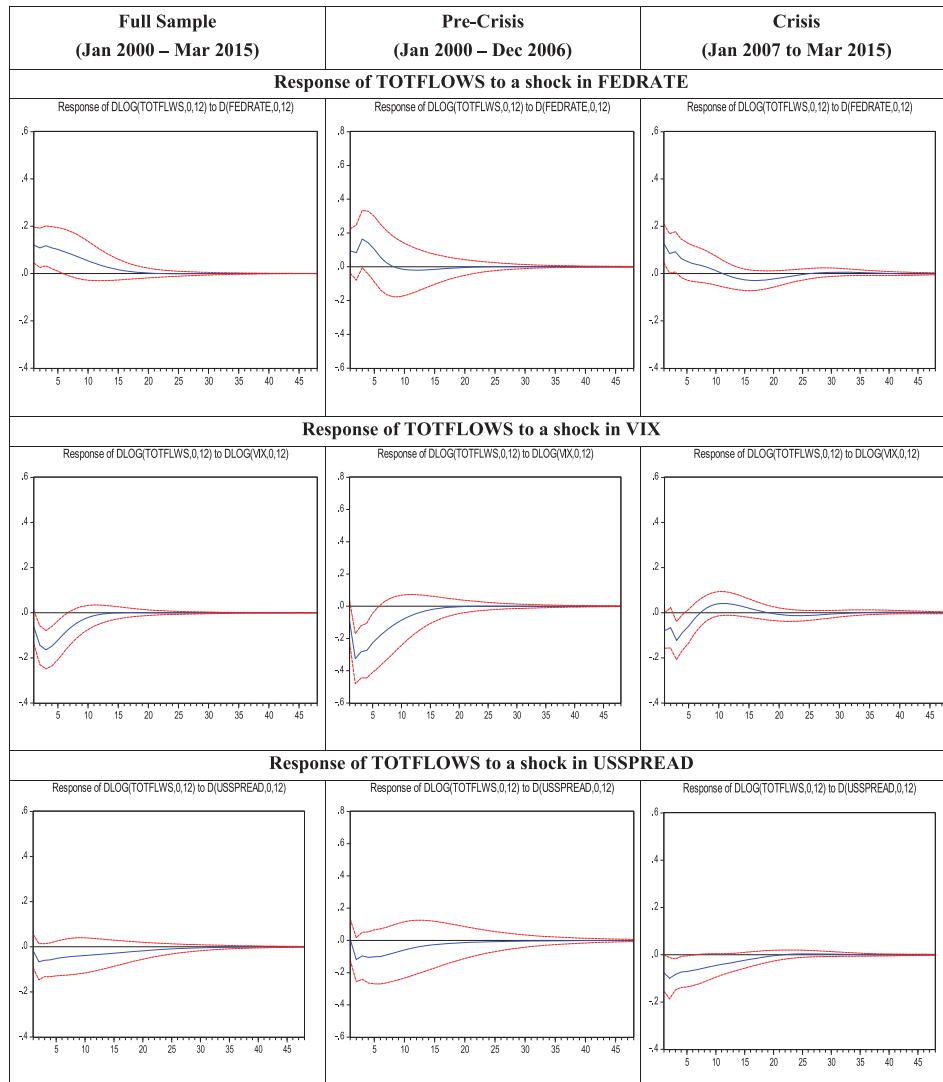
Meanwhile, a one-time shock to VIX will have a significant negative effect on TOTFLWS across all sample periods. The impact of a shock to VIX on TOTFLWS is larger and more persistent during the pre-crisis relative to the crisis sample. Nonetheless, we find a significant impact in all three periods considered. High global risk aversion dampens risk appetite, which in turn, triggers a flight back to safe haven assets.

Lastly, a one-time shock to USSPREAD has an immediate negative impact on TOTFLWS. The impact, however, is insignificant at the 5% significance level in both the full sample and pre-crisis sample. A notable result, however, is that the impact of a shock to USSPREAD to TOTFLWS becomes significant during the crisis sample. This validates other empirical studies that have found conclusive evidence that long-term interest rates had been a significant driver of gross portfolio flows to emerging economies, during the US Fed's implementation of quantitative easing (Fernandez, 2015).

In summary, the results of the IRF show that gross portfolio inflows to the Philippines are sensitive to external push factors (i.e., US monetary shocks). It can also be noted that the dynamics of these flows and the relative importance of its drivers are time varying (Fratzscher, 2011).

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17. This could suggest that the impact of an increase in the US Fed's policy rate could impact capital flows through other channels aside from the interest rate channel, such as the risk sentiment channel.

Figure 9
Results of the VAR Model

Full Sample (Jan 2000 – Mar 2015)	Pre-Crisis (Jan 2000 – Dec 2006)	Crisis (Jan 2007 to Mar 2015)

Response of TOTFLOWS to a shock in FEDRATE

Response of DLOG(TOTFLWS,0,12) to D(FEDRATE,0,12) | Response of DLOG(TOTFLWS,0,12) to D(FEDRATE,0,12) | Response of DLOG(TOTFLWS,0,12) to D(FEDRATE,0,12)

Response of TOTFLOWS to a shock in VIX

Response of DLOG(TOTFLWS,0,12) to DLOG(VIX,0,12) | Response of DLOG(TOTFLWS,0,12) to DLOG(VIX,0,12) | Response of DLOG(TOTFLWS,0,12) to DLOG(VIX,0,12)

Response of TOTFLOWS to a shock in USSPREAD

Response of DLOG(TOTFLWS,0,12) to D(USSPREAD,0,12) | Response of DLOG(TOTFLWS,0,12) to D(USSPREAD,0,12) | Response of DLOG(TOTFLWS,0,12) to D(USSPREAD,0,12)
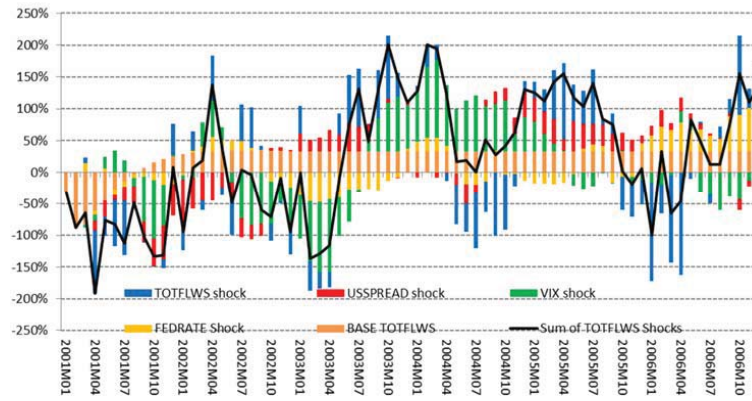

Source: Authors' calculations.

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3.2.2 Historical Decomposition

To evaluate the relative contribution of the factors identified in the VAR model and hence, assess their relative importance as drivers of gross portfolio capital inflows to the Philippines, the paper also employs historical decomposition on the observed gross capital inflows series. Taking into account the time-varying dynamics of capital flows, we perform the historical decomposition in both the pre-crisis period and the crisis to post-crisis periods.

Figure 10
**Gross Portfolio Inflows (Growth Rate)**
Pre-crisis

Source: Authors' calculations.

Figure 10 shows that prior to the US Sub-prime crisis, shocks to VIX and FEDRATE contributed dominantly to TOTFLWS cycles. In particular, both negatively contributed to TOTFLWS during periods when growth rate of TOTFLWS are declining and positively when growth rate of TOTFLWS are increasing.

Figure 11
Gross Portfolio Inflows (Growth Rate)
Crisis to Post-Crisis
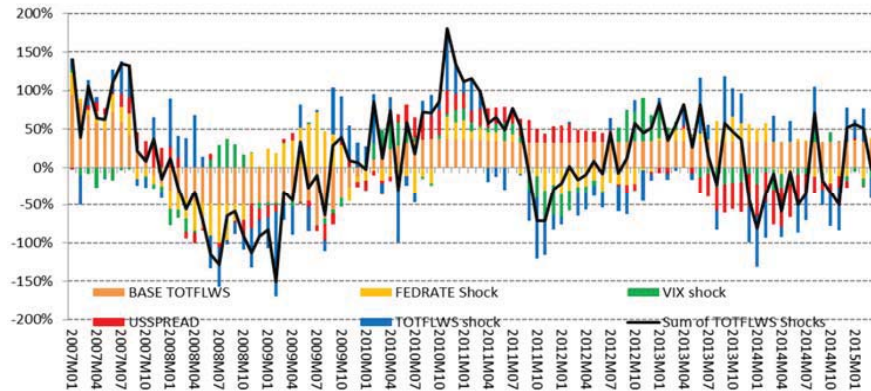
Source: Authors' calculations.

Meanwhile, during the crisis period, Figure 11 shows that shocks to VIX and FEDRATE continued to contribute significantly to TOTFLWS. However, an increasing contribution of shocks to USSPREAD on TOTFLWS can be observed. In particular, during the period July 2010 to October 2011 when growth rate of TOTFLWS was positive, shocks to USSPREAD contributed positively to TOTFLWS. This period roughly coincides with the US Fed's implementation of QE program. This finding is consistent with the paper's hypothesis that the lowering of US long-term interest rate could result to an increase in gross portfolio inflows in the Philippines. To some extent, this supports a number of empirical findings that lowering of US long-term interest rates due to QE program led to surges in gross portfolio inflows to emerging economies like the Philippines.

The US Fed lift-off may have important consequences also to the volatility of bank and money market flows. Since most of the inflows pass through the Philippine banking system, the uncertainty in the reaction of foreign flows to the moves of the US Federal Reserve may result in disruptions in the financial intermediation.

A proxy for the magnitude of the amount that could be susceptible to sudden exits is the level of international claims of banks in the Philippines, which are originally flows that came through the banking system. Figure 12 shows that claims have substantially increased to post above US$30 billion, close to double than the levels after the 2008 GFC. The bulk of international claims on the

Philippines accrue to European banks, standing at US$15.29 billion, followed by US banks with US$8.57 billion as of end-2014.

During the 2013 taper tantrum, quarter-on-quarter claims dipped by US$4.1 billion, which represented around 10.7% of GDP for Q2 2013. The majority of the quarterly decline in claims is due to European banks, followed by US banks. There is also volatility in the total claims, as this swung back to US$33.5 billion in Q3.

Nevertheless, the Philippine banking system continued to show stable profitability and capital adequacy during these periods. Strong balance sheets are expected to minimize the risks arising from the volatility. In addition, the US Fed lift-off could have a positive impact on global risk sentiment (VIX) and compress the term spread (USSPREAD) on portfolio inflows to emerging economies including the Philippines.

Figure 12
International Bank Claims on the Philippines
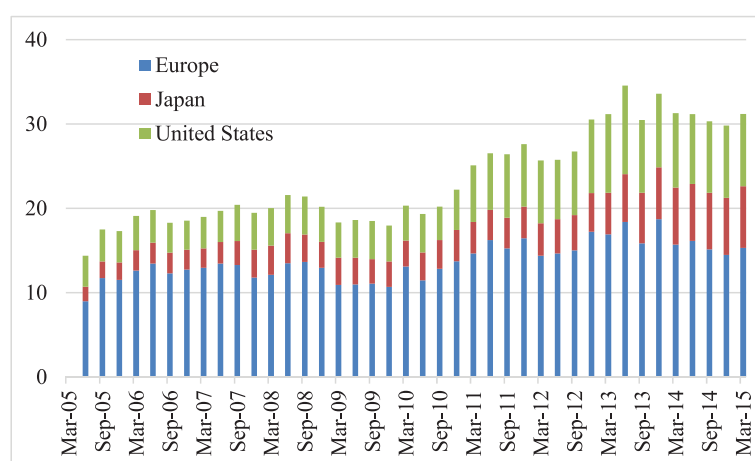
Source: BIS.

4. Policy Implications of Capital Flow Volatility

As the Philippine monetary authority, the BSP's policy actions to manage the capital flow volatility are aimed at maintaining price and financial stability in the Philippine economy. As an inflation-targeting central bank, the BSP

manages short-term interest rates with a view to influencing long-term rates, thereby managing expectations. However, faced with the implications of the surges in capital inflows, in particular the wide swings in the exchange value of the peso, the increase in domestic liquidity and the heightened risks to financial stability, the BSP has resorted to other measures, employing a combination of measures in monetary policy and banking supervision to further manage the risks associated with capital flow volatility.

In general, monetary policy does not have to be employed to address external shocks, given its pervasive impact on the whole economy. As such, time-based and targeted macroprudential measures are considered to complement monetary policy in maintaining stability in the economy.

4.1 Strong Macroeconomic Fundamentals

While push factors appear to be the dominant factor in driving cross-border flows, the role of strong macroeconomic fundamentals in capital flow management is very important. A robust environment supported by a coherent policy framework will further propel growth and act as the first line of defense in periods of excessive volatility in capital flows.

Maintaining the positive alignment in policies that support growth, manage inflation, strengthen the financial system, and build external buffers will foster resilience for the Philippine economy to effectively deal with surges and reversals. More importantly, the BSP should continue on embarking on its reform agenda of deepening the capital market, widening the investor base and enhancing its monetary and financial policy implementation, which will help the economy cope with the evolving behavior of capital flows. The robustness of the fundamentals of the Philippines has been regularly cited by credit rating agencies as the basis of a stable outlook for the economy and expectation of resilience amidst the uncertainty abroad.

Aside from acting as buffer and anchor, strong fundamentals will also support a positive differentiation of the Philippine economy in comparison to other countries, which would matter in the severity and volume of potential reversals in capital flows. In the taper tantrum episode of May 2013, the Philippines fairly rode out external headwinds and pressures from abrupt market adjustments as investors looked at the country's fundamentals and domestic demand conditions in their risk assessment. In this particular period, there is evidence that investors started to differentiate more across countries based on fundamentals (GFSR, 2014) and hence, will be a crucial factor should financial conditions change.

4.2 Appropriate Macroprudential Measures

Given the threats of capital flow volatility to price and financial stability, monetary authorities need to also consider the effectiveness of non-monetary measures to achieve its objectives. The BSP draws on an expanded policy toolkit that includes not only the policy interest rate but also macroprudential measures suited to the attendant risks to the economy. Being both the monetary authority and financial supervisor in the Philippine economy, the BSP is at an advantageous position to coordinate monetary and financial policies and build on each sector's expertise to develop comprehensive actions in managing capital flows.

The BSP has a wide array of macroprudential measures to respond to challenges of maintaining financial stability, but it should continue to develop and adjust these policies in consistency with the change in the economic landscape. Macroprudential policies are already in place (ex ante) to contain the risk-taking behavior of financial intermediaries. Concrete examples of these measures include loan-to-value ratio caps, imposition of ceilings and concentration limits on loan portfolios and tighter reporting of real estate exposures.

There is increasing recognition also of keeping guard on the financial system's exposure to real estate, given the latter sector's interconnectedness to the banks as a source of finance. In terms of managing real estate exposures, the BSP implemented the Real Estate Stress Test (REST) requirement in 2014.[18] It also fine-tuned guidelines with regard to the credit risk management practices of a bank, requiring appropriate credit risk management frameworks and governance for financial institutions to proactively mitigate credit concentration risks.[19]

The BSP should also stand ready to deploy appropriate macroprudential measures to prevent excesses in specific markets prone to price misalignments.

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18. Under the new rule, banks should conduct a stress test of their total loan portfolios and ensure that it would be able to maintain a common equity Tier 1 capital ratio of at least 6% and a minimum risk-based capital adequacy ratio of 10%, even if 25% of a lender's exposure to the property sector has been written off. (BSP Memorandum Circular No. 839 Series of 2014).

19. BSP Circular No. 855 Series of 2014.

4.3 Prudent Banking Supervision

The strength of the banking system and its ability to withstand shocks will be tested in periods of sharp volatilities. Reforms and policies that bolster the health of the banking system via stronger capitalization, diversified revenue base and fortified risk management systems should be a priority to ensure smooth financial intermediation amidst stress.

One of the major regulatory reforms implemented by the BSP since 2013 has been the adoption of the Basel III Minimum Capital Requirements for Philippine supervised banking institutions. The requirements set new regulatory ratios related to bank capital, where banks must meet specific minimum thresholds for so-called Common Equity Tier 1 (CET1) capital and Tier 1 (T1) capital in addition to the Capital Adequacy Ratio (CAR). These regulatory thresholds effectively move banks worldwide to rely more on core capital instruments like CET1 and T1 issues. This is in lieu of hybrid instruments, which did not fare well in the global crisis as far as absorbing losses were concerned. The ability to absorb losses is central to Basel III, and should help banks cope with capital flow volatility.

Aside from capital adequacy, the BSP continues to monitor the external exposures of banks, which could be a channel of stress on balance sheets despite healthy domestic operations. The BSP requires banks to submit a regular report on their external position to provide a clear picture of the risks and vulnerabilities of the international transactions of supervised institutions. In the Philippine case, however, there remains a balance between the external assets and liabilities of banks.

4.4 Collaborative Inter-agency Coordination

Finally, inter-agency cooperation and coordination in managing capital flows will help increase the effectiveness of policy responses. Financial stability risks may cut across sectors that are not within the regulatory perimeter of the central bank but may eventually or inevitably, spillover to the banking system. The BSP continues to lead the Financial Sector Stability Council as a forum to collaborate with key regulators including the Department of Finance, Securities and Exchange Commission and the Insurance Commission. Under this forum, agencies coordinate policies, share best practices and information and ensure that there is a similarity in vision in supporting business and financial growth but likewise safeguarding stability.

5. Conclusion

The free flow of capital accords important benefits to the Philippine economy. The availability of increased capital has the potential to propel the growth of economy through the deepening of capital markets and financing of productive expansion of strategic sectors. However, uncertainty prevails in the external environment: an anemic and fragile global growth complicates the increase in the US Federal Funds rate and further puts pressures on emerging economies like the Philippines that already face challenging idiosyncratic domestic challenges. This uncertainty is expected to result in further volatility in capital flows that monetary authorities have to contend with.

The Philippines needs to accept the reality of volatility as a constant feature and consequence of openness and therefore implement appropriate policy measures, and pursue stronger macroeconomic fundamentals to manage such volatility and in the process, fully reap the benefits of global integration. While there is no tested formula or policy mix to face volatility, it is imperative for authorities such as the BSP to develop a pragmatic and flexible approach to policymaking as it continues to commit to its mandates of maintaining price, financial and overall macroeconomic stability.

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Annex A
Composition of the Balance of Payments, Philippines
Quarterly, in million US$, 1999-2014

Current Account   **Capital Account**
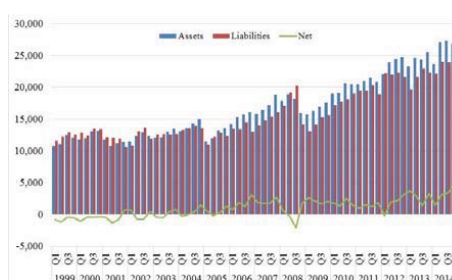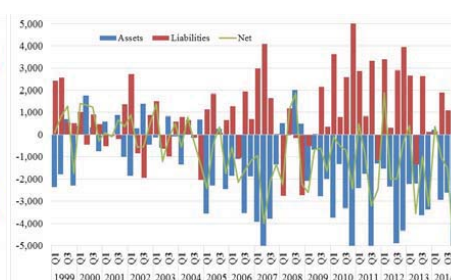
Foreign Direct Investment   **Portfolio Equity**
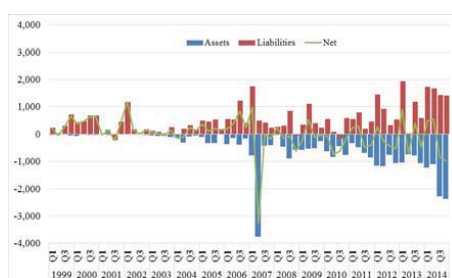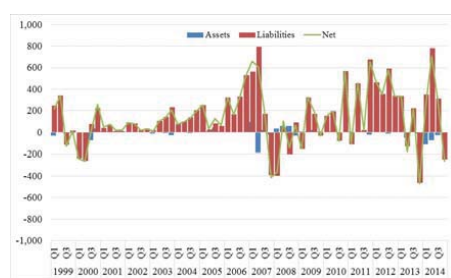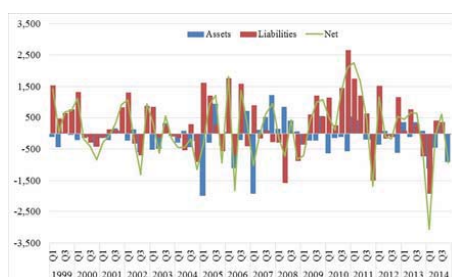
Portfolio Debt   **Bank and Money Market**
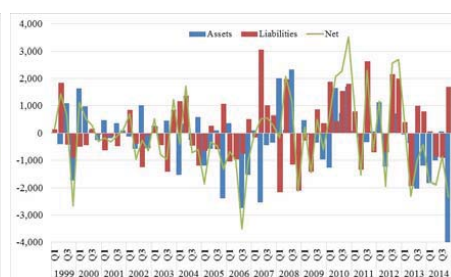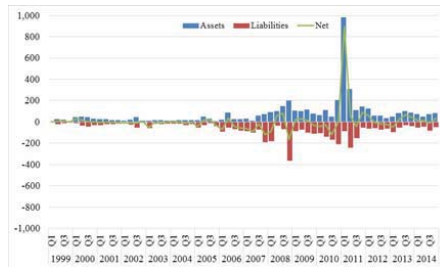
Derivatives   **Reserves**
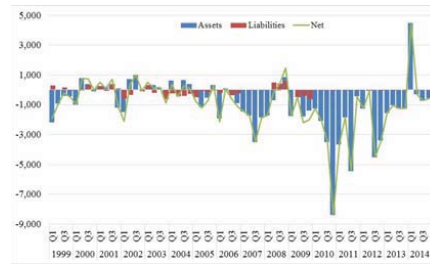
Annex B
Details of the VAR Model

1.   Data Summary and Preliminary Transformations

Data were sourced from FRED, Bloomberg, and the BSP. The necessary data transformations are performed for use in the VAR model. In particular, variables expressed in rates namely the FEDRATE and USSPREAD were transformed by taking their year-on-year differences. Meanwhile VIX and TOTFLWS were transformed as year-on-year growth rates.

Chart 1
Data Presentation
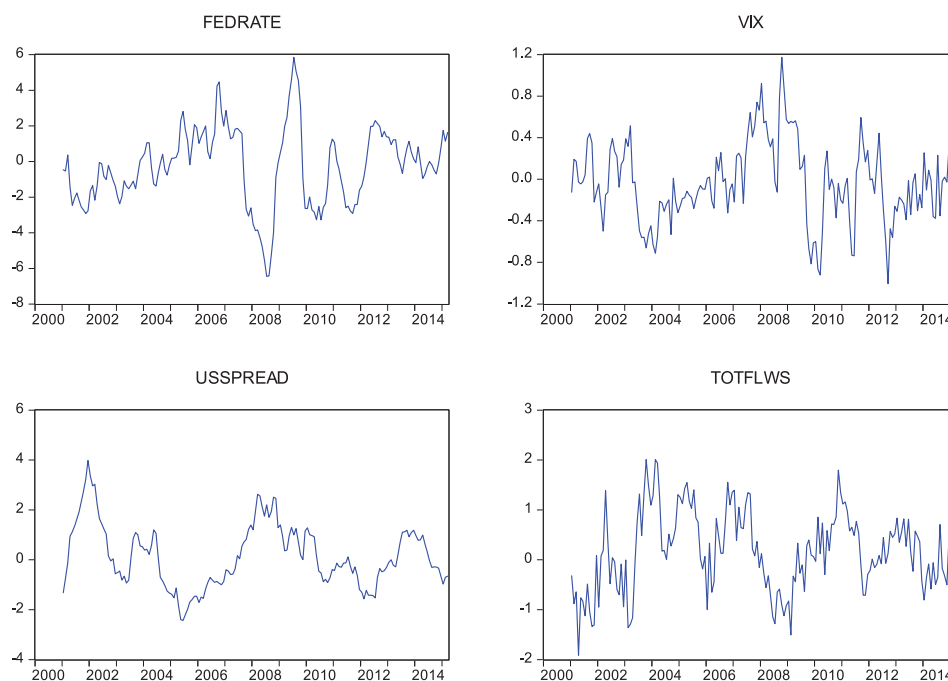
Table 1
Unit Root Summary

Variable	Unit Root
FEDRATE (y-on-y difference)	I(0)
VIX (y-on-y growth)	I(0)
USSPREAD (y-on-y difference)	I(0)
TOTFLWS (y-on-y growth)	I(0)

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2. Checking of Assumptions

The verification of assumptions on all three models were performed in terms of autocorrelation, stability, and, normality. In this section, discussion will only focus on the full sample. However, detailed results of the model can be made available upon request.

2.1 Lag Length Selection and Autocorrelation

The choice for the model's optimal lag length for all three samples is mainly motivated by the elimination of autocorrelation in the residuals. The Schwarz Criterion (SC) suggests a lag of 1 while the Hannan-Quinn Criterion (HQC) suggests the use of 2 lags (Table 2).Based on the Autocorrelation LM Test, the inclusion of 2 lags would be more optimal as it would remove the autocorrelation in the residuals (Table 3).

VAR Lag Order Selection Criteria
Endogenous variables: D(FEDRATE,0,12) DLOG(VIX,0,12) D(USSPREAD,0,12)
DLOG(TOTFLWS,0,12)
Exogenous variables: C CRISIS
Sample: 2000M01 2015M03
Included observations: 169

| Lag	LogL	LR	FPE	AIC	SC	HQ
0	-787.1783	NA	0.202967	9.756789	9.908630	9.818435
1	-364.5012	814.2370	0.001382	4.766886	5.222407*	4.951822
2	-332.1008	60.82528	0.001130	4.565654	5.324856	4.873882*
3	-323.1118	16.43383	0.001233	4.651679	5.714562	5.083198
4	-299.7723	41.52427	0.001129	4.561623	5.928188	5.116434
5	-288.4316	19.62009	0.001199	4.618793	6.289038	5.296894
6	-273.8487	24.51355	0.001226	4.636181	6.610107	5.437573
7	-247.2558	43.39701	0.001083	4.506206	6.783814	5.430890
8	-229.5154	28.07988*	0.001068*	4.484852*	7.066140	5.532827

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

VAR Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at
lag order h
Sample: 2000M01 2015M03

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Included observations: 169

Lags	LM-Stat	Prob
1	14.68876	0.5475
2	20.18779	0.2119
3	26.16286	0.0518

Probs from chi-square with 16 df.

2.2 Stability

The graph of the AR roots of the model confirm that the variables used in the VAR system are already stationary, indicating that the VAR system is stable (Figure 1).

Inverse Roots of AR Characteristic Polynomial
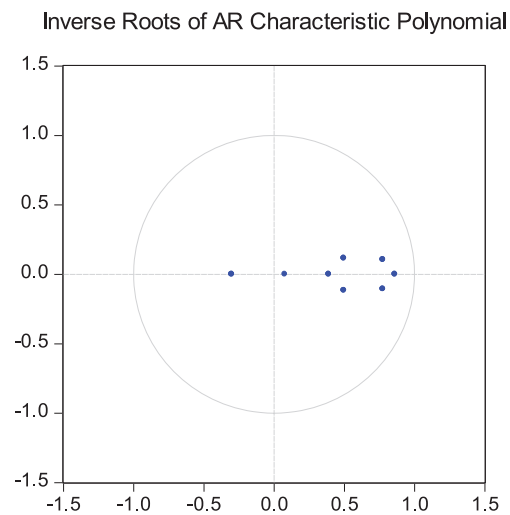
2.3 Normality

The test for the normality of the residual rejects the null hypothesis that the joint-distribution of the error terms is multivariate-Normal due to the residuals of the FEDRATE. There appears to be evidence of non-Gaussian errors in the

equations which is a common finding when using financial data. This concern, however, is not considered too severe a problem for this study as the sample size is sufficiently large (Karlsson, 1993).

VAR Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
Null Hypothesis: residuals are multivariate normal
Date: 11/26/15   Time: 14:06
Sample: 2000M01 2015M03
Included observations: 169

Component	Skewness	Chi-sq	df	Prob.
1	-0.097308	0.266707	1	0.6055
2	-0.020215	0.011510	1	0.9146
3	0.062019	0.108339	1	0.7420
4	0.156666	0.691330	1	0.4057
Joint		1.077885	4	0.8978

Component	Kurtosis	Chi-sq	df	Prob.
1	4.581377	17.60947	1	0.0000
2	2.713793	0.576816	1	0.4476
3	3.079862	0.044911	1	0.8322
4	2.538067	1.502568	1	0.2203
Joint		19.73376	4	0.0006

Component	Jarque-Bera	df	Prob.
1	17.87617	2	0.0001
2	0.588325	2	0.7452
3	0.153249	2	0.9262
4	2.193898	2	0.3339
Joint	20.81165	8	0.0077

2.4 Identification

Structural identification is obtained by imposing a standard Cholesky decomposition of the estimate of the variance-covariance matrix. The ordering is in line with previous studies on monetary policy transmission. Among the four variables, FEDRATE is the slowest moving series. Thus, we assume it to be

most exogenous and is placed on top of the ordering (Bruno and Shin, 2013; Miyajima et al., 2014). Meanwhile TOTFLWS is assumed to be the most endogenous among the four variables due to the fact that Philippines is a small open economy and thus has little influence on US and global monetary and economic variables. The two remaining variables are market variables which could adjust instantaneously to news and are placed after FEDRATE. Following Bruno and Shin (2013), the paper runs two separate VAR analysis with VIX and USSPREAD ordered interchangeably. Thus the variables are ordered as (FEDRATE, VIX, USSPREAD, PHFLWS) and (FEDRATE, USSPREAD, VIX, TOTFLWS), respectively. Based on the separate runs, both orderings yielded very similar impulse response. The IRFs of the alternative ordering are presented below.

Response to Cholesky One S.D. Innovations ± 2 S.E.
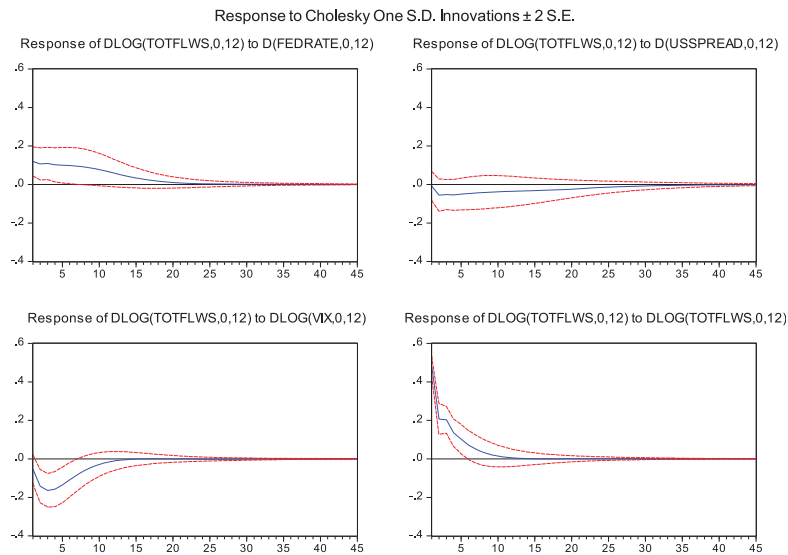
2.5 Empirical Considerations and Limitations

The VAR framework employed in this paper focuses mainly on "push" factors. The authors recognize that exclusion of "pull" factors could possibly lead to omitted variable bias and hence interpretation of the results should proceed with caution.

We only focus on "push" factors due to several reasons. First, the main objective of the model is not to explain the main determinants of capital flows in the Philippines but to assess the impact of US monetary policies on these

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flows. Second, extensive list of empirical studies have given primacy to external factors over domestic factors as the most important drivers of capital flows to EMEs including the Philippines (Calvo et al., 1993; Fernandez-Arias and Montiel, 1995; Reinhart and Reinhart, 2009). Third, the exclusion of "pull" variables allows the assessment of the effects of US monetary variables without contaminating them with the possible feedback from "pull" variables (Dahlhaus and Vasishtha, 2014). Fourth, the exclusion of "pull" variables allows the estimation of a parsimonious model to conserve degrees of freedom.[20]

Nonetheless, the use of a low-dimensional four variable VAR only provides the impulse responses for the included variables, which only takes into account a small subset of the numerous factors that could influence capital flows. An ideal set up would be to run a model that contains all the best predictors of capital flows. For instance, including pull factors allows for a more comprehensive analysis that takes into account the effect of pull factors on capital flows. Information about the potential feedback between the push and pull determinants of capital flows could be very useful in policy making. However, this requires extensions of VAR models that could handle richer information sets. Nonetheless, the method applied in this paper is sufficient to provide insight to the paper's main research question and extensions to the model can be done in future research.

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20. Standard VARs rarely employ more than six to eight variables.

Chapter 8

CAPITAL FLOWS AND THEIR IMPLICATIONS FOR CENTRAL BANK POLICIES IN SRI LANKA

By
Harsha Eranda Paranavithana[1]

1. Introduction

Capital flows can be considered to be one of the most significant factors affecting economic and socio-political relations between emerging and advanced economies, especially in the highly integrated global economic environment in the 21st century. Increasing international capital flows can support long-term economic growth through an improved international allocation of saving and investment. However, these flows can also pose challenges to macroeconomic management, as is evident from the contemporary experience of several emerging economies. This is a result of the faster international transmission of shocks and the increased risks of overheating, credit and asset price boom-and-bust cycles and abrupt reversals in capital inflows.

Over the past two decades, most of the economies in the SEACEN region received massive capital inflows due to their rapid economic development. The influx of foreign capital can supply these economies with the needed capital to support their economic development but it can also have an adverse impact on the economy and financial system of the recipient countries, if the capital inflows are not properly managed (Yuan, 2008).

Sri Lanka had a relatively closed economic policy during 1970-77. However, after the introduction of the open economic policy in 1977, Sri Lanka experienced a gradual pick up in capital inflows in line with the experiences of other countries following such structural reforms i.e., reduction of price controls, floating exchange rates and trade and capital liberalization processes. During the early 1990s, inflows into the capital market increased gradually with the relaxation of restrictions on foreign investment in the stock market, privatization of State-owned Enterprises (SOEs) and foreign loan inflows to SOEs for restructuring purposes. During the 2007-08 period, Sri Lanka implemented several major policy decisions to improve capital flows into the Sri Lankan economy. These policy decisions include the inaugural issuances of international sovereign bonds for the international market and permitting foreign investors to invest in the government securities market, among others. The country also experienced a surge in capital flows subsequent to mid-2009 as a result of the achievement of sustainable peace following the defeat of Liberation Tigers of Tamil Eelam (LTTE). Several mechanisms were put in place to protect investors, making Sri Lanka one of the safest countries in the world to invest in. Article 157 of Sri Lanka's constitution which guarantees investment protection treaties and agreements was approved by the Parliament by a two-thirds majority (the Constitution of the Democratic Socialist Republic of Sri Lanka, 1978). However, capital flows into Sri Lanka have been modest compared to other SEACEN economies, although foreign direct investment and portfolio investment have been increasing over the years, supported by the deepening financial sector reforms, capital account liberalization, privatization and increased corporate profitability.

Traditional literature classifies the determinants of capital flows into two categories: external or push factors and domestic/regional or pull factors (Fernandez-Arias, 1996). However, there is no consensus as to what kind of factors has high positive effects on capital flows in the domestic economy (Montiel and Reinhart (1999), Kim (2000), Ferrucci et al. (2004)). In the context of pull factors, Cardenas and Barrera (1997), Fratzscher (2011), Kabadayi et al. (2012) and Ahmed and Zlate (2013) have demonstrated that domestic economic growth rates, domestic interest rates and domestic inflation rates positively correlate with the capital flows to impact the domestic economy. In the meantime, researchers like Calvo et al. (1993, 1996), Fernandez-Arias (1996), Montiel and Reinhart (1999), Kim (2000), Ying and Kim (2001), Ferrucci et al. (2004), Byrne and Fiess (2011) and Forbes and Warnock (2012) have documented how push factors such as global growth rate and US interest rate can drive capital flows by non-residents to resident economies. This debate together with the lack of academic literature on emerging markets in this context, provide the platform to further investigate which kinds of factors mainly contribute to the determination

of capital flows. This paper, therefore, mainly intends to investigate the determinants of capital inflows into Sri Lanka using quarterly data from 1996 to 2014. Additionally, this paper aims to analyze the effect of central bank policies on capital flows and their impact on the monetary, exchange rate and financial system stability in Sri Lanka.

The remainder of the paper is organized as follows: Section 2 presents capital account liberalization and controlling policies in Sri Lanka; Section 3 outlines the key determinants of capital flows into Sri Lanka while Section 4 presents the conclusion and major issues. Policy recommendations are outlined in the final section.

2. Capital Account Liberalization and Controlling Policies in Sri Lanka

2.1 Trends and Composition of Capital Flows

The capital account balance (KAB)[2] includes bank and money market flows (BMM), portfolio debt investment (PFD), changing official reserves (RES), foreign direct investment (FDI), portfolio equity investment (PFE) and derivatives (DER). The Sri Lankan economy has experienced current account deficits since the 1960s, peaking at 16.4% of GDP in 1980. At the same time, current account surpluses were recorded only in 1965 and 1977 (0.7% and 3.5% of GDP, respectively). The current account deficit widened during the open economy phase after 1977. During 1978-85, the current account deficit widened to 8.2% of GDP reflecting the increased level of imports due to high demand as a result of expanding economic activity including the development of large infrastructure development projects and export processing zones. However, with the expansion of exports, improvements in both the services and transfers accounts and the completion of large donor funded development projects, the current account deficit as a percentage of GDP, declined significantly from the high levels in early 1980s, and have remained at single digit levels since (CBSL, 2009).

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2. Current account balance (CAB) = KAB=BMM+PFD+RES+FDI+PFE+DER. In the Balance of Payments (BOP), BMM flows appear under the category of 'other investment'. As bank loans and money market transactions are the main components of this category, we refer to these flows as 'bank and money market' flows to lend them a more meaningful label. Sri Lanka's derivative market is still developing. Therefore, derivative transactions (executed by residents or non-residents) have been ignored in this study.

Figure 1
Gross Capital Flows as a % of GDP
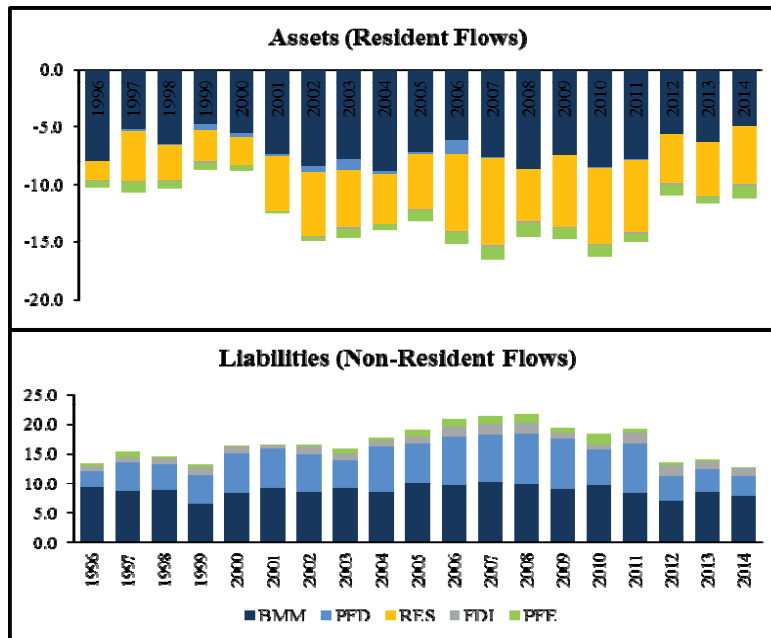
Source: Author's calculations.

As the current account balance has consistently reflected a deficit, a high savings-investments gap is evident. Accordingly, the capital account shows net inflows to match the current account balance (after taking errors and omissions into account).[3] Being a country with an open capital account with some limitations,[4] Sri Lanka's total gross capital flows have generally been balanced and reflect two-way flows by residents and non-residents. The two-way trend is an important trait of the BOP as it serves as a stabilizer during times of stress. Non-resident outflows are generally coupled with a rebalancing by residents who unwind their assets abroad and repatriate them back into the country.

According to Figure 1, the main drivers of non-resident inflows into the Sri Lankan economy were BMM, PFD and FDI. The average composition of capital

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3. International standards specify that the "financial account" is the main counterpart to the current account.

4. Section 2.4 describes the liberalization of Sri Lanka's capital flows and controlling policies.

flows in Sri Lanka indicates that most international transactions made by non-residents (accumulation of liabilities) take the form of BMM, PFD as well as FDI. However, on the assets side (made by residents), BMM and RES flows have played a prominent role throughout the period. Compositions of Sri Lanka's BOP in nominal terms and as a percentage of GDP are shown in in Annex 1.

During the recent global financial crisis, non-residents repatriated investments in Sri Lankan bonds and banks slightly slowed cross-border lending to Sri Lanka. These flows are most likely a reflection of the banking crisis in North Atlantic economies. However, equity-related flows, both FDI and PFE, remained relatively stable throughout the period (Figure 2).

Figure 2
Composition of Net Capital Flows as a % of GDP
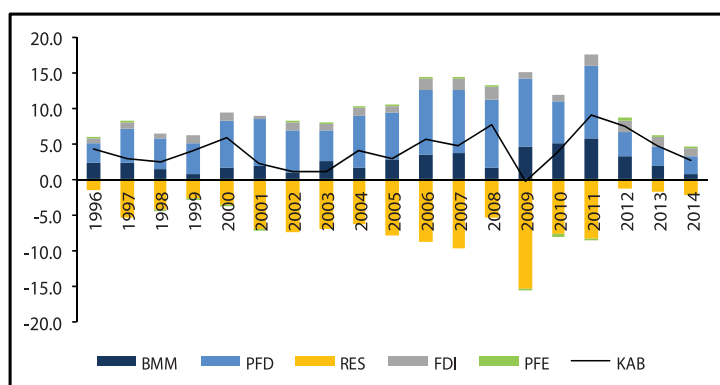
Source: Author's calculations.

2.1.1 *Foreign Direct Investment*

During the British colonial period from 1815–1948, Great Britain was the major source of FDI in Sri Lanka. British FDIs focused on the development of infrastructure facilities that were required for their investment in the plantation sector of the country. Upon achievement of independence in 1948, Sri Lanka followed different strategies with changes in government until 1977 (Ministry of Finance and Planning, 2013).

Figure 3
FDI Flows as a % of GDP
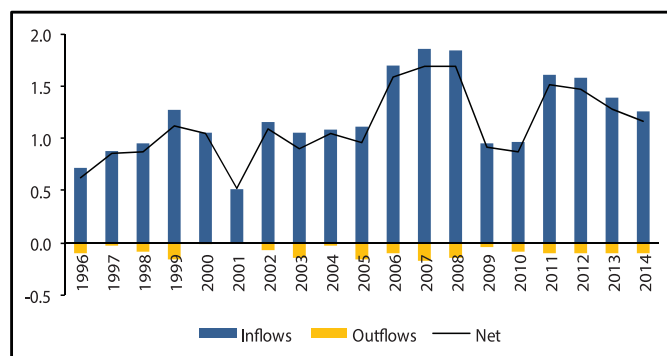
Source: Author's calculations.

With the introduction of economic policy reforms in 1977, FDI flows increased continuously until 1983. Due to the conflict in both the northern and southern parts of the country, FDI flows dropped significantly during 1987-89 (Figure 3). However, in late 1989 the government managed to crush the rebels in the southern part of the country and the armed struggle was again limited to the Northern and Eastern Provinces. The privatization of state-owned enterprises also contributed to the attraction of significant amounts of FDI between 1990 and 2001. FDI flows were negligible as a percentage of GDP until late 2006. The annual average inflow of FDI in the period between 1982 and 2006, amounted to just US$183 million which was approximately 1.01% of GDP. During 2009-14 period, the country attracted significant inflows of FDI consequent to achieving sustainable peace after the government forces crushed the LTTE rebels in May 2009. The annual average inflow of FDI during 2009-14, was US$1,115 million which was around 1.83% of GDP. Even though Sri Lanka is largely globally integrated, Sri Lankans have invested a negligible amount in the global market. Therefore, only one-way transactions can be identified in the context of FDIs.

2.1.2   Bank and Money Market Flows

The BMM flows to Sri Lanka mainly reflect external loans undertaken by the public and private sector, interbank placements and deposits as well as trade credit flows. The growth in external liabilities of the banking system is typical for a country with a highly liberalized financial system. The presence of locally incorporated foreign banks and the expansion of domestic banks regionally have led to increased financial integration, and cross-border banking flows have become a norm. Part of the increase in banking system liabilities is also a reflection of liquidity management activities of domestic banks, where the surplus liquidity of

its regional subsidiaries is placed in Sri Lanka for redistribution to regional subsidiaries facing a liquidity deficit.

A large part of resident outflows also comprise BMM flows, which have, in fact, been driving the consistent net outflows of BMM from Sri Lanka, averaging -7.3% of GDP over the recent two decades. This reflects external loan repayments by the public and private sector, trade credit extensions as well as banking sector activities in the form of interbank transactions and placements of deposits abroad.

2.1.3   Portfolio Debt and Equity Flows

The portfolio debt and equity flows (portfolio investment) have also increased in the recent past. In 1991, US$31 million portfolio investment was recorded as approval was granted - permitting foreign investment in shares of companies incorporated in Sri Lanka. Within five years, private capital portfolio investments increased to US$387 million. The recession and low interest rates in the advanced economies were the main external push factors whereas high domestic interest rates, further partial liberalization of the capital account and contemporary boom conditions in the Colombo Stock Exchange (CSE) were some of the important pull factors for this development (Pushparajah, 2009).

Figure 4
Regional Share Markets Performance (2009-14) and
PE Comparison (2014)

Source: Bloomberg.

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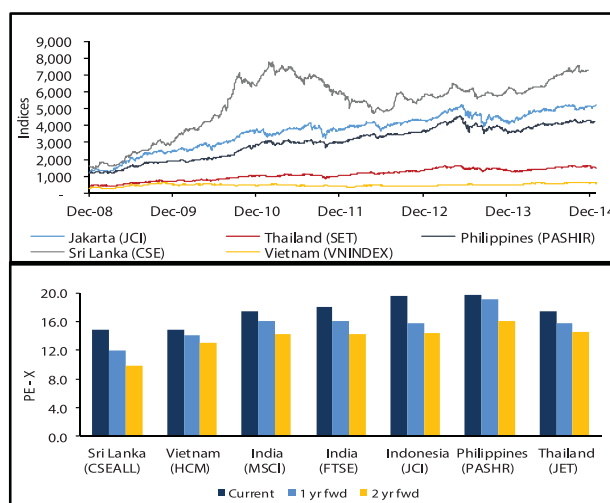
Portfolio investments were also negligible as a percentage of GDP until late 2006. The annual average net portfolio investment during the 1996-2006 periods was only US$1,106 million which was only around 5.7% of GDP. The end of the conflict and future expectations of strong economic growth significantly uplifted the sentiment of the investors, business community and the public at large since mid-2009 and Sri Lanka's capital market rallied for two consecutive years, with Bloomberg recognizing the CSE as one of the best performing markets globally, during 2010 and 2011(SEC, 2014). During 2009-14, inflows in the form of equity and investment fund shares showed greater resilience while substantial inflows were received through the issuance of debt securities by the government and the banking sector (CBSL, 2014). The annual average net portfolio investment during 2009-14 was only US$3,189 million, which was around 6.1% of GDP. The CSE All Share Price Index (CSEALL) on average, performed better than global indices and some of the best-performing regional indices from June 2009 onwards through 2014, despite this growth easing over the immediate post-war period after mid-2011 due to a market correction.

The CSE still trades at a discount to regional markets despite strong fundamentals. The CSEALL currently trades at a low price earnings (PE) valuation compared to most of its regional peers, despite the country being one of the fastest-growing economies in the world. The Colombo Bourse, which is currently classified as a frontier market, has been the best performing market for the year 2014 amongst the selected universe and is the market with the highest real GDP growth. The CSEALL's current valuation of 14.9x is at a 17% discount to its regional peers. Similarly, the CSEALL's forward valuations also trade at discounts to peers, despite expected growth in market EPS over the next 12 months (SEC, 2014).

2.1.4 International Reserves

The changes in net international reserves over the last two decades have been shaped by developments in both the current and capital accounts of the BOP, particularly movements in portfolio investments. Being a current account deficit economy, reserve assets in the BOP have consistently recorded inflows as they reflect the central bank's reserves accumulation. The accumulation of reserves assets were interrupted in certain periods, particularly during the recent global financial crisis between 2008Q2 and 2009Q1. By end-2008, the BOP turned into a deficit and international official reserves dropped significantly as a result of several adverse factors, such as the sudden withdrawal of investment in Treasury Bills and Bonds by foreign investors, hasty claims on short-term

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credit facilities that were previously freely available for petroleum imports and severe valuation losses arising from the sharp depreciation of major international currencies against US$. Such factors exerted an unforeseen and unfavorable pressure on the country's BOP and led to a substantial decline in external reserves (CBSL, 2009). Therefore, the Executive Board of the International Monetary Fund (IMF) on 24 July 2009 approved a 20-month Stand-By Arrangement (SBA) facility of SDR1.65 billion (approximately US$2.6 billion), to Sri Lanka to cushion the BOP and restore international reserves to a comfortable level.

2.2 Volatility in the Capital Account

Extracting from the notable idiosyncratic features of volatility of different components of the capital flows, we observed that for Sri Lanka, BMM, PFD and RES flows are the most volatile inflows, outflows and net flows during the period (Table 1).

Table 1
Volatility of Capital Flows by Type
(as a % of GDP)*

Period	Liabilities						Assets						Net					
	BMM	PFD	RES	FDI	PFE	KAB	BMM	PFD	RES	FDI	PFE	KAB	BMM	PFD	RES	FDI	PFE	KAB
1996-98	1.5	1.1	0.0	0.1	0.3	0.4	1.3	0.1	1.9	0.0	0.2	0.8	0.6	1.1	1.9	0.1	0.1	1.0
1999-07	1.9	1.5	0.0	0.4	0.5	3.3	1.7	0.4	2.2	0.1	0.3	3.5	1.0	1.6	2.3	0.4	0.2	1.8
2008-09	1.8	0.1	0.0	0.6	0.3	0.8	0.2	0.0	7.0	0.1	0.2	6.5	2.1	0.1	7.0	0.6	0.1	5.7
2010-14	6.0	3.3	0.0	0.3	0.6	9.4	5.1	0.0	3.5	0.0	0.9	9.4	2.1	3.3	3.5	0.3	0.4	2.6
Average	4.0	2.5	0.0	0.4	0.4	6.4	3.4	0.4	3.5	0.1	0.5	6.6	1.4	2.4	3.5	0.3	0.2	2.4

* Volatility is measured as the standard deviation of the quarterly flows as a percentage of GDP.
Source: Author's calculations.

During the global financial crisis, BMM, PFD and RES flows fluctuated significantly compared to other identified periods in the sample. Since Sri Lanka is a natural destination for FDI, data confirms that this component was observed to be the most stable in the data set being considered. In Table 1, net flows show less volatility than gross capital movements in Sri Lanka, indicating that there is a degree of negative correlation between the investment behavior of residents and non-residents. Nonetheless, flows of non-residents tend to be more volatile than what can be offset by residents. This is likely to be attributable to the international investment position (IIP) of residents being smaller than that of non-residents and should be an area of interest for policy makers in Sri Lanka.

2.3 Openness to Capital Flows

The level of gross capital flows indicates the degree of capital account openness. The limited degree of openness of the capital account reduces the ability of shocks of one type of flow to be offset by changes in other flows. Becker and Noone (2009) created an index that is derived from the ratio of the absolute value of the gross flows to the absolute value of the sum of gross and net flows, as follows:

$$FlowOpenness_{it} = \left[\frac{|residentflows_{it}| + |nonresidentflows_{it}|}{|residentflows_{it}| + |nonresidentflows_{it}| + |netflows_{it}|} - \frac{1}{2} \right] \times 200 \qquad (1)$$

Figure 5 (a) (b)
Sri Lankan Openness Index (1996-14)
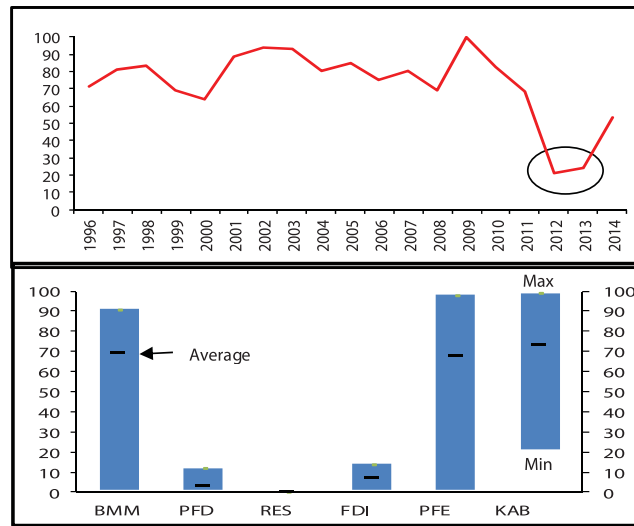
Source: Author's calculations.

When capital flows freely in both directions, Becker and Noone (2009) expect the sum of absolute gross flows to be large relative to net flows. In this case, the index tends towards 100. When capital flows are very one-sided, they expect gross flows to be smaller relative to net flows.

The most extreme case would be where gross flows (either assets or liabilities) are the same size as net flows. This would occur if resident or non-resident flows were totally controlled. In this situation, the value of the index

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would be zero. According to Figure 5a, from 2012-13 when non-resident flows became considerably less important, the index converged to zero. This indicates that during the global financial crisis period, there has been considerably less diversification of the net capital account balance among the gross flows.

Looking more closely at the components of the capital account (Figure 5b), we find a number of other interesting characteristics. The BMM and PFE flows are always well diversified with sizable two-way gross flows. Changes in foreign exchange reserves (RES) on the other hand are by definition always one-sided.[5] Additionally, some flows might have a low index number due to capital account restrictions, while others might have a low index number because either resident or non-resident flows are inhibited due to a lack of market development.

2.4 Sri Lanka's Capital Flows Liberalization and Controlling Policies

Capital inflows were at a negligible level during 1970-77 due to restrictive and inward oriented policies such as the reemergence of a comprehensive system of quantitative restrictions, high tariffs and foreign exchange controls. After introducing an open economic policy in 1977, capital inflows as a percent of GDP increased to 6% in 1978 from a level of under 1% in the previous year. Further, private capital, both direct investment and loans turned from a net outflow to a net inflow. With the establishment of the Greater Colombo Economic Commission (later Board of Investment) in 1978 and the first Export Processing Zone, direct inflows grew significantly (CBSL, 1998).

In the early 1990s, the second phase of economic liberalization commenced with the origination of a mass-scale privatization program and the liberalization of stock market investments. Subsequently, trade and payment systems were also liberalized and concerted efforts to increase private capital inflows were introduced in 1991. With the approval for foreign residents to purchase 100% of the issued share capital in the listed companies in 1992, subject to certain eliminations and boundaries, Sri Lanka experienced a gush in portfolio investment during   1993-94. In 1993, Sri Lanka fully liberalized current account transactions. Under the guidance of Article VIII of the IMF in 1994, Sri Lanka started to gradually liberalize its capital account (Amarasekara, 2004). In 1995, commercial banks were allowed to obtain foreign loans up to 15% of their capital and reserves. In 2001, Sri Lanka abandoned its managed floating exchange rate regime and

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5.   Foreign exchange reserves are only ever resident assets and have no corresponding non-resident liability.

adopted a fully floating exchange rate regime. During 2007-14, the country witnessed a gush in capital flows with the issuance of sovereign bonds in international markets, higher FDI inflows and increased foreign investment in the CSE. In 2006, the government opened the T-bond market to foreign investors with an aggregate ceiling of 5% of the outstanding bonds. After one year, this ceiling was increased to 10% in respect of increased investment in T-bonds by foreign investors. The government also opened the T-bill market to foreign investors with an aggregate ceiling of 10% of outstanding bills in 2008. In 2011, the Monetary Board of the Central Bank decided to raise the current threshold for foreign investments in Treasury bills and Treasury bonds from 10% of the outstanding T-bills and T-bonds stock to 12.5% (CBSL, 2011).

During the past few years, Sri Lanka's macroeconomic fundamentals have improved and the domestic financial sector has become stronger and more resilient. Against this background, capital and foreign exchange regulations have been reviewed and relaxed gradually with the objectives of achieving greater efficiency in the conduct of international financial transactions and further facilitating economic activity of the private sector through greater ease of doing business, thus enhancing the overall competitiveness of the economy. In keeping with the above policy framework, new relaxation measures were implemented in 2013, with the introduction of the standard criteria to permit non-bank financial institutions to accept foreign currency deposits and repatriation of Pre-SIERA (Share Investment External Rupee Account)[6] foreign investments in Sri Lanka. Additionally, general approval was granted to foreign institutional investors, corporate bodies incorporated outside Sri Lanka and investors resident outside Sri Lanka to invest in unit trusts subject to certain conditions. Meanwhile, Sri Lanka has taken numerous progressive actions such as the supplying of unskilled labor at low cost, offering costly tax concessions, etc. to endorse financial openness and to enhance the investment climate. Policy attention has shifted towards the implementation of a correct investment promotion strategy, underpinned by various factors such as political and social stability, improved infrastructure, low tax regime, skilled labor and efficient government institutions (CBSL, 2010).

However, Sri Lanka's capital markets are still under-developed compared to some regional peers. Some portfolio investment areas in Sri Lanka still remain

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6. The Central Bank has established a mechanism to grant permission on a case-by-case basis for the repatriation of dividends and sale or maturity proceeds of investments made by foreign investors in shares and business ventures in Sri Lanka, prior to the introduction of the SIERA in 1990.

closed to foreign participation. Therefore, policy makers need to identify key portfolio investment areas and consider approximate relaxation policies to attract foreign investments into the country.

2.5 Capital Flows with Monetary and External Sector Polices

2.5.1   Impact of Capital Flows on Monetary and External Sector

Capital flows were not substantial until 2007 and since then, it has gradually increased. It has been noted in recent times, that capital flows impact domestic deposit and lending rates to some extent. Additionally, these inflows coupled with trade flows and workers' remittances seemed to have impacted on the exchange rates and official reserves in certain years. The Sri Lanka rupee-US dollar exchange rate appreciated by 3.1% in 2010, irrespective of high domestic inflation as compared to that of major trading partners and competitors, largely due to relatively high foreign capital inflows and sharp rise in workers' remittances. Meanwhile, in the first half of 2012, the rupee depreciated by 14.6% against the US$ due to initial overshooting after the major policy change. Subsequently, the rupee appreciated by 4.8% in the second half of 2012, supported by increased foreign currency inflows in the form of workers' remittances, earnings from tourism, and inflows into the government securities market and the CSE (CBSL, 2012).

Figure 6
Capital Inflows, Net Absorption and Exchange Rate Movements
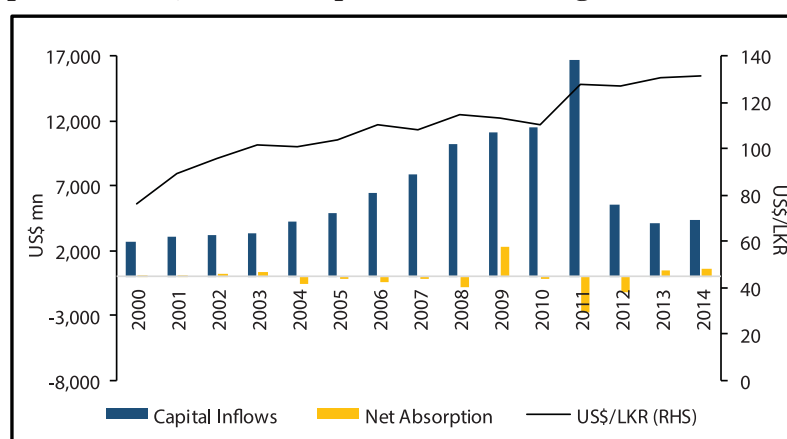
Source: Author's calculations.

From January 2013 through early June 2013, the rupee appreciated marginally by 0.6% against the US$, while it depreciated by 5.0% against the US$ during the second week of June through end-August, mainly due to an increase in import demand and the expectation of unwinding by foreign investors from the government securities market in anticipation of possible tapering of the US bond buying program (CBSL, 2013). In 2014, the appreciation pressure was mainly due to the increase in foreign exchange inflows in the form of export earnings, workers' remittances and other financial inflows on account of international sovereign bonds, government securities, foreign loans to the government and private sector and foreign investment in the CSE. Accordingly, the rupee appreciated by 0.3% against the US$ by the end of the third quarter of 2014. However, with increased import demand and net outflows associated with the government securities market, there was pressure on the Sri Lankan rupee in the last quarter of 2014, resulting in a depreciation by 0.5% against the US$, causing an overall annual depreciation of 0.2% (CBSL, 2014).

The Sri Lankan government has been issuing sovereign bonds for the international market since 2007 and this has significantly influenced the official reserves of the country. The reserves declined to US$2,402 million in 2008 from US$3,508 million at end-December 2007, largely due to the sale of foreign exchange amounting to US$1,532 million in 2008 to meet the excess demand resulting from the higher trade deficit. Since 2009, official reserves have increased gradually to a comfortable level as a result of the continuous flow of proceeds from international sovereign bond issuances.

The CSEALL index has been rising over the last five years reflecting increased activities in the CSE. On average, foreign trading at the CSE has accounted for around 25% of the trading value. In 2009, after surpassing the 30% level with the market rallying with local retail strength, overseas trading contributions waned in 2010 and 2011. Meanwhile, the market witnessed a net positive flow of foreign investments starting from 2012 onwards (Figure 7). This clearly shows foreign investor confidence in Sri Lanka's economic prospects. Foreign turnover levels increased to US$558 million during 2013, significantly higher than the levels seen over 2011-12. Foreign turnover came in at US$518 million in 2011, while it reached US$417 million in 2012. The momentum continued in 2014 with foreign trading activity accounting for nearly 30% of the total market turnover (SEC, 2014).

Figure 7 (a) (b)
Foreign Fund Movements and Market Turnover Split (US$ mn)
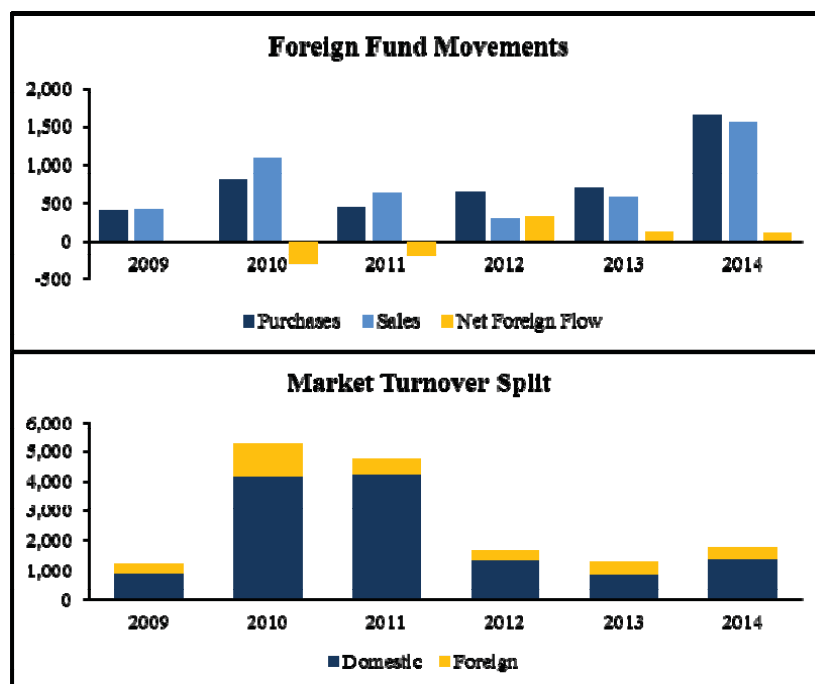
2.5.2 *Monetary and External Sector Policy Responses to Deal with Capital Flows in Recent Years*

The relaxation of some capital controls (as outlined in Section 2.4), has posed some challenges to monetary and exchange rate policy management in Sri Lanka. This condition was aggravated in recent years, due to allowing foreigners to carry foreign exchange from their overseas banks and, expectations of further appreciation of the Sri Lankan rupee with continuous foreign inflows. During 2008-09, the CBSL maintained a high interest rate regime to discourage capital outflows. In the same period, the CBSL imposed high statutory reserve requirements (SRR) on rupee deposits to reduce inflationary pressures in the domestic rupee market. Hence, current CBSL policy strategies are mainly concentrated on market intervention without adjustment of the SRR on rupee

deposits or central bank policy rates to manage capital flows. Presently, CBSL continuously absorbs excess liquidity from the foreign exchange market to prevent a large appreciation of the Sri Lankan rupee. Maintaining the exchange rate at a relatively stable level against the US$ through the continuous absorption of foreign exchange from the market has reduced the competitiveness of imports, through an undervaluation of the Sri Lankan rupee. During 2013-14, the CBSL absorbed US$2,546 million from the domestic foreign exchange market, whilst mopping up the excess liquidity in the domestic banking system through aggressive Open Market Operations (OMOs), on overnight/long-term basis.

2.6 Capital Flows and Financial Stability

2.6.1 Impact of Capital Flows on Financial Stability

Sri Lanka's current banking sector regulations implement limits on foreign borrowings, maximum accommodation and single borrowing limits and the existing exchange control regulations act as safeguards in ensuring financial sector stability while imposing certain limitation on lending to resident entities in foreign currencies.

Figure 8
Capital Flows to Banking Sector (US$ mn)

Source: Author's calculations.

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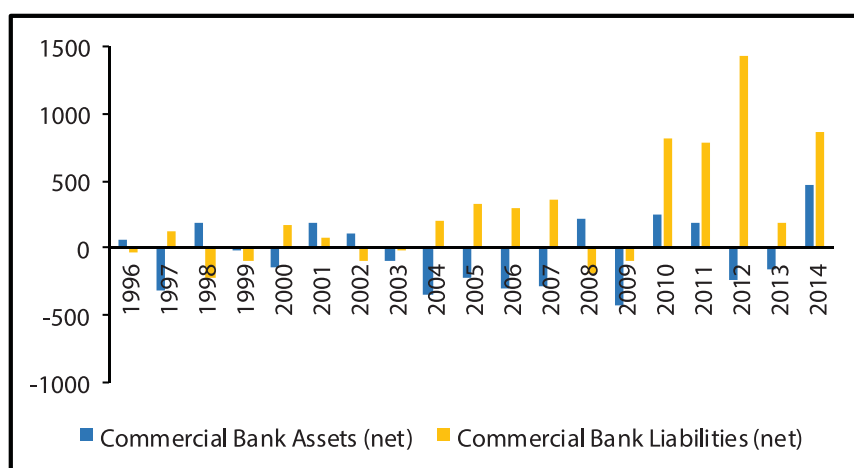
However, the Central Bank Circular No. 380 (1979) permitted Off-shore Banking Units (OBUs) to borrow from and to lend to non-residents without any controls. During 2007-08, capital flows to Domestic Banking Units (DBUs) turned to net outflows due to the settlement of overseas loans. Due to an increased demand for foreign currency loans from the Board of Investments (BOI) companies, the net capital flows to OBUs have been increasing since 2008. The net inflows to OBUs in 2012 and 2014 increased substantially to US$1,435 million and US$863 million, respectively, as compared to an average inflow of US$150 million during 1996-2011.

2.6.2 Financial Stability Responses to Deal with Capital Flows in Recent Years

Throughout the last decade, the government of Sri Lanka allowed foreigners to invest in government securities and to open savings accounts, either in foreign currencies or in local currency. This exposes the financial system to foreign exchange risks if there is any sudden reversal of such foreign inflows. High exposure to non-resident investors is a concern as the unwinding of such investment can destabilize financial markets and the real economy. Limiting the exposure of the capital account to foreign investments through the maintenance of a 12.5% threshold on non-resident holdings of government securities has helped prevent excessive inflow and outflow of "hot money" in the case of Sri Lanka. Therefore, most of the foreign investment in government bonds is long-term in nature. Moreover, polices applied to improve financial system stability and soundness will ensure the resilience of this sector to any shocks that may be created by foreign capital flows.

3.   Identifying Key Determinants of Capital Flows to Sri Lanka

3.1 Review of Empirical Literature

There is a vast pool of literature which attempts to determine the main factors underlying the surge in capital inflows recorded by emerging economies since the early 1990s. Several researchers (notably Calvo et al., 1996 and Fernandez-Arias, 1996) have emphasized, in this context, the distinction between "pull" and "push" factors as a means of determining capital flows. The first category (pull factors) generally refers to improvements in the domestic economy's prospects, associated notably with economic growth, interest rates, inflation stabilization and structural reforms. The latter (push factors) refers mostly to external shocks and other regulatory changes in the world economy.

3.1.1 Empirical Literature in the Global Context

Recent studies have found that either pull or push factors have an impact on the behavior of capital flows. Among the typical pull factors found to be important for capital flows are, domestic GDP growth rate, domestic interest rate and domestic inflation (Fratzscher (2011), Kabadayi et al. (2012) and Ahmed and Zlate (2013)). Among the push factors, the global growth rates, global inflation rates and global interest rates are the most common followed by global risk, as represented by Byrne and Fiess (2011) and Forbes and Warnock (2012). Meanwhile, considering the comparative advantage of South Asian economies, Husain and Jun (1992) demonstrate that the ample supply of low wage, skilled and educated labor would attract capital flows. Ralhan (2006) carried out a cross-sectional study of eight countries (Australia, India, Indonesia, Argentina, Brazil, Chile, Colombia and Mexico) to identify the determinants of capital flows, especially in the wake of economic liberalization and deregulation. Based on Ralhan's findings, government policies should be directed towards improving the fundamentals of the economy, such as gross foreign reserves, gross domestic product and total external debts, so as to attract capital inflows. Ralhan describes gross foreign reserves are one of the important factors affecting capital flows in all of the countries considered, regardless of the region or group. Yang, Xiong and Ze (2013) examine the determinants of FDI and foreign portfolio investment with the static and dynamic models of six Asian and seven Latin American countries. Their results show that expectation factors are of great importance in these two regions along with FDI and foreign portfolio investment. Further, FDI is highly influenced by economic expectations while foreign portfolio investment is dependent on exchange rate expectations.

Montiel and Reinhart (1999) conclude that domestic macroeconomic policy has significantly attracted short-term capital inflows to Asia than to Latin America. Hernandez, Mellado and Valdes (2001) stress that the effects of pull factors are stronger than the push factors in influencing capital flows into emerging markets in the 1990s. The results confirm that the net private capital flows to emerging economies seem to support the expected outcome, when it relates positively with the inflows of capital into emerging markets. This is also corroborated by Mody et al. (2001) who cites the eminence of pull factors in attracting capital inflows to emerging markets. The study concludes that pull factors such as consumer price index, domestic credit, industrial production index, domestic interest rate, credit rating, reserve-import ratio and the domestic stock market index have played a significant role in attracting capital flows into all the economic regions in the sample studied.

Push factors comprise the economic conditions of capital exporting countries, including the international interest rates and growth rate of global GDP. Primarily, international interest rates, particularly the U.S. interest rate, have significantly influenced the movement of capital flows to emerging economies. The capital inflows to most emerging economies appear to have been largely pushed by the low returns available in advanced economies (Warnock and Warnock, 2009). Second, the global GDP growth rate is another external factor that causes capital flows to emerging economies (Chuhan et al., 1998 and Calvo et al., 1996). Meanwhile, Sarno and Taylor (1999) demonstrated that global factors are more important than domestic factors in explaining the dynamics of bond flows and the US interest rate explains the short-term dynamics of portfolio investment, especially bond flows.

Meanwhile, Culha (2006), De Vita and Kyaw (2008) and Ahmed and Zlate (2013) find a mixed result, where both pull and push factors in terms of real factors (domestic output and industrial country's output), are vital to the explanation of capital inflows to emerging and developing economies. Ghosh et al. (2014), who focused their attention on the determinants of surges in inflows to emerging economies, found that while global factors act as "gatekeepers", local fundamental factors determine the ultimate magnitude of the surge.

3.1.2 Empirical Literature in the Sri Lankan Context

A limited number of studies have been conducted on the determinants of capital flows in Sri Lanka. Using annual data from 1977-07, Pushparajah (2009) demonstrates that capital inflows to Sri Lanka remain relatively small, and have not posed any major challenges to the conduct of monetary policy and monetary management, except during the 1993-94 and 2007-08 periods when there were capital flow surges. Expanding upon the Fully Modified Ordinary Least Square (FMOLS) Approach and the Vector Error Correction Model (VECM), Liyanage (2014) concludes that pull factors such as real GDP, inflation and political stability are the main capital flow drivers in the economy. Brana and Lahet (2008) investigate the impacts of both external factors and domestic fundamentals on the evolution of capital inflows using a panel data set comprising four South Asian countries including Sri Lanka over the period of 1990-2007. Their findings show that both push and pull factors are significant and push factors such as trade strategies, global liquidity and contagion factors, seem to be major determinants of capital inflows into South Asia.

3.2 Methodology

3.2.1 Formulation of the Model

As explained in Section 3.1, both pull and the push factors determine capital flows to any country. Equation (2) shows capital flows as a function of pull factors (internal variables) represented by X_i and push factors (external variables) represented by Y_i.

$$CapitalFlows = \alpha + \beta_i X_i + \delta_i Y_i + \varepsilon \qquad (2)$$

3.2.2 Data Collection

In order to empirically test the determinants of capital flows,[7] we model capital inflows to Sri Lanka (as a percentage of GDP) as a linear function of both pull factors, such as real GDP growth rate,[8] domestic inflation rate[9] and interest rate differential[10] and push factors, such as the G20 economies' real GDP growth rate[11] and CBOE volatility index.[12] For this study, quarterly data spanning from 2001Q2 to 2014Q4 is used. Data related to capital flows and all pull factors are sourced from the Central Bank of Sri Lanka's external database. Data related to all the push factors are sourced from the International Financial Statistics published by the International Monetary Fund and CBOE official website.

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7. The dependent variable in this study is capital inflows (KAB), which is obtained by summing BMM, PFD, RES, FDI, and PFE. The rational to form aggregated data from these five flows is that they are major components of capital flows in the financial account of Sri Lanka.

8. The real GDP growth rate represents the domestic performance of an economy and is widely cited in many literature on the determinant of capital inflows into a country (Pushparajah (2009), Brana and Lahet (2008) and Abdullah et al. (2010)).

9. Colombo Consumer Price Index (CCPI) shows the soundness of domestic macroeconomic policies.

10. Defined as the difference between annualized domestic 6 month Treasury bill rate and 6 month LIBOR rate.

11. Sri Lankan major trading partners and competitors and FDI partners are represented in this category.

12. The CBOE volatility index (VIX) is a key measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices (The VIX is widely seen as a market proxy for risk aversion and uncertainty).

Equation (3) builds on Equation (2), comprising three internal variables and two external variables that were chosen for this study.

$$KAB = \alpha + \beta_1 RGDP + \beta_2 INF + \beta_3 INTD + \delta_1 G20RGDP + \delta_2 VLX + \varepsilon \qquad (3)$$

where, the dependent variable KAB denotes capital inflows to GDP ratio. Internal independent variables such as RGDP, INF and INTD represent real GDP growth rate, domestic inflation rate and the interest rate differential, respectively. Meanwhile, external variables, such as G20RGDP and VIX represent G20 economies' real GDP growth rate and CBOE volatility index, respectively.

3.2.3 Estimation of Unit Root Test and Cointegration Test

Macroeconomic variables have a tendency to move together in a time series dataset. To avoid the problem of spurious regression, a unit root test is performed on the variables. Various alternative econometric tests are available to check whether a data series is stationary or not. The Augmented Dickey-Fuller (ADF) and the Philips-Perron (PP) tests are the most popular. Based on the results depicted in Table 2, the data series are found to be non-stationary at level, and stationary at first difference.

Table 2
Unit Root Test Results

Variable	Level (with intercept)		1st Difference (with intercept)	
	ADF Statistic	PP Statistic	ADF Statistic	PP Statistic
KAB	0.6514	0.6405	0.0000	0.0000
RGDP	0.1221	0.1486	0.0000	0.0000
INF	0.1219	0.3751	0.0002	0.0011
INTD	0.1024	0.2782	0.0000	0.0000
G20RGDP	0.0548	0.1697	0.0001	0.0001
VIX	0.0658	0.0705	0.0000	0.0000
1% critical val.	-3.5600	-3.5563	-3.5600	-3.5574
5% critical val.	-2.9276	-2.9255	-2.9276	-2.9266

Engle and Granger (1987) and Engle and Yoo (1987) propose the use of cointegration tests for two variables and a single equation. Alternatively, Johansen (1988) and Johansen and Juselius (1990) suggest a test based on the maximum likelihood method to resolve the problem of the possibility of the presence of cointegration vectors. The dynamic inter-relationships among the variables are analyzed using this method, one of greater robustness in as far as it incorporates, in the VECM, the deviations related to the long-run path of the series (Verbeek, 2004). The number of cointegrated vectors can be obtained through the use of the Trace Statistic test and the use of the respective critical values. Table 3 shows the cointegration test results.

Table 3
Johansen Cointegration Rank Test Results

Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5% Critical Value	Prob.**
None *	0.503425	113.8211	94.67366	0.0011
At most 1	0.592464	29.73412	29.81498	0.0584
At most 2	0.446148	46.53402	47.95448	0.0987
At most 3	0.272572	24.01739	29.79707	0.1997
At most 4	0.122456	7.150662	15.49471	0.5602
At most 5	0.004280	0.227350	3.841466	0.6335
Trace test indicates 1 co-integrating eqn(s) at the 5% level				
* denotes rejection of the hypothesis at the 5% level				
**MacKinnon-Haug-Michelis (1999) p-values				

Based on the results in Table 3, the model has one cointegrated vector (error terms), which means there is a long-run relationship among the variables. Therefore, to identify the determinants of capital flows in Sri Lanka, we use the VECM. This is due to the fact that: (i) all the macroeconomic variables are endogenous, enabling the use of a multi-equation estimation; (ii) all the variables are non-stationary, proposing an estimation in first (or higher) differences; and, (iii) there is a cointegrating relationship in this model, suggesting the inclusion of the cointegration relationship as an additional regressor (Engle and Granger, 1987).

Cointegration relationships in the system require that a VECM be used instead of a vector auto regression (VAR) model. The VECM, initially developed by Engle and Granger (1987), has as its aim, the insertion of short-run adjustments

due to the presence of cointegration. However, Johansen and Juselius (1990, p.170) have more precisely described the VECM as a means of analyzing short-run as well as long-run adjustments.

3.3 Empirical Analysis

The VECM is a restricted VAR that has cointegration restrictions incorporated in the specification. Therefore, it is formulated for use in a non-stationary series that is known to be cointegrated. The cointegration term is known as the error correction term since the deviation from the long-run equilibrium is corrected regularly through a series of partial short-run adjustments. To run the model, we consider optimal lag length as two[13] (Akaike Information Criterion (AIC) value of lag length one is -13.48, but AIC value of lag length two is -15.67). Table 4 shows the results of the Error Correction Model.

Table 4
Empirical Long-run Results

Cointegrating Eq	KAB	RGDP	INTD	INF	G20RGDP	VIX
β Coefficient	1.0000	1.0810	4.3182	-2.4723	-5.0034	-0.6678
Standard Errors		1.3305	0.7859	0.5956	1.5438	0.2878
T-Statistics		2.2227**	6.3744*	-6.3476*	-3.8494*	-1.2475

*Significant at 1% level.   **Significant at 5% level.*

Based on the results of the error correction term (KAB), the speed of adjustment is statistically significant and it takes approximately 7 quarters (1/0.1384) to adjust to the equilibrium level. Thus, the determinants of capital flows into Sri Lanka can be specified as follows:

$$KAB = 18.24 + 1.08RGDP + 4.32INTD + 2.47INF - 5.00G20RGDP - 0.67VIX \qquad (4)$$

Accordingly, the results suggest that an increase in domestic real GDP growth by 1% will increase capital inflow-GDP ratio by 1.08. An increase in interest rate differential of 1% will increase capital inflow-GDP ratio by 4.32. However, an increase in domestic inflation by 1% will decrease capital inflow-GDP ratio by 2.47. Meanwhile, the G20 economies' real GDP growth and CBOE

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13. A number of alternative ways are available for selecting optimal lag length for VECM. Among them, choosing the lowest AIC value is most common.

volatility index are also negatively associated with capital flows. An increase of the G20 economies' real GDP growth rate by 1% will decrease capital inflow-GDP ratio by 5.00. An increase of CBOE volatility index by 1 index point will decrease capital inflow-GDP ratio by 0.67, but it is not statistically significant.

Based on the VECM results, an increase in domestic real GDP growth is found to attract more capital flows to Sri Lanka in the long-run.[14] Economic growth can lead to an increase in capital flows because of growing investor confidence. Puah et al. (2010) demonstrate that the growth in resources increases a country's creditworthiness and the increase in creditworthiness attracts more capital flows. The interest rate differential is positively associated with capital flows. This is quite typical as we were in very different cyclical positions.

Advanced economies (especially some euro zone economies) are still striving to recover from the Great Recession and have eased monetary policy. In contrast, the recovery of the Sri Lankan economy has been much stronger since 2009, and in order to maintain this momentum and to control inflationary pressures, the authorities have had to adopt a tight monetary policy stance, resulting in a widened interest rate differential, thus attracting capital inflows into Sri Lanka.[15] Domestic inflation has had significantly negative effects on capital inflows, which is consistent with the theory that a high inflation rate discourages capital inflows. There is a negative relationship between the G20 economies' real GDP growth and capital flows to Sri Lanka. This may be a result of the increasing investment opportunities available in the G20 economies with higher returns, as a result of their higher growth rates, thereby causing a reduction in capital flows to small emerging economies like Sri Lanka. Since the VIX index is generally regarded as a measure of global uncertainty, the results in VECM suggest that capital inflows to Sri Lanka are, indeed, negatively impacted by global uncertainty. However, this result is not statistically significant. This may be attributed to that fact that Sri Lanka's capital market is still at the developing stage. Further, the presence of capital controls renders fluctuations in the VIX index rather insignificant in the determination of capital flows to Sri Lanka.

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14. This is consistent with the findings of Athukorala (2003), Athukorala and Karunarathna (2004), Pushparajah (2009), Thilakaweera (2012) and Liyanage (2014).

15. Singh (2007) and Verma and Prakash (2011) in the context of India, Ali (2012) in the context of Pakistan and Brana and Lahet (2008) in the context of Asia have demonstrated that positive interest rate differential create capital inflows into the domestic economy. However, World Economic Outlook (April 2015) published by the International Monetary Fund point out that expected interest rate hike in the US economy might attract more capital flows from emerging economies.

4. Conclusions and Major Issues

Capital inflows to the Sri Lankan economy were at negligible levels during 1970-77, in both nominal terms and as a percentage of GDP. This was due to restrictive and inward oriented policies such as the reemergence of a comprehensive system of quantitative restrictions, high tariffs and foreign exchange controls. After the introduction of an open economic policy in 1977, capital inflows as a percentage of GDP increased to 6% in 1978 from a level of under 1% in the previous year. However, capital flows were not substantial until 2007 and prior to that they have not posed any major challenges to the conduct of monetary and exchange rate policy as well as to the maintenance of financial system stability in the country. As a result of the government allowing foreign investors to invest in government securities as well as its issuance of sovereign bonds for the international market from 2007, capital inflows into the Sri Lankan economy have gathered a gradual momentum. Consequently, capital flows have started to exert pressure on the implementation of monetary and exchange rate policies as well as the maintenance of the financial system stability in the country.

To deal with these issues, the CBSL have adhered to different policy strategies at different periods. In the 2007-08 period, the CBSL relied primarily on monetary management policy. In order to absorb the excess liquidity in the banking system, the CBSL changed the Statutory Reserve Requirement (SRR), while absorbing excess liquidity through its Open Market Operations (OMOs) via the sale of Treasury bills and CBSL's own securities.

Due to the global financial crisis in the latter part of 2008, there was a significant withdrawal of foreign investments in government securities leading to intensified pressures on exchange rates to depreciate with foreign outflows. Accordingly, the Sri Lankan rupee depreciated by 4.6% during the last quarter of 2008. In this regard, to meet the excess demand triggered by such sudden capital outflows, the CBSL sold foreign exchange, creating a liquidity shortage in the banking system, requiring the provision of rupee liquidity by the CBSL through OMOs. Since mid-2009, the country has received further capital inflows consequent to the newly established peace in the country. To deal with the gradual improvement in capital inflows during the 2009-14 period, the CBSL relied primarily on exchange rate management policy rather than on monetary management policy. During that period, the CBSL continuously intervened in the domestic foreign exchange market to absorb excess liquidity without adjusting the SRR on rupee deposits or central bank policy rates to manage foreign inflows.

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In terms of the determinants of capital flows to Sri Lanka, the empirical investigation suggests that pull factors such as domestic real GDP growth rate and interest rate differential are positively correlated with capital inflows, while domestic inflation is negatively correlated with capital inflows. Additionally, push factors such as the G20 economies' real GDP growth rate and CBOE volatility index are negatively correlated with capital flows.

Even though inward FDI, equity investment of up to 100% by the foreigners in shares listed in the CSE and foreign investment in government securities up to 12.5% of outstanding Treasury bills and bonds are freely permitted, the capital inflows into Sri Lanka still remain relatively small, compared to other emerging economies in the SEACEN region. Due to certain restrictions, the government currently receives higher capital flows than the private sector. Meanwhile, the concessional financing that was available to the government from multinational financial institutions such as World Bank, Asian Development Bank, Organization for Economic Cooperation and Development, etc. are gradually easing with the country's transition into a upper middle income status from the lower middle income category. This might increase the government debt service burden. Additionally, the higher yield rates on government securities compared to other emerging economies', resulting from higher budgetary financing requirement, may encourage speculative capital flows in the short-term, which may reverse faster if the Sri Lankan rupee depreciates rapidly and macro imbalances emerges in the country.

5. Policy Recommendation

For an emerging and open economy like Sri Lanka, international capital flows have always been an important component for economic development and growth. To maintain international capital flows at a sustainable level, continuous improvements in the regulatory framework and market infrastructure are needed. More vigorous reforms in the regulatory and legal environment are required to provide adequate investor protection and sound business practices would help remove distortions and increase efficiency in the financial system. Moreover, improvements in market infrastructure (e.g., the development of internationally competitive clearing and settlement system) would promote the broadening of the investor base and the liquidity of the bond markets.

Although it is essential for the CBSL to maintain stable capital inflows and outflows, this is challenging task. Promoting the inflows of long-term capital inflows can help facilitate economic growth and is beneficial for the recipient economies. However, with short-term capital, the inflows can sometimes adversely

affect the capital market and aggravate the volatility of the stock market because of the myopic pursuit of profits. Therefore, the CBSL should discourage short-term capital flows to both the private and public sectors.

An important feature to note is that, in achieving broader monetary, exchange rate and financial stability, especially in the current environment of high uncertainty, Sri Lanka should not rely on a single or limited set of policy tools. Instead, the use of more pragmatic policy methods are crucial, whereby a mix of policy instruments have to be used for different situations and objectives, depending on the nature of risks being confronted and the effectiveness of the policy.

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Annexure I: Composition of Sri Lanka's Balance of Payments (US$ bn)
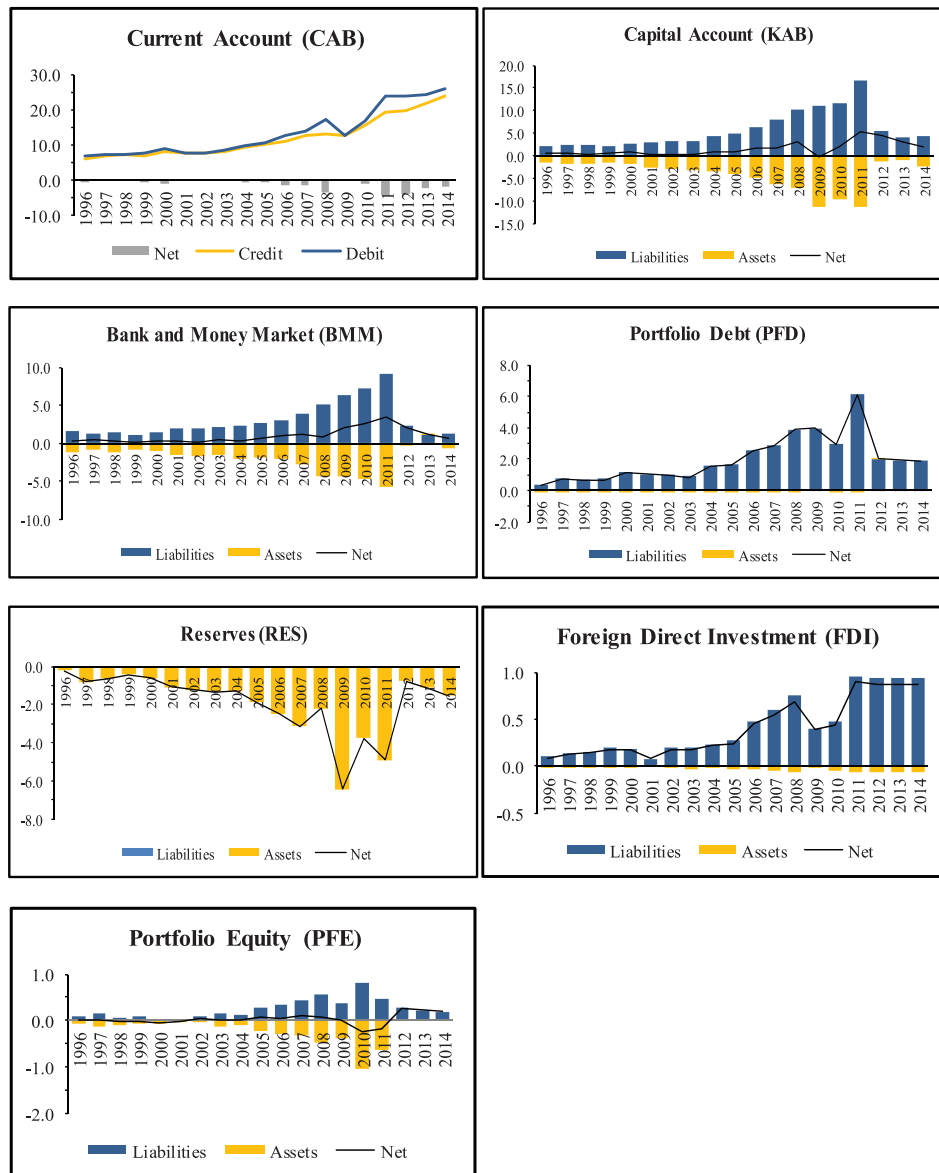
Source: Author's calculations.

Annexure II: Composition of Sri Lanka's Balance of Payments (as a % of GDP)

Current Account (CAB)

Capital Account (KAB)

Bank and Money Market (BMM)

Portfolio Debt (PFD)

Reserves (RES)

Foreign Direct Investment (FDI)

Portfolio Equity (PFE)
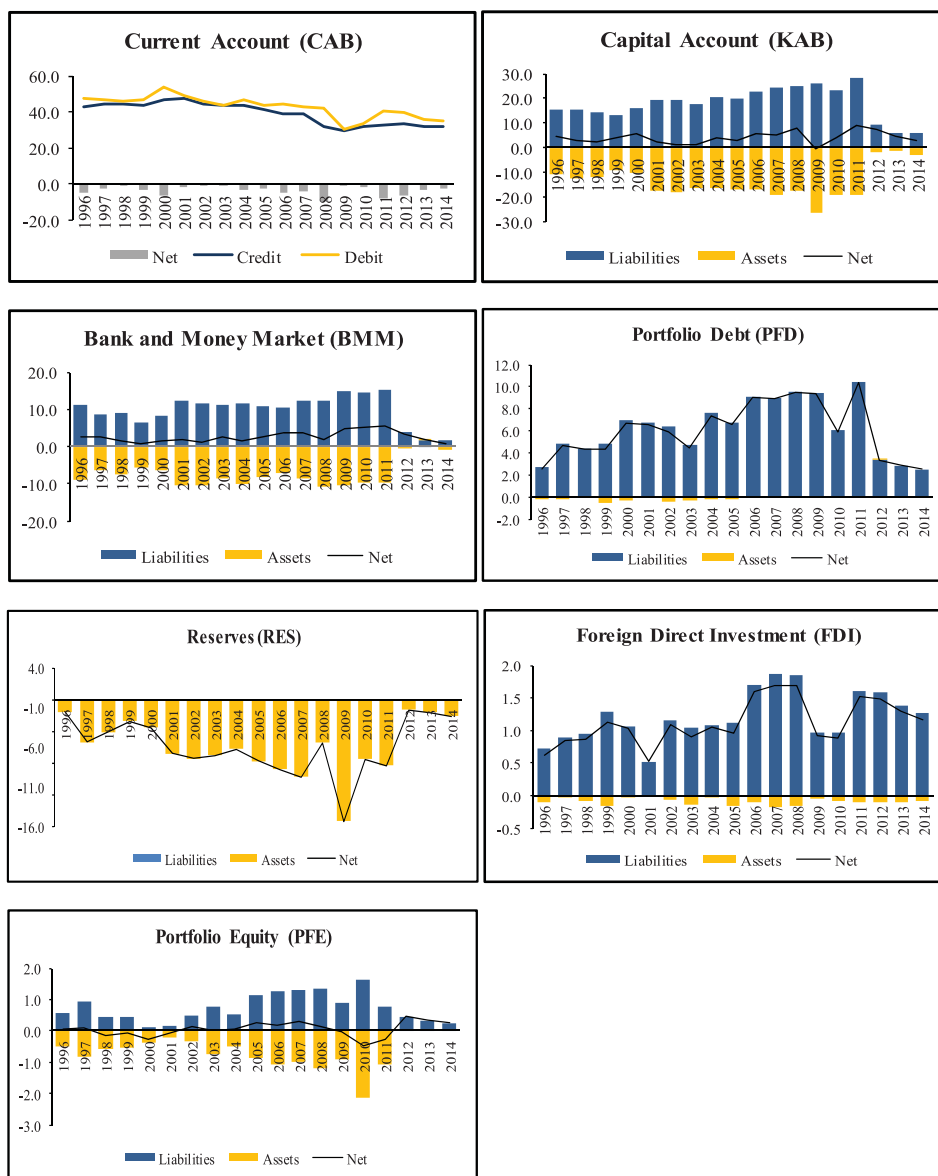
Source: Author's calculations.

Chapter 9

INTERNATIONAL CAPITAL FLOWS IN CHINESE TAIPEI

By
Ti-Jen Tsao[1]

1. Introduction

Before the global financial crisis of 2008, advocates of free international capital flows argued that the capital-poor (high marginal return on capital) economies could speed up their productivity growth, economic diversification and internationalization if they allowed the free flow of capital from the capital-rich (low marginal return on capital) economies. Beyond the lasting benefit of capital inflows on investment, the capital-poor economies are able to smooth their business cycles via cross-border capital flows. Therefore, a well-established global economy needs high international capital mobility to lower the financing cost of investment, improve the efficiency of capital allocation, facilitate technological progress, and so forth.

However, the global financial crisis of 2008 gave us a different lesson from what supporters of free international capital flows advocated. Dadush and Stancil (2011) found that international capital did not flow from capital-rich economies to capital-poor ones; instead, it constantly poured into the capital-rich economies. The reason behind this is that the savings rate is usually higher in the developing economies than in the developed economies, but investment opportunities are fewer in the former than in the latter. Take Chinese Taipei as an example. It is categorized as a capital-rich economy, but it still receives a significant amount of capital flows from overseas.

According to the 2013 Trade and Development Report of United Nation Conference on Trade and Development (UNCTAD), the growing unrestricted international capital flows does not necessarily stimulate real investment, or bring about higher and more stable GDP growth rates. In other words, free international capital flows seldom increase the activities of foreign direct investment which is seen as a facilitator to boost the potential output of an economy. Instead, it attracts hot money to speculate on financial assets across countries. While the financial market is hardly proven to be perfectly efficient, it does not come as

a surprise to find prices being seriously distorted by market failure, e.g., herding behavior in foreign exchange market. This inefficiency could further damage economic development and international trade. Based on this reality, mass capital inflow is no longer a sign of a strong economy; on the other hand, it becomes a source of economic imbalance. The United Nation Development Program (UNDP), in one of its 2009 reports, claimed that international capital flows had become the main driver of exchange rate variation, instead of international trend or economic fundamentals.

In some of the recent literature, unregulated international capital flows are believed to be an unstable factor of the global economy. Bluedorn, et al. (2013) showed that since 1980, for a sample of nearly 150 countries, private capital flows are typically volatile for all these countries, advanced or emerging, across all points in time. This holds true across most types of flows, including bank, portfolio debt, and equity flows. Rey (2015) highlighted that the gains to international capital flows have proved elusive whether in calibrated models or in the data. Large gross capital flows derived from easy monetary policies of the major central banks disrupt asset markets and financial intermediation resulting in harmful side effects. Chen, et al. (2015) pointed out that the estimated effects of the US quantitative easing on the emerging economies are generally larger than those found for the United States and other advanced economies. The estimates suggest that the US monetary policy spillovers contributed to overheating in the emerging economies and to the corresponding exchange rate appreciation pressure. Therefore, cross-border monetary policy spillovers via international capital flows can be important sources of global macroeconomic and financial instability.

From around mid-2014, more and more financial market participants expected that the Federal Reserve System (Fed) would begin the process of interest rate normalization in the near future. This expectation triggered continuous capital outflows from the emerging markets since then. According to Kynge and Blitz (2015), some US$ 940 billion of capital flowed out from the nineteen biggest emerging market economies, including Chinese Taipei, in one year since mid-2014. Moreover, there was a great amount of cross-border capital moving in and out of these economies between 2008 and 2014. During the global financial crisis from 2008 to 2009, US$ 480 billion of capital flowed out from these emerging market economies, but then the capital flowed back between 2009 and 2014, which amounted to US$ 2 trillion.

It is observed that short-term international capital flows have dominated the fluctuations of the exchange rate of the New Taiwan Dollar (NTD). When

foreign investors remit money in Chinese Taipei, the NTD exchange rate usually appreciates, and vice versa. The recent statistics show that for the last three years nearly 40% of the total NTD trading volume is attributed to foreign investors' activities, and the top twenty foreign investors represent 35.2% of these activities. Beyond the NTD exchange rate, the local stock market performance is also skewed towards the direction of short-term foreign capital flow. According to the data released in May 2015, foreign investors own 31.3% of the local listed companies by market value, which could be up to 37.5% if foreign direct investment is included. Such a high ratio is second only to 52% in the Brazilian stock market, with the highest ratio in the world.

As a small open economy, Chinese Taipei highly relies on international trade for its economic development, but this kind of economic structure usually attracts short-term cross-border capital taking advantage of its thin market, which undermines not only the stability of the local financial market, but also the domestic economy. The thinness of the local financial market in Chinese Taipei can be perceived by the following numbers: the total market value of the NTD assets owned by foreign investors, including stocks, bonds, and deposits reached US$ 246 billion, around 58% of the foreign exchange reserves of Chinese Taipei at the end of September, 2015. Fortunately, Chinese Taipei has been able to maintain current account surplus, low external debt, high financial liquidity, etc. so that its economy is less vulnerable to external shocks, compared with other emerging market economies. This strength is recognized in the 2014 Monetary Policy Report of the Fed as well. Because of its solid economic fundamentals, Chinese Taipei did not encounter slow economic growth, mass capital outflows, and significant deprecation of the NTD exchange rate in the previous Fed tightening cycles which usually caused international capital to flee from the emerging markets and slow local economies.

The rest of the paper is organized as follows. Section 2 introduces the characteristics of capital flows in Chinese Taipei. The external impacts on capital flows and financial market in Chinese Taipei are presented in Section 3. The policy responses to capital flows in Chinese Taipei are discussed in Section 4. Finally, Section 5 concludes the findings and provides further extensions of this paper.

2. Characteristics of Capital Flows in Chinese Taipei

First of all, to follow the terminology of this SEACEN research project, the balance of payments identity in this article is employed below:

$$CAB = KAB = FDI + PFE + PFD + BMM + RES + DER,$$

where CAB is current account balance; KAB is capital account balance; FDI is foreign direct investment; PFE is portfolio equity investment; PFD is portfolio debt investment; BMM is bank and money market flows; RES is change in official foreign exchange reserves; and DER is derivatives.

Chinese Taipei enjoys current account surplus for a long period of time, which is consequently accompanied by a capital account deficit. Meanwhile, errors and omissions in the balance of payments of Chinese Taipei are trivial (Figure 1).[2] As a percentage of GDP, the balances of current account and capital account shrank from the peak in 1986, but rebounded since 1998.

Figure 1
Overview of Balance of Payments of Chinese Taipei (% of GDP)
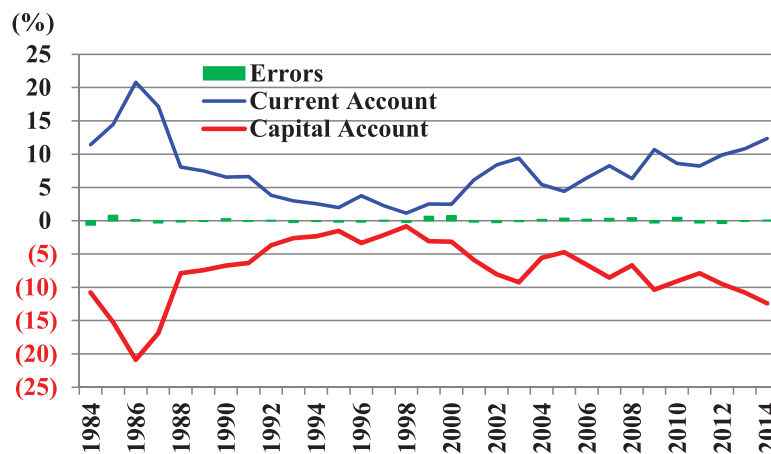
Source: Central Bank, Chinese Taipei.

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2. See Appendix for an illustration of the relevant statistics.

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Both the current account credits and debits gradually expanded in terms of GDP shares in the 2000s, which reached 77% and 64%, respectively, in 2014 from about 50% prior to 2000. Additionally, the current account surplus of Chinese Taipei climbed to a record high of US$ 65 billion in 2014, which was mainly contributed by strong merchandise export (Figure 2).

For the capital account of Chinese Taipei, the movements of resident and non-resident flows are nearly symmetric. It is interesting to find that both resident and non-resident flows decreased to around 0% of GDP in the global financial crisis of 2008, but they increased again after that. The ratio of the capital account deficit to GDP was 12% in 2014, the highest value since 1987 (Figure 3).

Figure 2
Current Account of Chinese Taipei (% of GDP)
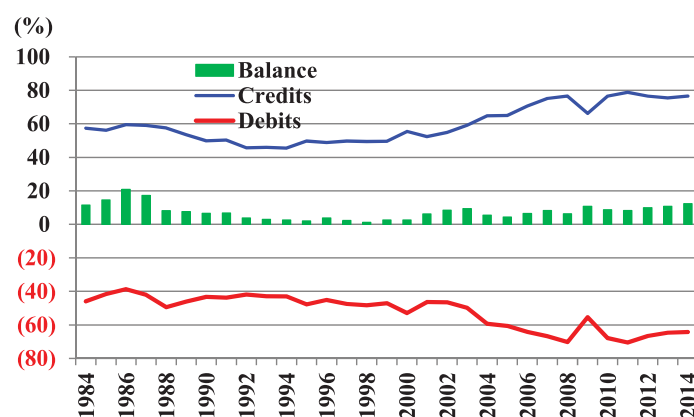
Source: Central Bank, Chinese Taipei.

The long-term net capital outflows from Chinese Taipei make it one of the key net creditors in the world. The net international investment position of Chinese Taipei climbed to US$ 957 billion in 2014, which was about 181% of its GDP. Compared with the number one global net creditor, Japan, the growing amount of Chinese Taipei rose to 31% of its net international investment position in 2014 (Figure 4).

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Figure 3
Capital Account of Chinese Taipei (% of GDP)
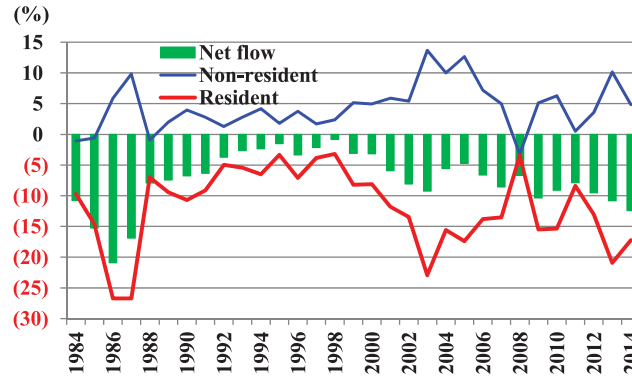
Source: Central Bank, Chinese Taipei.

According to the literature, there are several methods to measure the degree of openness to capital movements of an economy. For the cross-economy comparison in this SEACEN research project, a simple method of the openness index is applied to the capital account of Chinese Taipei, which is presented as follows:[3]

$$Flow\ Openness_{it} = \left[\frac{\left| resident\ flows_{it} \right| + \left| nonresident\ flows_{it} \right|}{\left| resident\ flows_{it} \right| + \left| nonresident\ flows_{it} \right| + \left| net\ flows_{it} \right|} - \frac{1}{2} \right] \times 200$$

Figure 4
Net International Investment Position of Chinese Taipei
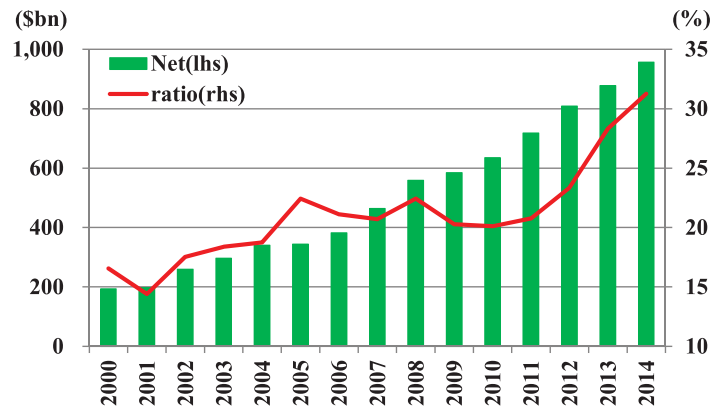
Source: Central Bank, Chinese Taipei.

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3. See Becker and Noone, (2009), "Volatility in International Capital Movements," Reserve Bank of Australia.

The openness index of the capital account of Chinese Taipei basically kept rising during the sample period, but was negatively impacted by external shocks (Figure 5).

Figure 5
Openness Index of Chinese Taipei (1)
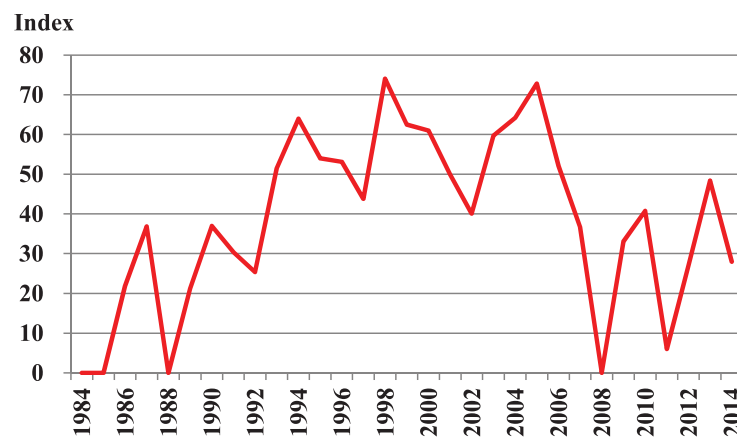
Source: Central Bank, Chinese Taipei.

This openness index was dragged down several times by the global financial turbulence, which caused either non-resident inflows to decrease or non-resident outflows to increase. The recent drop of the openness index in 2014 is due to emerging market instability triggered by weak commodity prices and the strong dollar. The index value declined to 28 in 2014, lower than the long-term average.

Following the same method, the openness indices of FDI, PFE, PFD, BMM, and DER, components of a capital account, are calculated to analyze the openness to capital flows of Chinese Taipei in more detail (Figure 6). It is observed that the values of these sub-indices vary from 0 to above 90. As a result, their averages can be easily skewed by extreme values.

Figure 6
Openness Index of Chinese Taipei (2)
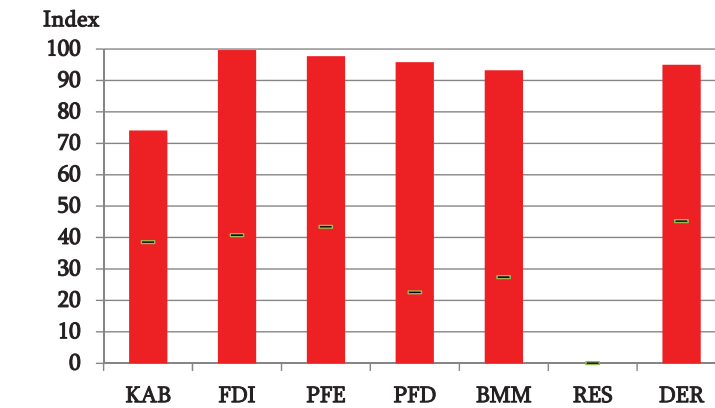
Source: Central Bank, Chinese Taipei.
Green-indicates the average of index value.

To take a closer look at the capital account of Chinese Taipei, the capital flows of non-residents and residents are decomposed below. For non-resident capital flows, the major components are the PFE and BMM during the sample period (Figure 7). As a percentage of GDP, they were 2.6% and 2.9% in 2014 respectively. It is found that the non-resident BMM has been very volatile, which is mainly attributed to the variation of two sub-components, i.e., currency and deposits and loans.

Figure 7
Liabilities of Capital Account of Chinese Taipei (% of GDP)

Source: Central Bank, Chinese Taipei.

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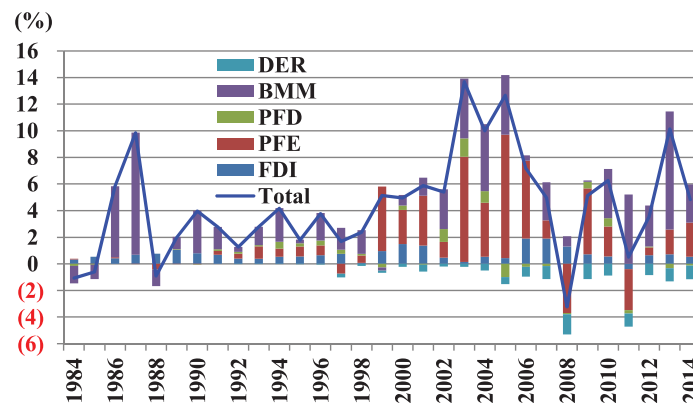
For resident capital flows, the main components are PFD, PFE and RES during the sample period (Figure 8). In 2014, their values were 6.9%, 3.9%, and 2.5% of GDP sequentially. The rising sizes of the PFD and PFE are attributed to more overseas investment from local life insurance companies, since the regulator in Chinese Taipei granted them wider access to the foreign market. Besides, a sudden jump of the BMM in 2013 was largely driven by the opening up of RMB deposit business onshore.

Figure 8
Assets of Capital Account of Chinese Taipei (% of GDP)
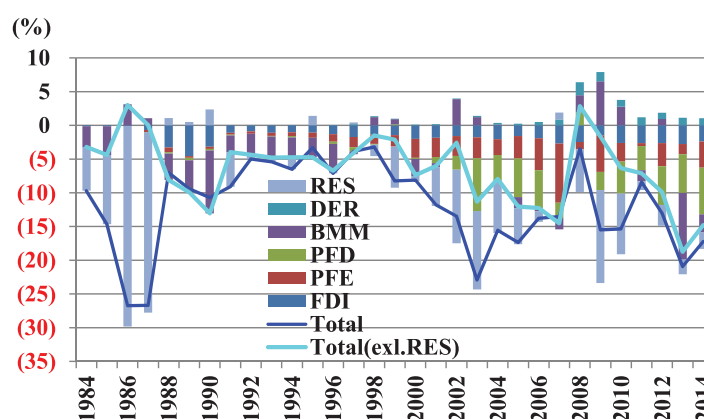
Source: Central Bank, Chinese Taipei.

3. External Impacts on Capital Flows and Financial Market in Chinese Taipei

Since the Fed will begin normalizing its policy rate sooner or later, it is useful to review how international capital flows in Chinese Taipei reacted to the previous Fed tightening cycles. After that, cross-border capital flows, especially short-term capital flows are examined to determine whether or not they have significant impacts on the NTD exchange rate and the local stock market in Chinese Taipei.

3.1 Directions of Capital Flows in Previous Fed Tightening Cycles

From mid-2014 to mid-2015, a substantial amount of capital flows poured out of the emerging market economies. This movement seriously worried the

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corresponding governments, including Chinese Taipei, that future interest rate normalization in the U.S. will deteriorate their financial stability and economic growth. Therefore, it is helpful to study whether or not Chinese Taipei experienced large capital outflows in the previous Fed tightening cycles.

Figure 9
Portfolio Equity Investment of Chinese Taipei (1994)
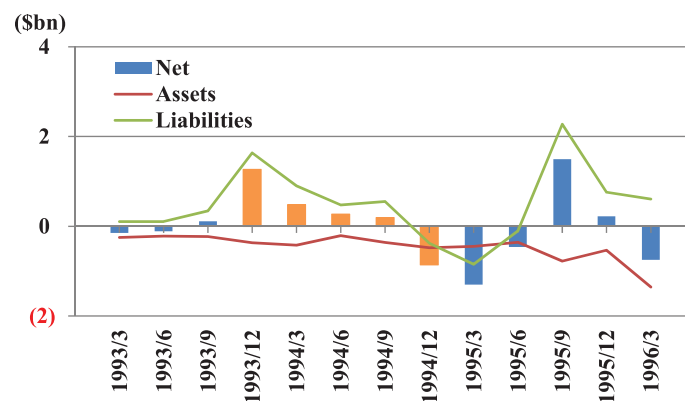
Source: Central Bank, Chinese Taipei.
Orange indicates the period of the Fed funds rate hike.

The Fed tightening cycles of 1994, 1999, and 2004 are taken as examples consecutively in the following analysis. Only the PFE, PFD, and BMM are discussed later, because FDI is relatively stable in Chinese Taipei and the DER is trivial. In the meantime, direction of the NTD exchange rate is studied as well during these cycles of the Fed funds rate hike.

In the Fed tightening cycle of 1994, the asset side of the PFE retained a stable outflow amount during this period, but inflow amount of the liability side of the PFE increased in the beginning of the cycle and then decreased gradually (Figure 9). The summation of the asset side and liability side shows a net inflow of the PFE to Chinese Taipei in this Fed tightening cycle.

Figure 10
Portfolio Debt Investment of Chinese Taipei (1994)
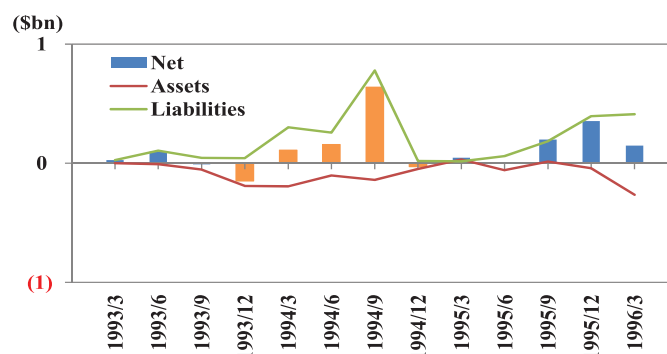
Source: Central Bank, Chinese Taipei.
Orange indicates the period of the Fed funds rate hike.

For the PFD of Chinese Taipei, both the assets and liabilities grew initially, but shrank at the end of the tightening cycle. The summation of the assets and liabilities shows that there was a net inflow of the PFD to Chinese Taipei during this period (Figure 10). For the BMM of Chinese Taipei, there is no clear sign that its assets or liabilities were influenced by the Fed's rate hike. Both of them moved symmetrically but with different direction. The summation of the assets and liabilities of the BMM indicates a net outflow of the BMM from Chinese Taipei occurred in the Fed tightening cycle of 1994 (Figure 11).

Figure 11
Bank and Money Market Flows of Chinese Taipei (1994)

Source: Central Bank, Chinese Taipei
Orange indicates the period of the Fed funds rate hike.

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For the NTD exchange rate, its nominal effective exchange rate (NEER) and real effective exchange rate (REER) were basically on the downward trend during this period. On the other hand, the NTD spot rate appreciated against USD from the beginning of the rate hike period, but depreciated against USD after the Fed stopped raising the policy rate (Figure 12).

Figure 12
NTD Exchange Rate (1994)
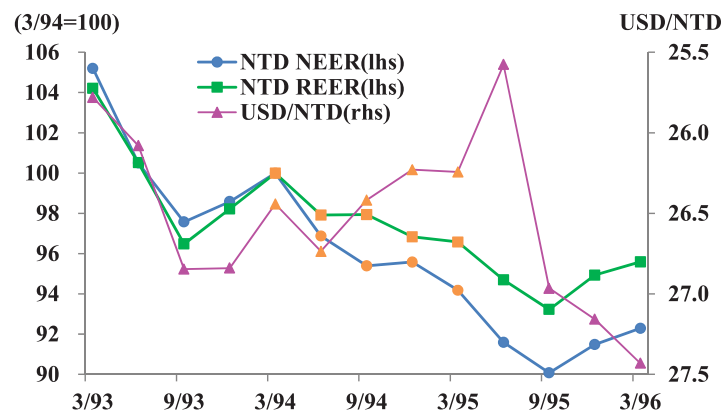
Source: Central Bank, Chinese Taipei.
Orange indicates the period of the Fed funds rate hike.

In the Fed tightening cycle of 1999, both the assets and liabilities of the PFE steadily increased from the beginning of the cycle, but they started to decline at the end of the cycle. In the aggregate, there was a net inflow of the PFE to Chinese Taipei during this period of the Fed funds rate hike (Figure 13).

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Figure 13
Portfolio Equity Investment of Chinese Taipei (1999)
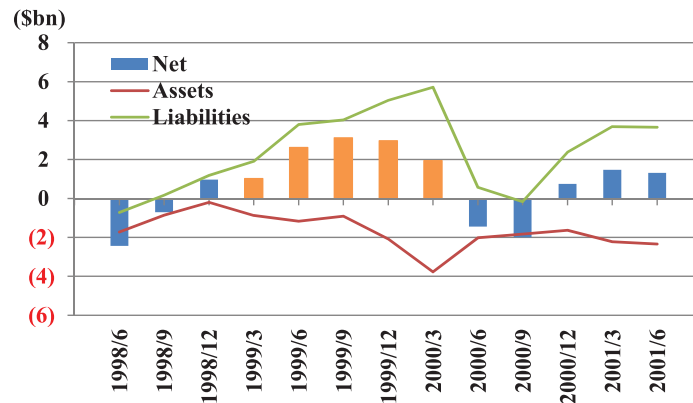
Source: Central Bank, Chinese Taipei
Orange indicates the period of the Fed funds rate hike.

For the PFD of Chinese Taipei, its assets and liabilities declined initially, but reversed at the end of the tightening cycle. The summation of the assets and liabilities of the PFD did not present consistent net outflows from Chinese Taipei in the cycle (Figure 14).
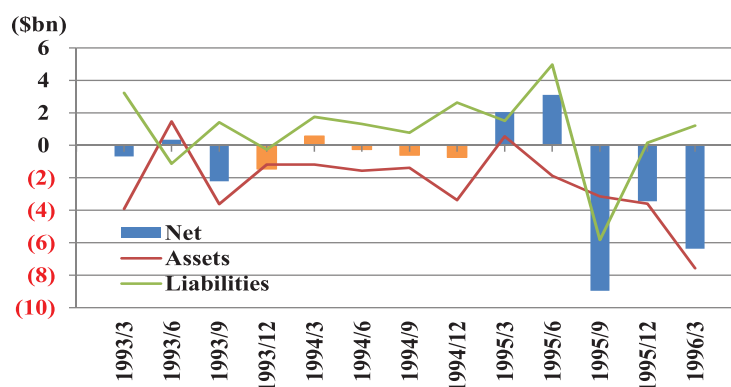
Figure 14
Portfolio Debt Investment of Chinese Taipei (1999)
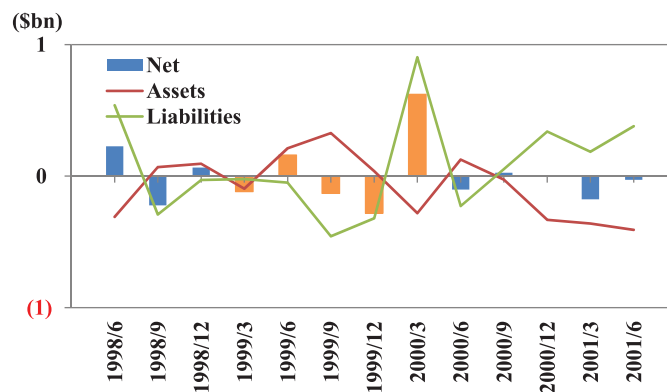
Source: Central Bank, Chinese Taipei
Orange indicates the period of the Fed funds rate hike.

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For the BMM of Chinese Taipei, the movements of its assets and liabilities were like random walk. It is found that no obvious flow direction of the BMM existed in this Fed tightening cycle (Figure 15).

Figure 15
Bank and Money Market Flows of Chinese Taipei (1999)
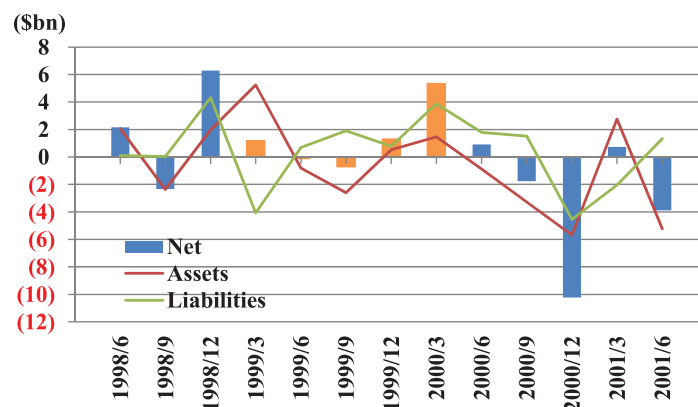
Source: Central Bank, Chinese Taipei
Orange indicates the period of the Fed funds rate hike.

Both the NEER and REER of the NTD exchange rate climbed from the beginning of the tightening cycle, and declined at the end of the cycle. The USD/NTD spot rate followed the similar trajectory during this Fed rate hike period (Figure 16).

Figure 16
NTD Exchange Rate (1999)
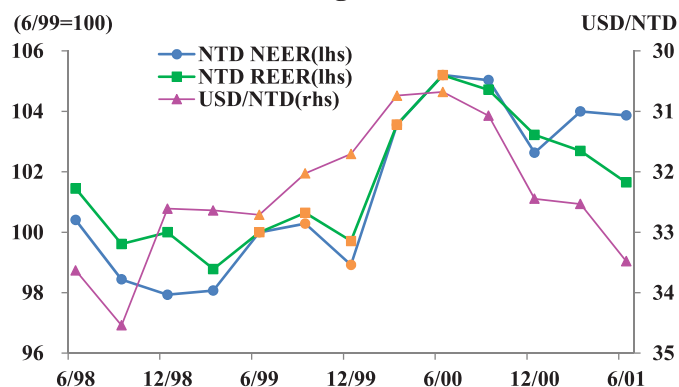
Source: Central Bank, Chinese Taipei
Orange indicates the period of the Fed funds rate hike.

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In the Fed tightening cycle of 2004, the liability side of the PFE diminished before the rate hike period, but then picked up in the midst of the period. Instead, the asset side of the PFE rose steadily without disruption during the rate hike period. The summation of the assets and liabilities of the PFE indicates that there was a net inflow of the PFE to Chinese Taipei during this period of the Fed funds rate hike (Figure 17).

Figure 17
Portfolio Equity Investment of Chinese Taipei (2004)
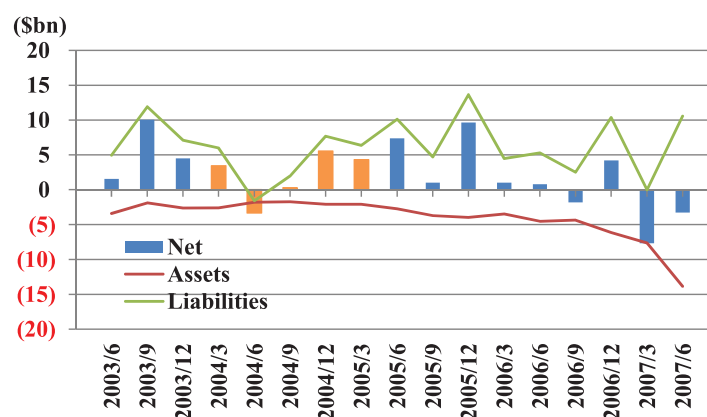
Source: Central Bank, Chinese Taipei
Orange indicates the period of the Fed funds rate hike.

For the PFD of Chinese Taipei, its asset side declined before the tightening cycle, but then rebounded in the middle of the cycle. On the other hand, the liability side of the PFD decreased gradually. Consequently, the summation of the assets and liabilities of the PFD shows that there was a net outflow of the PFD from Chinese Taipei during this Fed rate hike period (Figure 18).

For the BMM of Chinese Taipei, the movements of its assets and liabilities again did not show any clear sign in this Fed tightening cycle. As a result, the summation of the assets and liabilities presented that there was no consistent flow direction of the BMM to or from Chinese Taipei, even though the net amount as a whole was positive during this period of the Fed funds rate hike (Figure 19).

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Figure 18
Portfolio of Debt Investment of Chinese Taipei (2004)
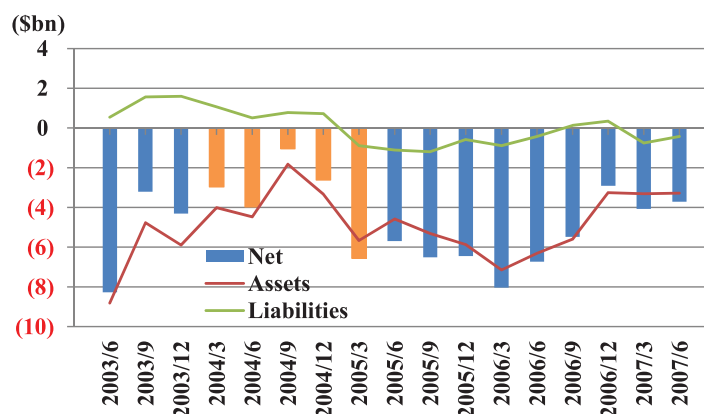
($bn)

For the NTD exchange rate, its NEER and REER rose from the bottom in the beginning of this tightening cycle, but both of them started to decline after around one year. Likewise, the USD/NTD spot rate followed a similar pattern as the effective exchange rates (Figure 20).

Figure 19
Bank and Money Market Flows of Chinese Taipei (2004)
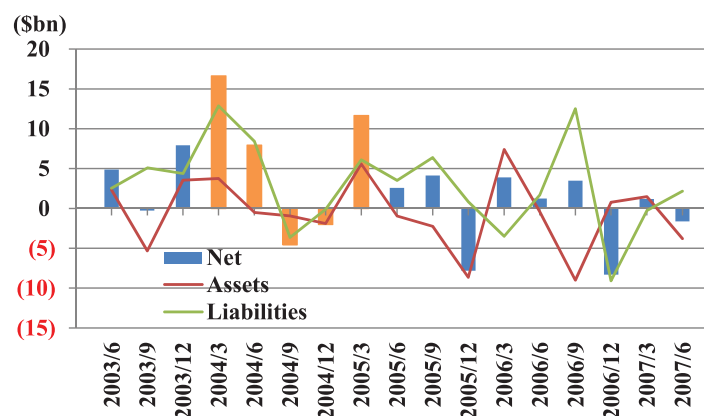
($bn)

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To sum up, there is little evidence to support that the Fed raising the policy rate would certainly cause international capital to flee from Chinese Taipei, according to the recent three episodes. For the PFE of Chinese Taipei, there were net inflows occurred most of time, which was contributed by larger inflows of the liabilities than outflows of the assets. For the PFD of Chinese Taipei, the net flows could be positive or negative; however, consistent net outflows from Chinese Taipei in the Fed tightening cycle of 2004 was attributed to the relaxation of overseas investment regulations, e.g., a higher upper limit of overseas investment for insurance companies. For the BMM of Chinese Taipei, it can hardly be concluded that there existed definitively net inflows or outflows brought by the Fed funds rate hikes.

Figure 20
NTD Exchange Rate (2004)
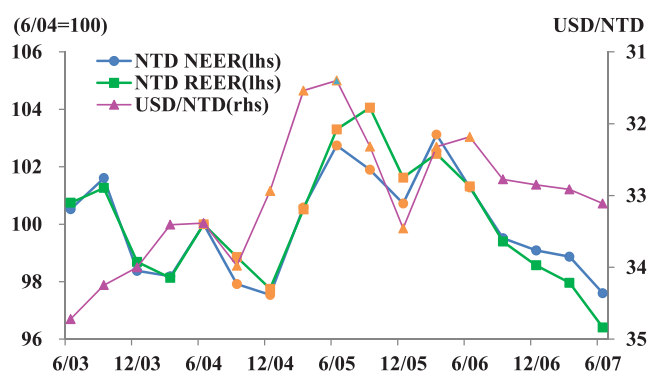
Source: Central Bank, Chinese Taipei
Orange indicates the period of the Fed funds rate hike.

In the three Fed tightening cycles, the NTD exchange rate generally weakened before the cycles. However, in the cycles of 1999 and 2004, the NTD exchange rate started to strengthen when the Fed funds rate was officially lifted, which was pointed out by not only its effective exchange rates, but also the USD/NTD spot rate. There are two possible explanations for the findings: one is that the participants in the NTD currency market usually overreact to the Fed funds rate hikes, and the other is that Chinese Taipei received net benefits of the US recoveries in these Fed tightening cycles, comparing export growth and interest rate differential.

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3.2 Foreign Investors' Influence on Local Currency and Stock Markets

As the capital account of Chinese Taipei continues to open up, capital flow management inevitably becomes a tougher task for the domestic authorities. Activities involving foreign portfolio investment had increased largely in the local currency market (Table 1). The share of foreign portfolio investment now stays around 20% of the NTD spot transaction. Besides, foreign currency deposits also play a crucial role in the local currency market. On the other hand, the share of international trade was down to 5.3% of the NTD spot transaction in 2013 from 52% in 1991.

Table 1
Shares of NTD Spot Transaction

(%)

	Foreign Portfolio Investment	Foreign Currency Deposits	International Trade
1991	0.4	8.6	52.0
1995	2.6	15.3	41.9
2000	12.5	21.2	19.4
2005	18.1	21.2	8.5
2010	22.1	22.7	5.6
2013	18.7	24.4	5.3

Source: Central Bank, Chinese Taipei

Cross-border capital flows have been a key factor in the volatilities of the NTD exchange rate and local stock market. It is found that the Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX) normally rises with the NTD appreciation when international capital flows in, and vice versa. This situation is not usual in many emerging market economies.

To present the correlation between international capital flows and local financial asset prices, a rolling correlation method is applied here. For the USD/NTD spot rate, the rolling correlation coefficient between its daily price and net foreign portfolio investment reached its peak, 0.63, in August 2011. After that, the rolling correlation coefficient dropped to the recent level, around 0.2 (Figure 21).

Figure 21
Rolling Correlation Coefficient (USD/NTD)
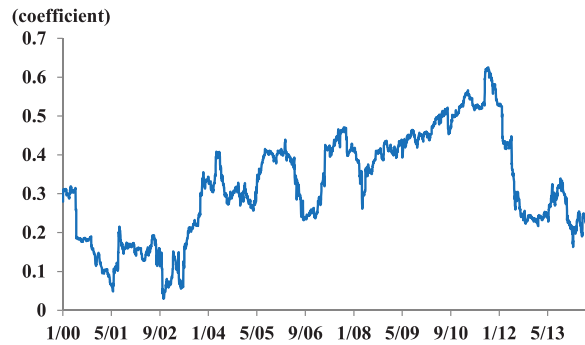
(coefficient)

Source: Central Bank, Chinese Taipei, Bloomberg.

For the TAIEX, the rolling correlation coefficient between its daily index value and net foreign portfolio investment climbed to its highest value, 0.71, in June 2012. Unlike the previous case of the USD/NTD spot rate, this rolling correlation coefficient maintained its value at around 0.65 (Figure 22). Because of high correlation presented above, it is found that the foreign investors often take advantage of the same direction of the TAIEX and the USD/NTD spot rate for short-term trading activities (Figure 23).

Figure 22
Rolling Correlation Coefficient (TAIEX)

(coefficient)
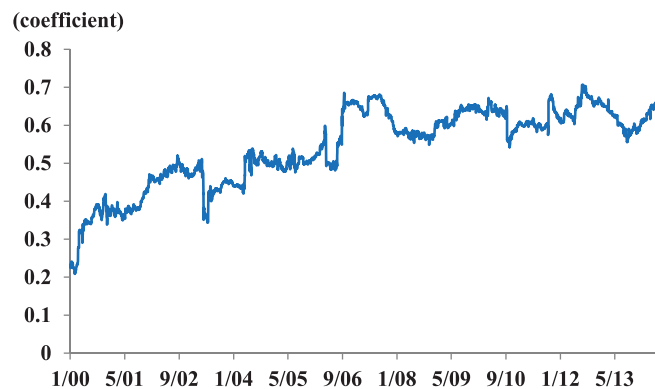
Source: Bloomberg.

Figure 23
TAIEX and USD/NTD
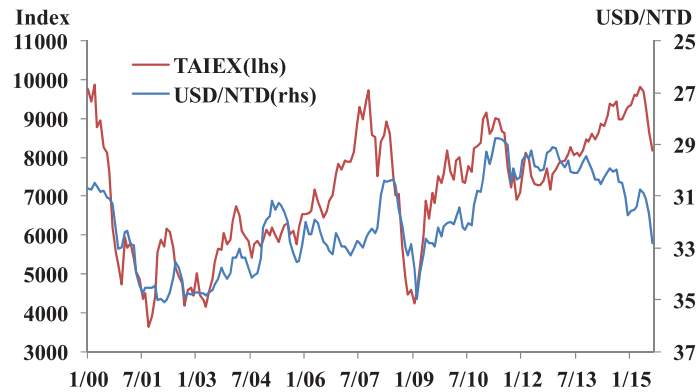
Source: Central Bank, Chinese Taipei, Bloomberg.

4. Policy Responses to Capital Flows in Chinese Taipei

Aiming at smoothing the international capital flows in Chinese Taipei, the Central Bank, Chinese Taipei (CBC) has initiated long-term measures and short-term tools. The objective of the long-term policy measures is to maintain sufficient flexibility of the NTD exchange rate in order to reflect the actual economic situation of Chinese Taipei. Therefore, it is easy to observe the two-way fluctuations of the NTD exchange rate over longer periods of time. Moreover, Chinese Taipei has been moving towards more balanced trade and providing domestic residents with wider access to overseas investment.

Chinese Taipei welcomes cross-border capital flows for direct investment or portfolio investment, but not currency speculation. In consequence, the CBC has adopted short-term policy tools to reduce the activities of speculators on the NTD exchange rate, especially after the 2008 global financial crisis. The major short-term policy tools are listed as follows:

1. Examine the final destination of cross-border capital inflows with their original declaration;

2. Raise the required reserve ratio of foreigners' NTD demand deposits exceeding their end of 2010 balances from 25% to 90%;

3. Constrain government bond holdings held by foreigners to less than 30% of their net capital inflows;

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4. Require foreigners' cash collateral of securities borrowing in USD, not NTD; and

5. Regulate offshore foreign investors participating in the domestic futures market to deposit margins in non-NTD currencies.

The policy responses mentioned above effectively lower the volatilities of the NTD exchange rate, which fulfills one of the CBC's operational objectives, i.e., maintaining the stability of the internal and external value of the currency (Table 2). The stability of the NTD exchange rate is highly praised by international rating agencies. Additionally, empirical studies, e.g., Lin, et al. (2012) prove that the NTD exchange rate shows anti-inflationary and counter-cyclical characteristics.

Table 2
Volatilities of NTD Exchange Rate

(%)

	Volatilities of Exchange Rates Against USD				
	NTD	KRW	SGD	JPY	EUR
2008-2011	5.80	15.65	6.91	10.98	13.34
2012-2014	4.46	8.79	6.60	8.76	8.90
	Volatilities of Real Effective Exchange Rates				
2008-2011	4.77	9.06	3.18	9.39	5.87
2012-2014	2.60	5.03	2.59	8.60	4.27

Source: Central Bank, Chinese Taipei, Bloomberg
Volatilities here are averages of annualized monthly standard deviations.

5. Conclusion

Based on the previous Fed tightening cycles of 1994, 1999, and 2004, this study is unable to conclude that the Fed raising the policy rate can result in a significant amount of international capital fleeing from Chinese Taipei, or the NTD exchange rate depreciating against USD. In other words, the Fed funds rate hike is not a sufficient condition of cross-border capital outflows or weakening of local currency for Chinese Taipei in the upcoming process of the US interest rate normalization.

The current consensus among the international community for cross-border capital flows is that governments should pragmatically regulate volatile short-term capital flows. The latest global financial crisis again proves that fast movement of international capital increases the instability of exchange rates and even throws them into disorder. Once the exchange rates are unable to function well in the international monetary and financial system, the local financial market and domestic economy of emerging markets will be badly impacted. This kind of impact could be persistent for quite a long time, and generally greater in the developed economies. Due to the harmful side effects of cross-border capital flows, international organizations suggest that governments should properly manage their capital accounts in order to reduce currency fluctuation. The 2011 Trade and Development Report of UNCTAD even supported the position that government intervention in currency markets is one of the policy options to prevent exchange rate misalignment. Besides, the 2013 IMF Policy Paper proposed a policy framework of capital flow management to assist governments in coping with unstable cross-border capital flows.

Especially after the 2008 global financial crisis, the central banks of the major advanced economies pursued unconventional monetary policies one after the other, such as quantitative easing, and zero or even negative policy rates to simulate their domestic economies. Those policies, on the other hand, created mass international capital to flow into the emerging markets. To prevent overheating in the local credit markets and future capital flight brought by the international capital inflows, many of these emerging market economies were forced to accumulate their foreign exchange reserves as a buffer. Besides, for better capital flow management, a spectrum of measures are provided by international organizations, including but not limited to reserve requirement for local currency deposits held by non-residents, limits on net open foreign currency positions of banks, limits on the ratio of banks' foreign currency loans and securities to foreign currency borrowing, capital requirements for foreign currency loans and derivatives of banks, levy on banks' non-deposit foreign liabilities, etc.

Because the non-residential capital flows can strongly influence the local financial market in Chinese Taipei, the authorities take the advice of the international organizations by implementing the appropriate macroprudential policies to lessen the negative impact of volatile capital flows. The outcome shows that the spillover effect from the major economies' unconventional monetary policies is successfully limited in the local financial market and domestic economy of Chinese Taipei. The effectiveness of the policies is highly recognized by the international community. For example, the United Nations Economic and Social Commission for Asia and the Pacific in its official document praised the

policies designed to manage capital flows since 2009 in Chinese Taipei, and Rodrik (2010) described this as a notable achievement.

The CBC applies the rule of leaning against the wind to reduce the volatility of the NTD exchange rate, and the technique of big data to enhancing capital flow management. By following the rule of leaning against the wind, as proposed in Drauwe, et al. (2006), the CBC smoothes the trend path of the NTD exchange rate to maintains its dynamic stability. By employing the technique of big data, the CBC is able to analyze high frequency data, which generates extra information on short-term capital flows. The CBC has been watching cross-border capital flows closely and principally let the NTD exchange rate be determined by the market. However, if the irregular factors such as short-term, big-volume fund flows and seasonal issues cause the currency to overshoot and lead to disorder, the CBC could step in to keep the foreign-exchange market in order.

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Composition of the Balance of Payments of Chinese Taipei

Current Account

($bn)

500
400
300
200
100
0
(100)
(200)
(300)
(400)

Balance
Credits
Debits

1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014

Capital Account

($bn)

60
40
20
0
(20)
(40)
(60)
(80)
(100)
(120)

Net flow
Residents
Non-residents

1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014

Foreign Direct Investment

($bn)

10
5
0
(5)
(10)
(15)
(20)

Net flow
Residents
Non-residents

1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014

Portfolio Equity Investment

($bn)

40
30
20
10
0
(10)
(20)
(30)
(40)

Net flow
Residents
Non-residents

1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014

Portfolio Debt Investment

($bn)

20
10
0
(10)
(20)
(30)
(40)

Net flow
Residents
Non-residents

1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014

Bank and Money Markets

($bn)

60
40
20
0
(20)
(40)
(60)

Net flow
Residents
Non-residents

1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014

Reserves

Derivatives

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Chapter 10

**LIVING WITH CAPITAL FLOW VOLATILITIES:
THE CASE OF THAILAND**

By
Chanaporn Sereevoravitgul[1]
Pim-Orn Watcharaprapapong[2]

1. Introduction

International financial integration allows an economy to leverage through greater pool of financial resources and possible spillover of technological advancement.[3] However, it also comes at a cost of exposure to financial shocks. The outcome of the Asian financial crisis in 1997 stemming from vulnerabilities in Thailand's economy is a reminder of how grave the cost can be, despite decades of benefits.

Yet, Thailand has continued to gradually open its external sector, while strengthening its financial structure and ensuring financial stability. The country has foregone a fixed exchange rate regime and adopted a managed-float exchange-rate regime under flexible inflation targeting. Transformations in the banking and financial sectors also have been made through a series of financial sector master plans and development in the stock exchange market and bond market. Memories of the crisis have been strongly embedded in the private sector's management culture, leading to better financial risk management. Given the limited exposure of Thailand to the international financial complexities prior to 2008, the country was only mildly affected during the sub-prime global financial crisis.

Nonetheless, Thailand's financial market after 2008 is a different story. Given higher integration into the global market, transmissions of external risks into the domestic market have become unavoidable. Policy changes in the major economies, economic data releases, and key events across the globe are constantly interpreted and incorporated into investors' decision making. Given that information can be transmitted throughout the world within a second, a single piece of news can cause *volatilities* in international financial flows in Thailand. Rising volatility of financial flows, therefore, has become a major concern for the policy maker.

Consequently, this paper aims at creating a better understanding of the volatilities of financial flows, or hereafter called 'capital flows'[4], by examining the case for Thailand – a small, open, emerging market economy. Stylized facts of different components of Thailand's capital flows are presented in Section 2. Next, Section 3 analyses the trends in capital flow volatility and the role of international reserve in reducing the total volatility. Section 4 evaluates the vulnerabilities in each component of the capital flows in Thailand when the Federal Reserve (Fed) starts its monetary policy normalization. Finally, Section 5 concludes by discussing the policy implications for central banks.

2. Capital Flows Anatomy: Trend and Its Components

In order to understand capital flows, we begin by revisiting the key concept of Balance of Payments (BOP) and the identity.[5]

$$BOP \equiv CAB + KAB \equiv 0$$
$$|CAB| \equiv |KAB|$$
$$|CAB| \equiv |KAB| \equiv |FDI + PFE + PFD + BMM + DER + RES|$$

_____

4. The term 'capital flows' has been broadly used in the academic literature a referring to the flows of financial transactions such as international investment in the stock markets and bond instruments. However, this particular term has been redefined by the IMF's Balance of Payments Manual (6th edition) to refer to acquisition of, or disposal of, non-produced, non-financial assets or capital transfer. The flow of financial assets is actually called Financial Account Balance, but in this paper we shall use the term 'capital flows' in congruence with previous academic study.

5. By accounting definition, the BOP has to be balanced and equal to zero. There are two accounts under the BOP, according to the double-entry bookkeeping standard, namely Current Account Balance (CAB) and Capital Account Balance (KAB). Since BOP is technically equal to zero, CAB must equal KAB in their absolute terms. The CAB records economic flows of trade in goods and services and flows of transfers. The KAB records financial flows that finance the economic flows in the CAB.

This paper will focus on the capital account balance (KAB) and will classify it into six broad subcomponents:

(1) Foreign Direct Investment (FDI),

(2) Portfolio Equity Investment (PFE),

(3) Portfolio Debt Investment (PFD),

(4) Bank and Money Market Flows (BMM),

(5) Derivative Flows (DER), and

(6) Change in Official Foreign Exchange Reserves Flows (RES).

The first five subcomponents together represent the Private Capital Balance (PKB). We employed the International Monetary Fund's Balance of Payments[6] data on Thailand's key capital flows in this study. We also normalized them with the gross domestic product (GDP) from Thailand's National Economic and Social Development Board. The illustration of flows in CAB, KAB, and all six components are shown in Appendix 1. For each sub-component, we show net flows, gross flows of assets – representing flows of Thai residents (R), and gross flows of liabilities – representing flows of non-residents (NR).

2.1 General Observations: CAB, KAB, and S-I Gap

The first observation is that the *gross* flows of KAB, around 10-20% of the GDP, are dwarfed by gross flows of the CAB, at 70-80% of the GDP, as shown in the top two charts of Appendix 1. This shows different levels of integration in the trade versus financial markets, and may imply limited development in the financial markets as well as regulations imposed on international capital flows. Such characteristic also applies to many other emerging market economies.

The net flows of the CAB and KAB are presented in Chart 1. Prior to Asian financial crisis in 1997, Thailand was under fixed exchange rate and experienced a CA deficit which reflected high domestic investment. Buoyant investment was financed by lower-cost funding from abroad through the existence of the Bangkok International Banking Facilities (BIBF). The influx of funds that

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6. We adopted the definition of the Balance of Payments Manual (5th edition) where positive flows represent inflows and negative flows represent outflows. As for the data under BOP Manual (6th edition) under assets side, we have transformed them by multiplying minus one (-1) to the series in compliance with the definition of the previous version.

contributed to 10%-of-GDP KA surplus had ultimately gone to the less productive sectors, particularly real estates. During and after the Asian financial crisis, both the CAB and KAB reversed abruptly reflecting a plunge in domestic investment. Thus, Thai residents became net savers (Chart 2) and capital exporters. Interestingly, the continuous trend in the CA surplus was disrupted in 2005 due to high oil import bills and the continual surplus was unclear after the 2008 global financial crisis. This reflected a narrowing gap between savings and investments.

Chart 1	Chart 2
Current Account Balance and Capital Account Balance	**Savings and Investments in Thailand**
Source: IMF.	Source: National Economic and Social Development Board.
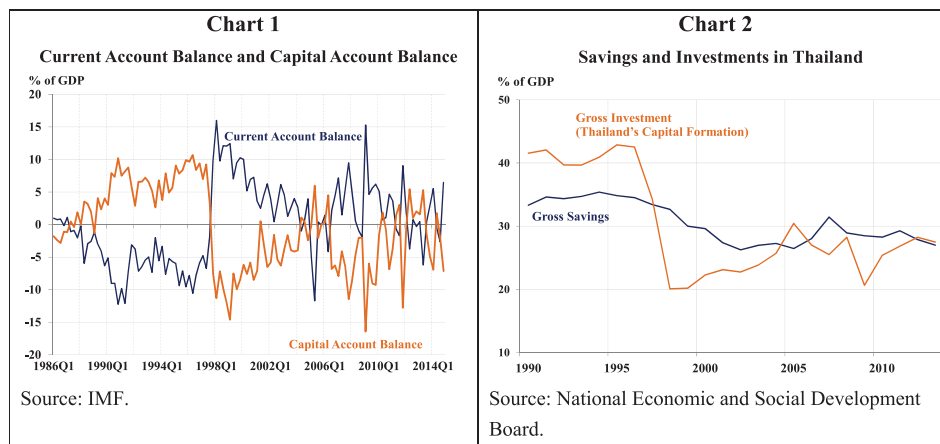
By decomposing the gross NR and R flows into each sub-component in Charts 3 and 4, we observe that the compositions of the NR and R flows are different and changing overtime.

2.2 The Non-residents Flows (NR)

The compositions of NR flows prior to the 1997 crisis were mainly BMM flows, with increasing portion of PFE and PFD at each episode of economic development. During 1990 – 1996, BMM recorded an average flow of 7.9% of the GDP and peaked at 20% of the GDP. This represented large borrowing from abroad, channeled in via the BIBF, to fuel the growing "Thai-ger". The fundamental currency mismatch and maturity mismatch of debt in the banking sector led to banking crisis once the exchange rate was floated. The debt crisis in the banking sector caused extreme outflows mainly in BMM, representing reversals of the mentioned foreign loans. Thailand spent the following decade repaying the ballooned debts, as the notional amount of debt doubled when the exchange rate sharply depreciated. Such debt repayment was shown by massive negative flows of BMM during 1997 – 2003.

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Chart 3
Non-Residents (Liabilities) Gross Capital Flows

% of GDP

FDI PFE PFD BMM DER ——KAB

1997 crisis   2008 crisis   2011 flood   2013 taper tantrum

Source: IMF.
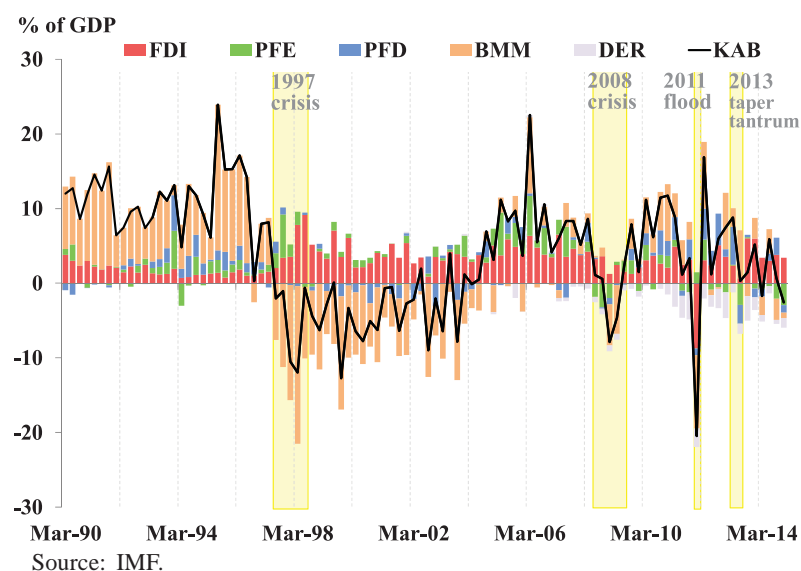
Chart 4
Residents (Assets) Gross Capital Flows

% of GDP

TDI PFE PFD BMM DER RES ——KAB

1997 crisis   2008 crisis   2011 flood   2013 taper tantrum

Source: IMF.

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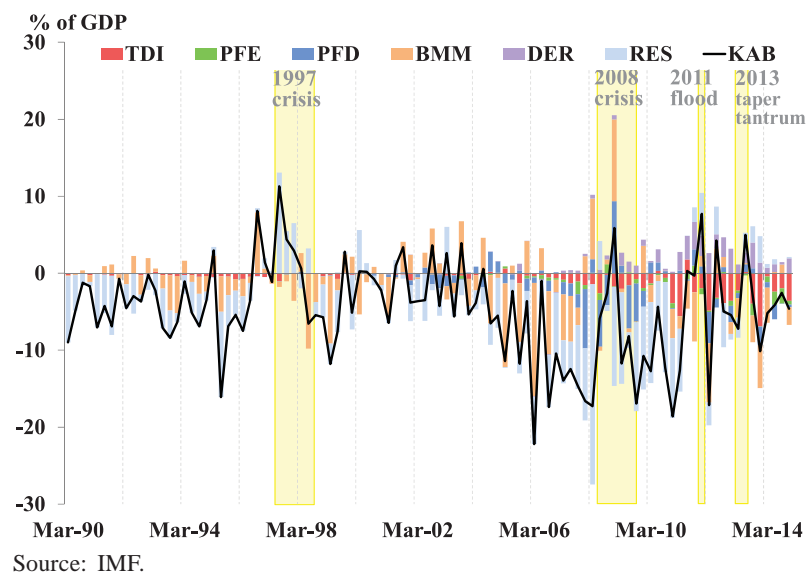
Exchange rate depreciation helped the Thai export recovery. The international corporations recognized growth opportunities from the weak currency, expanding exports, on-going long-term projects, merger and acquisitions activities, as reported by (Siamwalla, et al., 1999), and government incentives later on. These factors had led to a steady increase in the FDI after the 1997 crisis, despite the on-going legacy of the financial crisis. The FDI flows mainly came from Japan, United States, Hong Kong and Singapore, and were mostly invested in automobile, electronics and electrical appliances, and chemical industries. Thailand benefited from these export-related FDI until recently.

As for the flows of PFE, we observe increasing inflows prior to the 1997 crisis, as seen from Appendix 1, followed by some net outflows after the crisis. It is worth noting that NR eventually contributed to positive inflows which corresponded to a net-buy position in Thailand's stock market, once the index was slashed by more than half of pre-crisis level. Arguably, the stock price was undervalued relative to the country's fundamentals at that time. After the decade of repayment, the PFE expanded as the economic fundamentals and financial markets in Thailand had been improving. Unlike the PFE, the PFD reversed to net outflow position for a few years after the 1997 crisis. Both the PFE and PFD reversed slightly during the 2008 crisis, similar to most of the economies in the world at that time, as investors had become more risk-averse and shifted their investment to safe havens. Sizable outflows in the PFE and PFD are also observed during the taper tantrum episode in 2013.

Interestingly, despite beliefs that the FDI is persistent and unlikely to reverse, it did turn negative in a particular quarter of 2011Q4 due to the deterioration of confidence following the great flood that affected several manufacturing hubs and agricultural acreage in central Thailand. Aside from shutdowns and damages of industrial parks, logistics and transportation by land in that area were largely paralyzed. The Bank of Thailand (BOT) estimated the impact of the flood to be approximately 2% of the GDP in that quarter. The global supply chains, in particular in the electronics industry, whose production was severely disrupted, realized the risks that came with large exposure in Thailand. As a result, a number of the multinational firms decided to relocate some parts of their current and planned manufacturing facilities outside of Thailand to diversify the risk. Unlike the financial crisis in 1997 and 2008, the great flood was a blow to the country's economic fundamentals instead of to the financial market, and was more specific to Thailand. The sharp reversal was, fortunately, a one-quarter impact once the confidence had been somewhat restored.

Throughout Thailand's records of NR capital flows, we observe changes in the leading flows and vibrant movements in all the components, as they responded to the domestic and international factors. It can also be concluded that *all types of flows can reverse* – depending on which types of shock the economy faces.

2.3 The Residents Flows (R)

Compared to the NR flows, the R flows were relatively smaller and several sub-components only became visible in the 2000s. Prior to the year 2000, the capital net outflows of residents were mainly driven by RES, as a result of the fixed exchange rate regime, and BMM flows, which reflected promotion of the BIBF at that time. During the 1997 crisis, the international reserve was used to stabilize the exchange rate, as reflected by positive RES flows. Meanwhile, the BMM flows were almost halted, reflecting financial disintermediation.

The capital flows of private residents started to rise after 2002, partly revealing the restoration of the financial economy and improved fundamentals. Initially, the portfolio investments, both PFD and PFE, increased as mutual funds sought investment opportunities abroad. Also, outward direct investment (Thai Direct Investment: TDI) started to rise as the resident companies expanded operations and sought price competitiveness abroad, in response to the domestic labor shortage and rising wages. It is also worth noting that the outflows of TDI continued during the 2011 great flood in Central Thailand and 2013 taper tantrum episode.

The changing compositions of the resident capital flows also reflect the series of capital liberalization measures. The key actions are summarized in Table 1. While the NR flows had been liberalized for several decades, the flows on the residents' side were more gradually relaxed, starting with direct investment, banking flows, and portfolio investment flows. The increasing role of each component shown in Chart 4 could roughly be traced to each key action shown in Table 1. Perhaps the most prominent change, in fact for both R and NR flows in this case, in capital regulations was with the DER, which became more noticeable after the 2010, clearly seen in Appendix 1. As private resident flows were allowed to play larger roles, the private NR and R flows became more balanced, and the official RES flows subsided as expected.

Currently, Thailand continues to carry out the subsequent phases of the capital liberalization master plan (BOT, 2015). The key actions planned include the relaxation of foreign exchange regulations, such as allowing residents to freely purchase up to US$5 million worth of foreign currencies for deposit with

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domestic financial institutions, allowing residents to invest in securities abroad through onshore banks, allowing foreign corporations to borrow Thai baht from domestic financial institutions under certain conditions, as well as relaxations of regulations on corporate treasury centers. These movements should add to more dynamism in R flows going forward.

<div align="center">

Table 1

Key Development in Capital Liberalization in Thailand

</div>

Year	Measures or Actions	Flows Affected
1991	Allowed Thai resident firms to have TDI and allowed Thai residents to have foreign currency deposit accounts.	TDI, BMM
2002	Allowed mutual funds to invest abroad up to US$200mn total per year.	PFD, PFE
2003	Expanded types of institutional investors that can invest abroad, namely (1) government pension funds; (2) social security funds; (3) provident funds; (4) mutual funds (excluding private funds); (5) insurance companies; and (6) specialised financial institutions. Certain types of securities were allowed to invest under BOT's approval.	PFD, PFE
2007	Expanded amount of investment or lending of Thai companies to its parents, subsidiaries, or affiliated companies up to US$100mn. Allowed additional unlimited investment abroad of companies listed in the Stock Exchange of Thailand (SET) with positive net worth.	TDI
2008	Allowed retail investors to invest in securities abroad through securities companies and provident funds.	PFD, PFE
2010	Allowed all Thai companies to freely invest abroad. Allowed institutional investor to freely unwind hedging position.	TDI, DER
2012-2013	Introduced the Capital Account Liberalisation Master Plan. Mainly relaxed foreign exchange regulations in four major areas. (1) TDI: allowed individual residents to freely invest abroad, (2) PFD and PFE: expanded types of institutional investors allowed to invest abroad, lifted investment ceiling per investors, expanded choices of permitted types of securities (3) BMM: unlimited amount of foreign currency deposit accounts are allowed to be opened at domestic financial institutions to facilitate international payments of imports or other obligations. (4) DER: allowed Thai residents hedging overseas investment to freely unwind foreign currency hedging of capital transactions.	TDI, PFD, PFE, BMM, DER

Source: Bank of Thailand (BOT, 2012).

3. Volatility of the Capital Flows

With developments in the Thai financial markets and increasing international financial integration, especially on the residents' part through capital liberalization

measures, the capital flows have become more volatile. Against this backdrop, this section investigates the volatilities of different types of capital flows in Thailand. In particular, it seeks to identify whether the volatility of the flows are offsetting or amplifying each other in their nature.

To measure volatility, we start with the capital flows per GDP and adopt the eight-quarter, i.e., two-year, rolling standard deviation of the capital flows per GDP in accordance with (Claessens and Ghosh, 2013).[7] We applied the measures for residents, non-residents, and net flows of the total capital flows and the sub-components. The results are shown in Chart 5, with particular attention drawn to the difference in the scales of each panel.

Chart 5
Volatility of Capital Flows by Components

Rolling S.D. of flow per GDP (2-years rolling window)
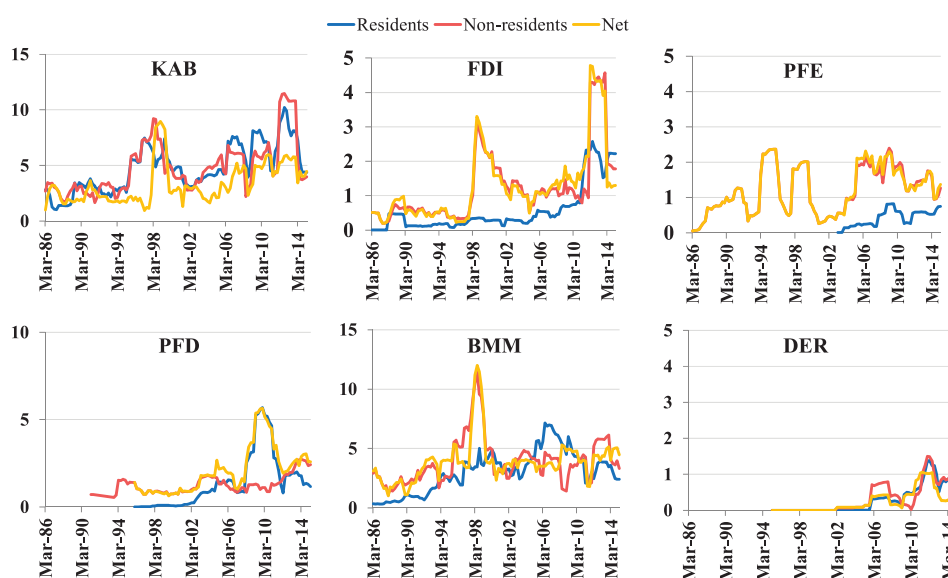
Source: IMF and NESDB calculated by authors.

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7. More sophisticated ways of calculating volatilities were used by (Bluedorn, et al., 2013), (Broto, et al., 2008), and (Alfaro, et al., 2004)

3.1 Volatility of Each Capital Flows Sub-component

Volatilities of each type of flows show spikes from time to time – indicating sudden (stop of) inflows or outflows in each sub-component. Together, they contribute to volatility of the KAB. Relatively low volatility in net KAB prior to 1997 crisis reflects the fixed exchange rate regime. The volatility of non-resident BMM flows dominated the overall volatility of gross KAB prior to 1997. In retrospect, this was a signal of the looming crisis. There was also a jump in the volatility of the FDI during this crisis. The post-1997 period saw a short phase of lower volatility, which started to pick up after 2002. Such pick up was due in part to the revitalized PFE and the rising FDI.

In terms of R versus NR flows, it is evident that most of the volatility in the net flows arose from that of the NR flows throughout the whole period – as the yellow lines in Chart 5 tend to be in tandem with the red lines. This reflects lower capacity of and some restrictions on the residents' flows. The exception was in the case of the PFD that peaked in 2010, when retail investors were mounting investment in securities abroad. This was prompted by the liberalization that allowed them to invest through the security companies and provident funds since 2008. However, such trend was reversed when the global financial crisis broke out and the risk-off sentiment kicked in. This resulted in dramatic changes in the PFD and anomaly in the volatility generated from the residents. Another anomaly worth mentioning was the case of the FDI during 2011, when the floods in the central part of Thailand triggered reversals of non-residents investors.

3.2 Why is the BMM so Volatile?

When comparing the volatility among the sub-components, the BMM has the highest volatility on average. Its rolling S.D. exceeded the level of 10 during the Asian financial crisis. Meanwhile, the volatilities of the other components hardly ever reached above the scale of 5. Interestingly, Bacchetta and Van Wincoop (1998), who studied financial liberalization and capital flow volatilities in the emerging market economies including Thailand, found that countries with financial liberalization tend to experience high volatility and overshooting effects during the initial periods. This was the case in Thailand during the 1990s liberalization in BIBF. However, the BMM volatilities remained relatively high throughout the following decades and variation between the flows of R and NR arose from 2005 onwards. Thus, we further decomposed the BMM, using the BOT statistics, to see which flows were responsible for the volatility. There are

three main components in the BMM, namely, loans, currency and deposits, and trade credits. The first two items show banking related activities, while the latter one represents flows not through banks, but through trade credits of exporters and importers. The results are shown in Charts 6 and 7.

Chart 6	Chart7

Source: BOT.
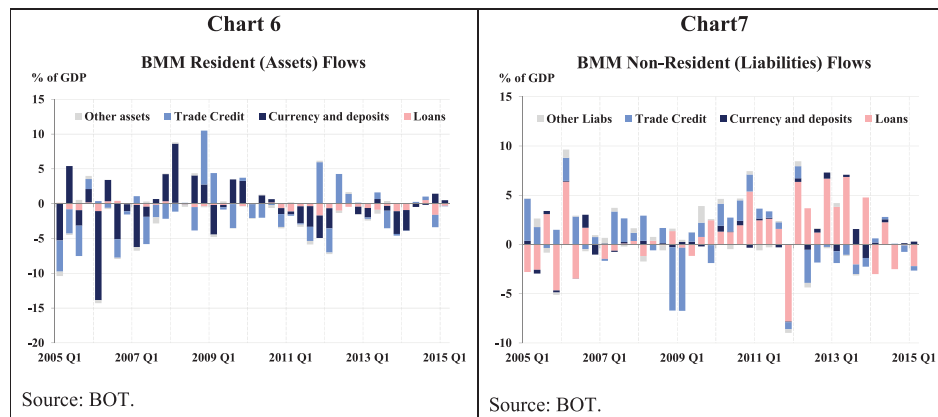
It can be seen that trade credits contributed a significant portion to both the R and NR flows. The volatile trade credits depend on trade activities, which explain part of the volatility in the BMM flows. Moreover, hedging transactions of export-import also contributed to fluctuations of the BMM, as Thaicharoen and Ananchotikul (2008) have pointed out. Substantially, flows of currency and deposits contributed to the assets side especially prior to the 2008 crisis, while loan flows contributed to the liabilities side after the 2008 crisis. The fluctuations in the BMM in relation to hedging transactions are shown in Charts 8 and 9. This behavior could be interpreted partly as a result of BOT's regulation to limit the financial institutions' foreign exchange position at day-end.[8] When exporters sell foreign currency in advance to the financial institutions, the financial institutions have a net positive foreign exchange position and thus are exposed to currency risk immediately, even though the hedging transaction is due in three months. At the end of the day, if the net foreign exchange position of the financial institutions exceeds the limit, then the financial institutions have to *square* the position. This can be done by withdrawal of currency and deposits from abroad

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8. The BOT requires financial institutions to have foreign exchange position limit at the end of the day: (1) no more than 15% of the institution's capital for each single foreign currency, and (2) no more than 20% of the institution's capital for all foreign currencies.

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or creating borrowing position from abroad. Such transactions would match the incoming foreign currency and net out the position. Another interesting observation is that the financial institutions appear to shift their behavior from squaring the position via currency and deposits account, before 2008 crisis, to loans from abroad after the crisis. This observation can be explained by the running down in currency and deposits accounts abroad. The relatively lower interest rates in various regions of the world compared to that in Thailand potentially explain this change in behavior.

An important implication from the BMM volatility is that an instrument designed to help smooth the flow, with inappropriate applications, can actually add to the volatility. We can observe from Charts 8 and 9 that the exporter hedging flows per GDP were not that stable, while we know that the trading activities were less variable. This implies that exporters did not consistently hedge at all times, and more likely hedged only when they expected the exchange rate to move in unfavorable directions. As the expectation justifies itself, the herding behavior originating from the same market information and perception will lead to amplification in the hedging behavior. On this kind of day, the end-of-the-day regulation just turns expectation into reality. It is, therefore, critical to enlighten the market participants that hedging instruments will work best once it is used consistently and it is rather harmful in a wrong application.

Chart 8
BMM Assets and Exporter Hedging Flows

Chart 9
BMM Liabilities and Exporter Hedging Flows

Source: BOT.
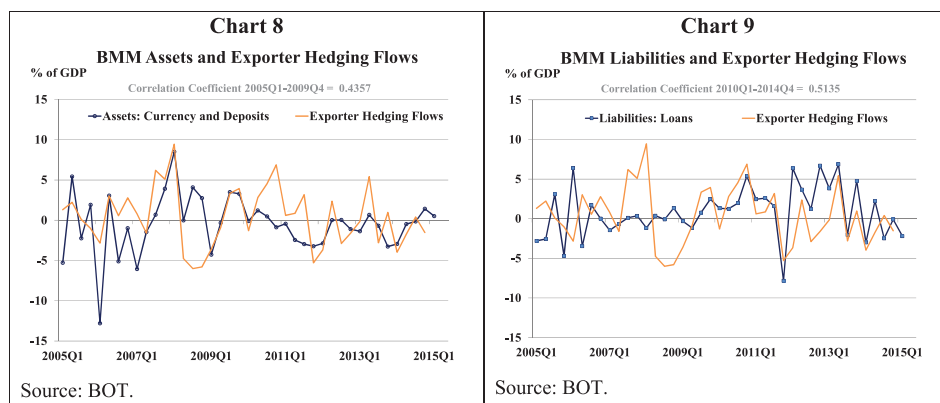
3.3 Amplification of Volatilities in Sub-components of KAB

It appears that the overall KAB volatilities were higher than that of each sub-component, indicating an amplification effect from the sub-components. Therefore, we analyze the Pair-wise Correlation Coefficient of the volatilities

of each flow. The summary of the result is shown in Table 2. The full results of all assets, liabilities, and net flows correlations are shown in Appendix 2.

It is not surprising that the correlation between the CAB and KAB is extremely high, as one is a reflection of another according to the BOP accounting definition. Similarly, the correlations between the KAB and its components are all significant, as shown in the second column, because the components add up to the KAB.

Table 2
Correlation Coefficients between Volatilities of
Sub-components of Net Flows

	(1) CAB	(2) KAB	(3) FDI	(4) PFE	(5) PFD	(6) BMM	(7) DER
CAB	1.0000						
KAB	0.8644*	1.0000					
FDI	0.4376*	0.6315*	1.0000				
PFE	0.5270*	0.4146*	0.2895*	1.0000			
PFD	0.3414*	0.3413*	0.2930*	0.4479*	1.0000		
BMM	0.6258*	0.5543*	0.2397*	0.3794*	0.1141	1.0000	
DER	0.0251	0.4629*	0.5266*	-0.2422	0.0887	-0.3573*	1.0000

Note: star (*) shows statistical significance of correlation coefficient at 5% level of confidence.

The first simple observation from the table is that most of the correlations are positive, proving that there is some amplification of volatility. Another useful inference is that the volatility in the FDI is significantly correlated with volatilities of the other sub-components. As the net FDI flow is mainly driven by the NR, this could imply that similar fundamentals that drive the FDI flows are also driving the other flows into and out of the country. These factors may include domestic economic growth prospect, interest rate differentials, or other external factors, such as the global investment appetite towards the emerging markets.

The PFE also has high and significant correlations with the PFD, suggesting a possibility that investors used these assets to diversify their portfolios. The DER flows are significantly correlated with two items: positively correlated with the FDI and negatively correlated with the BMM. This may imply that investors in the FDI, who generally are longer-term investors, normally hedge some foreign exchange risks; or more likely that the flows of loan in the form of FDI create the needs for foreign exchange derivatives to mitigate the risk. Most of the

hedging transactions can be done through banks, and the negative correlations in volatility of DER and BMM show substitutability between both the channels.

3.4 Role of International Reserves in Offsetting Volatility

From the top left figure in Chart 5, we could see that the overall volatilities of the gross R and NR flows of the KAB were higher than that of the KAB net flow, as the yellow line of the net flow tends to be lower than the red and blue lines. This signifies that the volatility of the R and NR flows of the KAB were offsetting each other to some extent. The offsetting effect was evident especially prior to the 1997 crisis and after 2008 crisis. We, therefore, divided the time frame into three periods according to the two crises and simplified our analysis by calculating a single standard deviation of volatility of capital flows in each period. The results are illustrated in Chart 10. We could see that the volatility of the PKB, the light blue line, is relatively high at above the scale of 5, whereas the total KAB, the black line, has relatively lower volatility for all three periods. High volatility in changes in the RES flow is also evident. This shows that volatility of the RES had offset that of the PKB and led to lower volatility in the overall net KAB. To paraphrase, it can be implied that the official reserves changed rapidly at the time when private capital flows became volatile.

Chart 10

Volatility of Net Capital Flows in Thailand

Sources: IMF and NESDB. Authors' calculation.

Table 3

Thailand's Economic Development

(Average)	80-97	98-08	09-14
GDP (Bn US$)	85	160	270
GDP growth (yoy)	5.5	4.8	3.1
FX (USDTHB)	25.31	40.14	32.03
CAB/GDP	-5.0	4.6	2.3
(X+M)/GDP	79	130	134
KAB/GDP	4.8	-4.9	-3.0
Reserve (Bn US$)	31*	49	162

Sources: IMF, NESDB and BOT. Authors' calculation.
*Average Reserve from 1993-1997.

Chart 10 and Table 3 reveal some interesting facts about a possible negative relationship between financial volatilities and real economic growth in the case of Thailand. As can be seen, the volatility of financial flows displayed in Chart 10 increased over the three episodes while the GDP growth decreased. Nonetheless, it is important to bear in mind that the economic structure and

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financial regime of the country was undergoing changes throughout these periods. Therefore, it may be more appropriate and informative to conduct further study on this relationship and its implication to policy choices.

4. Financial Exposure to the United States and Its Monetary Policy Normalization

Given the understanding of the behavior of capital flows in Thailand, this section will turn to a hot issue of what to expect after the Fed started its policy normalization in December 2015, after an unprecedented period of ultra loose monetary policy. In particular, we aim to identify which types of flow will be more sensitive to this event. First, we shall quickly summarize the behavior of each flow during the four episodes of crises and shocks in Thailand's financial economy. Next, we shall explore similar episodes of the Fed's hikes in the past to make projections about the behaviors of the capital flows in this current period. Then, we shall examine current exposure of Thailand's capital account to the United States. Finally, capital flow vulnerability will be assessed.

4.1 What can We Learn from the Past?

We revisit the behaviors of capital flows during the four periods of extreme movements mentioned in Section 2 to get some insights into which type of flows are expected to respond to the Fed normalization. From these four episodes, namely: (i) the Asian financial crisis of 1997; (ii) the global financial crisis of 2008; (iii) the great flood in central Thailand in 2011 Q4; and (iv) the taper tantrum episode in 2013, two observations can be summarized.

First, when the cause of the crisis is in the financial sector, the PFE and PFD tend to be mostly affected. On the other hand, when the crisis is related to the country's fundamentals, the longer-term funds of direct investment are affected. Second, there is no single type of flows that is more sensitive to shocks. The risk to reversal depends on the nature of the crisis, whether it is domestic or global, financial or real, as well as the conditions of the financial composition leading up to the crisis.

Bearing in the mind these two observations, we expect that when the Fed starts its normalization, the financial flows that would be more heavily affected in the case of Thailand, and possibly other emerging market economies, will be the PFE and PFD, similar to the taper tantrum period. Direct investment is expected to stabilize, since the event is monetary in nature and should have no

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immediate adverse impact on investors' perception of Thailand's longer-term potential growth. Conversely, a sign of more robust recovery in demand from the U.S. could lead to brighter prospects for the export sector in Thailand and its regional peers to some extent.

We turn to an alternative approach in projecting which types of flow will respond to this Fed's normalization by examining the behaviors of Thailand's capital flows during the earlier periods of the Fed's rate hikes. Two recent hikes and the tapering episode will be considered, namely (i) between March 1999 and June 2000, (ii) between September 2004 and September 2006, and (iii) the tapering tantrum between April – August, 2013. For each episode, both the R and NR flows and their sub-components will be examined. We expect that when the Fed increased its interest rate, and that of Thailand remains constant, there was an incentive for investors to shift more of their assets towards investment in the U.S. market. This could potentially result in fewer inflows into Thailand or capital reversals in some components. The empirical evidence of the accumulated capital flows were calculated and shown in Appendix 3. The analysis reveals the following results:

4.1.1 Fed's Rate Hike March 1999 – June 2000 (Accumulated 175 bps)

The capital movements were dominated by non-resident flows, most notably the BMM outflows, as seen from the scale in Chart 12 compared to that in Chart 11. Nevertheless, these outflows were mainly the continued repayments of foreign debt that Thailand accumulated before the 1997 financial crisis, and were likely not the direct response to the Fed's hike at the time. Regarding the other types of flows, although the PFD saw a slight outflow, the PFE rose mildly and the FDI maintained robust inflows. Therefore, it can be concluded for this period that the Fed's hike did not lead to a significant slowdown or outflow of non-resident funds.

4.1.2 Fed's Rate Hike September 2004 – September 2006 (Accumulated 425 bps)

On the residents' side, this period saw stop-start outflows of the BMM shown in Chart 13, driven by currency and deposits and trade credits as suggested by Chart 6. The higher U.S. policy rate compared to Thailand at the time may explain some of the deposit outflows in search of higher yields. However, the trade credits that Thai exporters issued for their foreign trading partners were more likely determined by fundamental variables such as real trade flows and

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export demand, than the interest rate differential. Meanwhile, on the non-resident side plotted in Chart 14, we observed increasing inflows in nearly all the components, namely FDI, PFE, and PFD, implying no impact from the Fed hike on the NR side.

4.1.3   Taper Tantrum Episode in 2013

The taper tantrum episode offers the most recent example of the Fed's tightening cycle, and is therefore of particular interest. Unlike in the previous episodes, the taper tantrum saw outflows of residents' TDI and, to a smaller extent, PFD and PFE, as portrayed in Chart 15. Apart from the response to the signal of the Fed's normalization, the outflows were partly results of the relaxations of the capital flow measures applied to the resident flows at the time. Likewise, we observed from Chart 16 that the non-residents PFE, PFD, and DER each experienced mild outflows, but these were concentrated mainly in 2013 Q2 before subsiding gradually.

From the evidence of the past cycles of the Fed's policy tightening, two conclusions can be made regarding what to expect from the current cycle. First, the resident flows appeared to be only weakly sensitive to the Fed's policy tightening. Among the different flow types, the BMM, followed by the TDI and portfolio flows, have responded somewhat in the past cycles. Nevertheless, thanks to the cautious steps towards liberalization of the resident flows that facilitate prudent investment of Thai residents abroad, the resident outflows should not lead to a major concern in this new cycle.

Chart 11

Residents (Assets) Gross Capital Flows
During Fed's rate hike: 1999Q2-2000Q2

Source: IMF.

Chart 12

Non-Residents (Liabilities) Gross Capital Flows
During Fed's rate hike: 1999Q2-2000Q2

Source: IMF.

Chart 13

Residents (Assets) Gross Capital Flows
During Fed's rate hike: 2004Q3-2006Q3

Source: IMF.

Chart 14

Non-Residents (Liabilities) Gross Capital Flows
During Fed's rate hike: 2004Q3-2006Q3

Source: IMF.

Chart 15

Residents (Assets) Gross Capital Flows
During Taper tantrum

Source: IMF.

Chart 16

Non-Residents (Liabilities) Gross Capital Flows
During Taper tantrum

Source: IMF.

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Chart 17	Chart 18
Thailand's Net Capital Flows and VIX index	**Thailand's Changes in Net Capital Flows and VIX**

Sources: IMF and CBOE.

Sources: IMF and CBOE.

Second, the PFE, PFD and DER are the most sensitive among the non-residents flows in the recent episodes, but again the magnitude has been mild. The muted reactions of the capital flows to the Fed's policy were in line with the study by (Thawornkaiwong and Annonchan, 2013) who found that interest rate differentials only marginally explain the private capital flows to Thailand. The more important determinants include changes in Velocity Index (VIX), outlook on Thai baht appreciation, Business Sentiment Index (BSI), and expected volatility of the Thai baht.

4.2 Direct Financial Exposure to the United States

Although we expect only small and gradual impact on Thai capital flows in the upcoming Fed normalization cycle, it is helpful to consider the international investment position (IIP) of Thailand on the liabilities side to examine the largest possible outflows that can take place. This is determined by the amount of claims that the U.S. has on Thailand, relative to other countries' claims. Both direct investment and portfolio position are considered, since we have pointed out that the PFE and PFD are more likely to respond to the hikes. The recent positions of both flows are shown on Charts 19 and 20.

The country's direct exposure to U.S. claims on international investment is relatively small for the FDI, but is the second largest in the Portfolio accounts, after the euro area. The U.S. registered a claim of 17% of the GDP on FDI and 24% of the GDP on the Portfolio accounts in the first quarter of 2015. As we concluded from the previous episodes, the Portfolio accounts – both PFE and PFD – are more prone to reversal in the time of monetary uncertainty. The maximum direct impact would be the amount of selloffs in the PFE and PFD

by U.S. investors. Nonetheless, the outflow is expected to take place gradually as investors have more or less priced-in the move while rebalancing their portfolio in preparation for the Fed's normalization. Meanwhile, the second-round impact from the outflows of the EU countries might be possible but is less likely.

Chart 19	Chart 20
Outstanding IIP Liabilities in FDI By countries	Outstanding IIP Liabilities in Portfolio Debt and Equities By countries
Source: BOT. Authors' calculation.	Source: BOT. Authors' calculation.
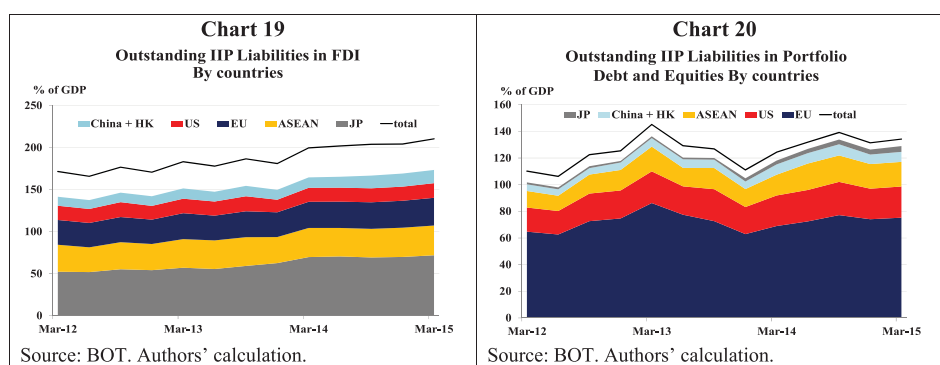
4.3 Assessment of Vulnerability of PFE and PFD

Recent developments of the PFE and PFD flows confirm that the market has priced-in the expectation of the Fed normalization gradually, as reflected in the declining share of the foreign holdings in stock and bond market in Charts 21 and 22. In the SET, the percentage of non-resident holdings out of the total market capitalization has been in steady decline since 2012, prompted partly by domestic political uncertainty. The figure stood at 32% in August 2015. Regarding the bonds, the share of the foreign holding has been dropping slowly to approximately 16% in June 2015, signaling gradual adjustment in the portfolio of international investors. Moreover, the share of the foreign holdings in Thailand in June 2015 is lower than that of Malaysia and Indonesia, and also lower than in the Thai stock market.

Chart 21	Chart 22
NR holding of Thai Equity in the Stock Exchange Thailand in percent to Market Capitalization	Foreign Holdings in LCY Government Bonds in the Region
Source: SET.	Source: Asian Bonds Online.
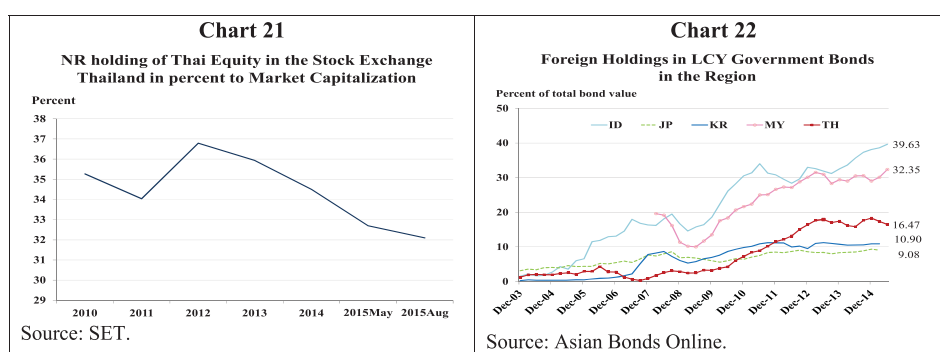
Moreover, when we decompose the outstanding IIP Liabilities into Equity and Debt Securities, it can be seen from Chart 23 that equity has higher exposure to non-resident capital reversals than debt. In 2015, while the non-resident holdings account for roughly 30% of the GDP in debt, they account for a far greater amount of 100% in equity. This means that the magnitude of the impact resulting from the non-resident sell-offs in debt securities will be more limited than from the equity securities. Moreover, over the past crisis episodes, namely the global financial crisis, the taper tantrum, as well as the sporadic emerging market economies (EM) sell-off periods since the beginning of 2015, Thailand's stock index has always suffered bigger losses than the bonds market, as summarized in Table 4. While the SET index dropped over all these periods, the bond market index saw much milder declines. This suggests that bonds tend to be longer-term investment that most investors intend to hold to maturity. Thus, this provides another piece of evidence that the equity market will likely be more vulnerable to global financial market panics.

Table 4
Changes in Financial Indicators during Past Crises

Percent peak-to-trough	FX (negative shows depreciation)	Stock Prices	Bond Market
2015Jan – 2015Aug	-7.6	-12.6	1.3
Fed Taper Tantrum 2013Apr – 2013Aug	-9.1	-8.3	-3.4
Global Financial Crisis 2008May – 2009Mar	-10.26	-48.2	14.2
Asian Crisis 1996May-1998Aug	-52.1	-83.6	

Note: FX for USDTHB, Stock Prices from SET index, Bond from Total Return Index.
Source: BOT, SET, Thai Bond Market Association.

Chart 23

Outstanding IIP Liabilities in Equity and Debt Securities

Sources: BOT, SET, Authors' calculation.

Chart 24

SET Index and Net NR flows

Source: SET.
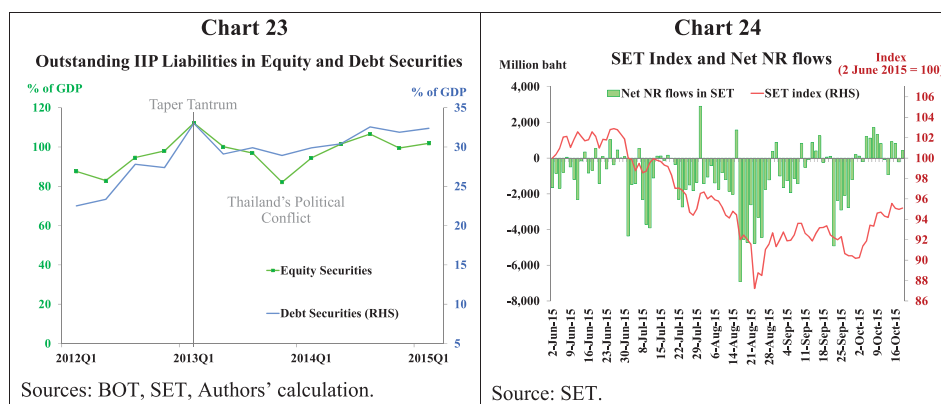
If portfolio equity is likely to take the hit in the future, how has it performed recently? The year 2015 has seen a number of EM sell-off episodes, mostly triggered by changes in market expectation regarding the timing of the Fed lift-off and concerns over the vulnerability of the Chinese and other Asian economies. The changes in the SET and NR outflows from June 2015 are shown in Chart 24, illustrating the various sell-offs. However, when compared to past crises, the stock decline of 2015 appears to be milder, and closest in magnitude to the taper tantrum episode as seen from Chart 25.

Moreover, when comparing changes in the stock indices during 2015 and 2013 taper tantrum across the Asian countries, it can be seen from Chart 26 that Thailand's stock loss was more severe than its neighbors in 2013, but remains roughly in line with the others in 2015. Moreover, the markets that saw significantly greater losses in 2015 than 2013, namely Malaysia, Hong Kong, and Shanghai also experienced country-specific problems or vulnerabilities at the same time. Therefore, it can be inferred that the extent to which global market panics affect each country's stock market depends critically on the specific conditions of that country.

Chart 25
Changes in SET and USDTHB after Various Crises

Thailand Stock Market Index

index

- May15-Aug15
- Fed Tapering Tantrum (Apr13-Aug13)
- Hamburger Crisis (May08-Mar09)
- Asian Crisis (May96-Aug98)

Number of months after peak

USDTHB

index · index

↑ depreciation

- May15-Aug15
- Fed Tapering Tantrum (Apr13-Aug13)
- Hamburger Crisis (May08-Mar09)
- Asian Crisis (May96-Aug98) RHS

Number of months after peak
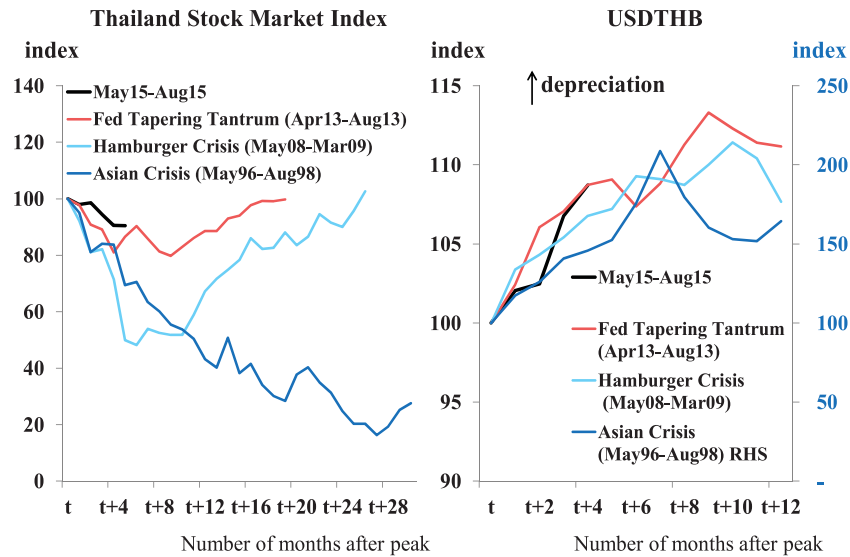
Chart 26
Changes in Stock Indices and Local Currencies
during Taper Tantrum vs Current Episode 2015

Change in Stock Market Index

- May-Aug 13
- May - July 15

Malaysia, Korea, Shanghai, HongKong, Singapore, Phillippines, Indonesia, Thailand

Change in Local Currencies per USD

- May-Aug 13
- May-Sep 15

(negative shows depreciation)

EUR, CNY, TWD, KRW, VND, SGD, PHP, THB, MYR, IDR

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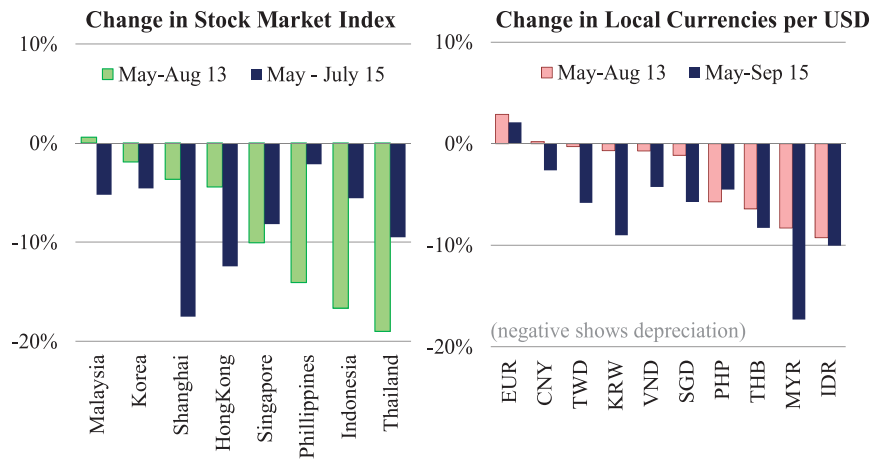
5. Implications on Central Bank Policy and Conclusion

The paper examined Thailand's capital flows in terms of the net and gross residents and non-residents flows and deciphered the sub-components over its recent economic history. The analysis covered both the general anatomy and the volatility of the flows. We also endeavored to analyze capital flows during previous Fed's normalization episodes and tried to infer to the on-going period. The key takeaways and policy implications from this paper can be summarized as follow.

(i) **Capital liberalization measures have contributed to more balance between the non-resident and resident flows.** The next phase of the capital liberalization master plan will continue to help adjust the balance, which will allow for more development in the capital market and greater international financial integration. With greater pool of financial resource, the country should benefit from the flexibility and diversification. Nonetheless, integration means higher risks transmitted through the financial channel, and that better risk management will be required. More balanced flows imply smaller role of the official flows, but the need for the central bank's actions is not ruled out, as discussed in the next point.

(ii) **The international reserves flows (RES) have helped offsetting the volatilities in private capital flows during extreme times** to avoid extreme movements of the exchange rate or misalignment from the economic fundamentals. It is well accepted that the official flows should respond to irregular shocks, preventing extreme disruption in financial economic activities and allowing time for the private sectors to adjust. However, a certain level of fluctuation in the exchange rate may help speed up economic adjustments that lead to resiliency. Furthermore, a flexible exchange rate also acts as an automatic stabilizer cushioning against capital flow movements as well as real economic shocks. The degree to which it is considered healthy or too extreme will remain a challenge to the central banks of each economy, and further studies will be beneficial.

(iii) **To avoid amplifications of capital flows volatility, the financial market participants need to consistently use hedging instruments, and the financial market must be developed in both depth and breadth.** Setting aside the role of offsetting international reserve flows, amplification of the volatility in private capital flows' sub-component was found in the case of

Thailand. The BMM flows were found to be the most volatile component, and the volatility was recently contributed by unstable hedging-related flows. In light of this, the market participants should consistently hedge against exchange rate uncertainties, and avoid the herd behavior one-sided transactions when the exchange rate moves in an unfavorable direction. This will help reduce excessive volatilities of the flows. Moreover, deeper and broader financial market will help absorb volatility and create substitutability in the flows.

(iv) **Policy makers should be vigilant to all signs of vulnerability in the financial market, because all types of flows can be reversed depending on the types of shock.** Strong and balanced economic fundamentals will contribute to resilient economic recovery against shocks. However, in the case of extreme shocks that can severely harm the financial economy, policy makers have to stand ready to safeguard stability. Capital Flow Management measures can be considered in such situation as the last resort. The decision must be carefully considered and clearly explained to the market, in order to yield effective result. Otherwise, these measures may lead to unintended consequences in market perceptions and policy credibility.

(v) **In the on-going Federal Reserves' policy normalization, the PFE flows are expected to be more vulnerable than other types of flows in the case of Thailand.** The equity market has always been more responsive to financial shocks compared to other financial assets. Nevertheless, we expect the response of equity flows during the ongoing episode to be gradual, because the market participants have already priced-in the event and the investors have been gradually selling assets of the emerging market economies throughout 2015. Thailand's PFE, hence, has been experiencing some outflows for some time and the outstanding amount of claims is much lower than before expectation of the Fed's hike.

Going forward, strong macroeconomic fundamentals, more developed financial market, more balanced flows between residents and non-residents, and better understanding of the use of financial instruments will serve as defenses against international financial market instability. Policy makers, therefore, have to strengthen the financial economy and ensure steady development in these aspects. Nonetheless, in the extreme circumstance, policy makers have to stand ready to apply the right policy mix to alleviate the adverse impact, safeguard stability, and provide a conducive environment for sustainable economic growth.

Chart 27	Chart 28
Thailand's Official Reserve Position	**Thailand's Reserve Adequacy Ratios**

Billion USD

200
180
160
140
120
100
80
60
40
20
0

Jan-93   Jan-97   Jan-01   Jan-05   Jan-09   Jan-13

Months of import   times

15   4.0

                                                    3.0

10
                                                    2.0

5   Gross Reserve/Import (1-yr avg.)
           Gross Reserves/ST Debt Original (RHS)   1.0

0   0.0
Jan-05   Jan-07   Jan-09   Jan-11   Jan-13   Jan-15
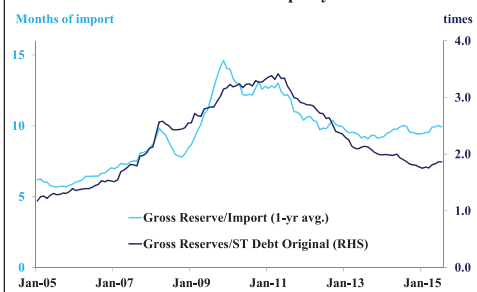
Source: BOT. Authors' calculation.   Source: BOT. Authors' calculation.

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Appendix 1 : Current Account Balance, Capital Account Balance and its Components

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Derivatives (DER)

% of GDP

Resident Flows
(positive shows net
gain from derivatives)

Net BMM Flow

Non-Resident Flows
(negative shows net
gain from derivatives)

Official Reserves (RES)

% of GDP

Official Reserve Flow
(Negative shows outflow and
accumulation of Net Foreign Assets)
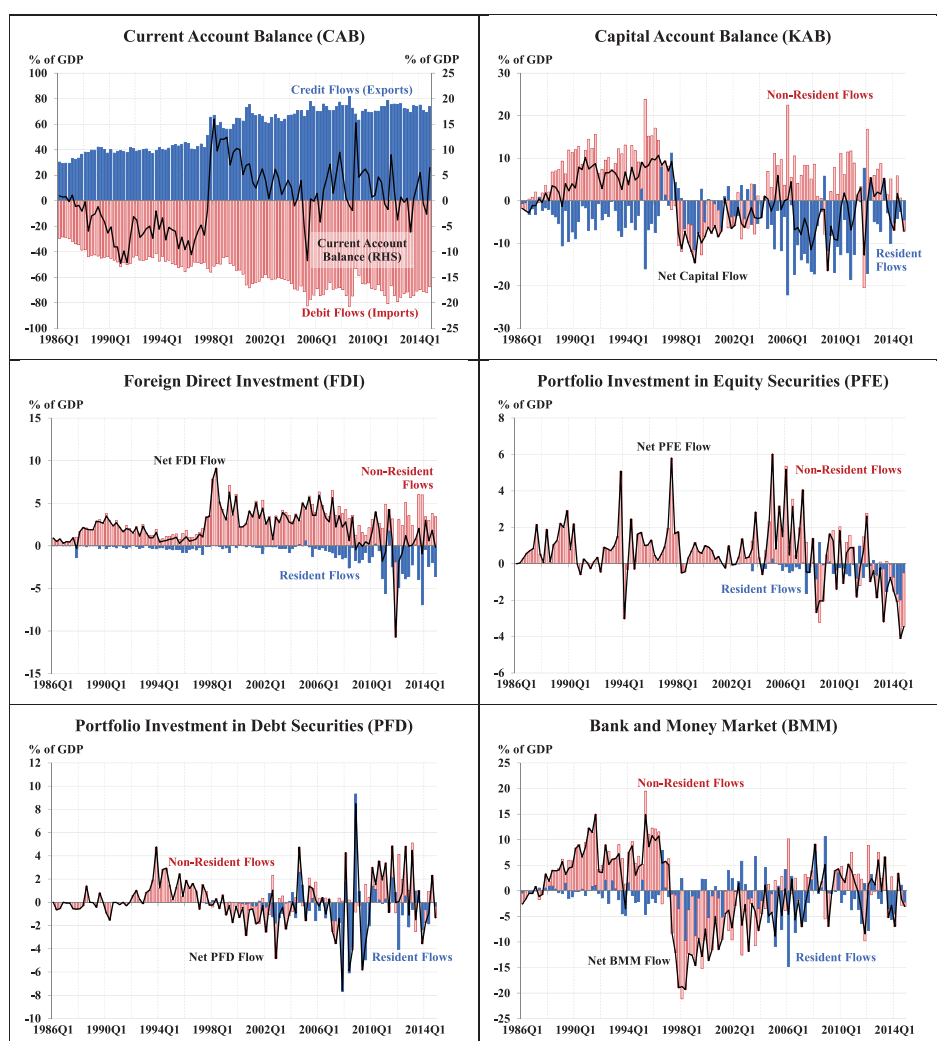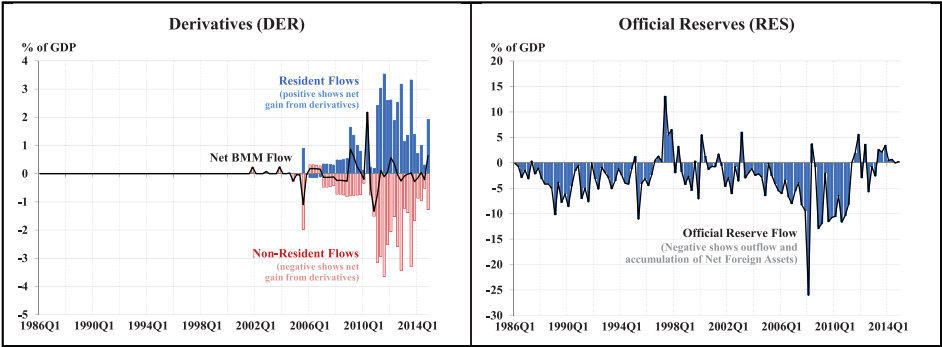
Appendix 2 : Correlations between Volatilities in Sub-components of BOP Flows

	cab_a	cab_l	cab_net	kab_a	kab_l	kab_net	fdi_a	fdi_l	fdi_net	pfe_a	pfe_l	pfe_net	pfd_a	pfd_l	pfd_net	bmm_a	bmm_l	bmm_net	der_a	der_l	der_net	res	pkb_a	pkb_l	pkb_net
cab_a	1.0000																								
cab_l	0.5161*	1.0000																							
cab_net	0.7446*	0.4593*	1.0000																						
kab_a	0.4112*	0.5569*	0.5419*	1.0000																					
kab_l	0.3745*	0.3586*	0.4761*	0.8287*	1.0000																				
kab_net	0.7282*	0.3887*	0.8644*	0.5630*	0.5522*	1.0000																			
fdi_a	0.1449	0.4307*	0.3167*	0.5858*	0.5404*	0.4265*	1.0000																		
fdi_l	0.4549*	0.2934*	0.4274*	0.5539*	0.6175*	0.6048*	0.6052*	1.0000																	
fdi_net	0.4994*	0.3730*	0.4376*	0.6069*	0.6315*	0.6025*	0.9190*	1.0000																	
pfe_a	0.3005*	0.2443	0.2598	0.4669*	0.3256*	0.5055*	0.5551*	0.4976*	0.4359*	1.0000															
pfe_l	0.3340*	0.3564*	0.5248*	0.5149*	0.3403*	0.3918*	0.2522*	0.2414*	0.2664*	0.1035	1.0000														
pfe_net	0.3252*	0.3606*	0.5270*	0.5274*	0.3526*	0.4146*	0.2667*	0.2663*	0.2895*	0.1806	0.9866*	1.0000													
pfd_a	0.0966	0.6908*	0.3230*	0.4561*	0.1862	0.3018*	0.4772*	0.0688	0.1567	0.4211*	0.2734*	0.2987*	1.0000												
pfd_l	0.0082	0.0566	0.0733	0.2759*	0.3129*	0.1905*	0.4680*	0.5172*	0.4063*	0.2236	0.2375*	0.2453*	0.003	1.0000											
pfd_net	0.2375*	0.6209*	0.3414*	0.4772*	0.2623*	0.3413*	0.5632*	0.2452*	0.2930*	0.4638*	0.4389*	0.4479*	0.9298*	0.4706*	1.0000										
bmm_a	0.4490*	0.5923*	0.4832*	0.6819*	0.4515*	0.3591*	0.2683*	0.3488*	0.3673*	-0.1861	0.6491*	0.6601*	0.2472*	0.2217*	0.4310*	1.0000									
bmm_l	0.4914*	-0.0064	0.5083*	0.5479*	0.7430*	0.4920*	0.0896	0.3533*	0.3230*	0.0673	0.2842*	0.2822*	-0.2382*	0.1349	-0.0433	0.3048*	1.0000								
bmm_net	0.6267*	0.0803	0.6258*	0.3812*	0.4910*	0.5543*	0.0774	0.2705*	0.2397*	0.5201*	0.3766*	0.3794*	-0.0773	0.0594	0.1141	0.3198*	0.8046*	1.000 0							
der_a	-0.0089	0.0755	0.175	0.4109*	0.4845*	0.6244*	0.8197*	0.6214*	0.6279*	0.4840*	-0.1195	-0.1056	0.2128	0.4253*	0.2705	-0.5154*	0.2545	0.011	1.0000						
der_l	-0.1211	-0.068	0.2834*	0.3862*	0.4249*	0.3873*	0.7248*	0.5327*	0.4746*	0.0601	0.0953	0.0977	-0.2537	0.3004*	0.247	-0.0588	0.2542	-0.1533	0.5482*	1.0000					
der_net	-0.0377	0.1533	0.0251	0.3799*	0.3499*	0.4629*	0.4826*	0.2719*	0.5266*	0.0704	-0.2153	-0.2422	0.1796	-0.0797	0.0887	-0.3689*	0.0562	-0.257 3*	0.5953*	0.3172*	1.0000				
res	0.4578*	0.4944*	0.4219*	0.6404*	0.4720*	0.4197*	0.3283*	0.3288*	0.4104*	0.5719*	0.2661*	0.2898*	0.5410*	0.0198	0.5180*	0.3389*	0.3697*	0.47S8 *	0.1125	-0.2854*	0.1679	1.0000			
pkb_a	0.4720*	0.7632*	0.5598*	0.7753*	0.5093*	0.4852*	0.5132*	0.4087*	0.4373*	0.3656*	0.6342*	0.6486*	0.8264*	0.2872*	0.7375*	0.8619*	0.2462*	0.3 171*	0.0092	-0.0976	-0.106	0.5657*	1.0000		
pkb_l	0.3745*	0.3586*	0.4761*	0.8287*	1.0000*	0.5522*	0.5404*	0.6175*	0.6345*	0.3256*	0.3403*	0.3526*	0.1862	0.3129*	0.2623*	0.4515*	0.7430*	0.49 10*	0.4845*	0.4249*	0.3499*	0.4720*	0.5093*	1.0000	
pkb_net	0.5859*	0.4783*	0.6082*	0.6885*	0.7545*	0.6619*	0.5407*	0.5550*	0.5738*	0.7489*	0.2944*	0.3220*	0.5101*	0.2065*	0.5028*	0.3534*	0.6180*	0.6868*	0.4950*	0.07	0.2542	0.7881*	0.5875*	0.7545*	1.0000

Note: 8-quarters rolling S.D. of capital flows per GDP were calculated for each series then pair-wise correlation coefficients were calculated and shown in the table, where star (*) indicates significance at 5% level of confidence.

Notation "_a" shows series of assets flows, "_l" shows series of liabilities flows, and "_net" shows series of net flows.

RES is an official flows made by resident, i.e., assets side, thus there is no liabilities flow of RES and the net RES is the same as RES flows on assets side.

Appendix 3: Accumulated Capital Flows of Thailand during Fed's Rate Hike Episodes

Accumulated Capital Flows Per GDP and Accumulated Increased Rates	Mar 1999 – Jun 2000 1999Q2-2000Q2	Sep 2004 – Sep 2006 2004Q3-2006Q3
Accumulated Fed's rate hike (basis points: bps)	From 4.75 to 6.50 175 bps	From 1.00 to 5.25 425 bps
Total Capital Flows (KAB)		
Net	-39.7	-0.2
Assets	-9.5	-81.8
Liabilities	-30.2	81.5
Foreign Direct Investment (FDI)		
Net	20.2	38.9
Assets	-0.7	-2.2
Liabilities	20.9	41.1
Portfolio Equity Investment (PFE)		
Net	4.3	23.0
Assets	0.0	-1.4
Liabilities	4.3	24.4
Portfolio Debt Investment (PFD)		
Net	-4.1	6.2
Assets	-0.2	-0.9
Liabilities	-3.9	7.0
Bank and Money Market (BMM)		
Net	-54.8	-29.8
Assets	-3.3	-40.2
Liabilities	-51.5	10.4
Changes in Official Reserves (RES)		
Net	-5.4	-37.6

Source: U.S. Federal Reserve and IMF. Calculated by authors.Note: Positive figures show inflows and negative figures show outflows. RES is asset-side by default and negative flows imply outflows by authority to increase net foreign asset. Derivative flow was miniscule in both periods and, thus, was omitted from the output table.