Effectiveness of Capital Controls: Evidence from Thailand

JUTHATHIP JONGWANICH AND ARCHANUN KOHPAIBOON

This paper examines the effectiveness of capital account policies in Thailand during the period 1993–2010. Our results show that policies toward capital account liberalization tend to be more effective than those toward capital account restriction in changing the volume of capital flows. The composition of capital flows also matters for the effectiveness of policy measures. When capital restrictions were introduced in the late 2000s, our results show that there was a switching effect from more capital restricted asset classes toward less restricted ones. This study also finds that the central bank did not gain more monetary autonomy from introducing capital inflow restrictions. However, such restrictions, both inflows and outflows (liability side), could help limit the fluctuations in the nominal exchange rate, especially relative to the US dollar in 2000–2010.

JEL classification: F21, F32, F36, F41, G15

I. INTRODUCTION

Capital liberalization had been implemented in most emerging Asian countries since the late 1980s. Restrictions had been gradually phased out during this period with an aim to enhance a country's capacity to receive benefits from capital flows.[1] However, evidence relating to impacts of such liberalization over the past two decades has led to doubts about net gains of the policy in capital-receiving countries. Particularly, it has been blamed as a key factor leading to boom and bust cycles in many emerging countries, including the sudden reversal of capital inflows during the Mexican crisis in the early 1990s and the Asian financial crisis in the late 1990s.

In the early 2000s, capital inflows gathered momentum again in emerging economies, including those in Asia. Central banks in many countries reintroduced capital restrictions to guard against the buildup of the inflows while preserving their monetary autonomy and extensively intervening in foreign exchange markets. In Thailand, for example, the unremunerated reserve requirement on fixed income flows was introduced in September 2006 after unsuccessful

[1] Note that capital account policy referred to here mostly affect the financial account, not the capital account.

Juthathip Jongwanich is Assistant Professor, School of Management, Asian Institute of Technology. Archanun Kohpaiboon is Assistant Professor Faculty of Economics, Thammasat University. The authors would like to thank Mayurachat Tipparat for excellent research assistance.

measures to limit the buildup in nonresident holdings of baht accounts in 2003. Chinese authorities restricted the borrowing of dollars by foreign bank branches in the People's Republic of China (PRC) in September 2006. Such a restriction was also introduced in the Republic of Korea in April 2007 and in India in August that same year.

Over the past two decades, a number of empirical studies have examined the effectiveness of capital account policies introduced in emerging countries, but the results are still mixed and vary according to countries and periods sampled. Tamirisa (2004), for example, shows that capital account policies introduced in Malaysia during the Asian crisis helped the central bank gain monetary autonomy. By contrast, Edison and Reinhart (2001) found ineffectiveness of capital control policy in Thailand in 1997, while Coelho and Gallagher (2010) found that capital controls introduced in the 2000s were modestly successful in reducing overall volume of inflows in Thailand.

With mixed empirical evidence on the effectiveness of capital account policy, this study aims to examine in depth the effectiveness of capital controls by using Thailand as a case study during the period 1993–2010. The effectiveness of capital account policies examined in this study cover five key aspects, mainly their ability to: (i) change the volume and composition of capital flows, (ii) relieve real exchange rate appreciation pressure, (iii) stabilize exchange rate movement, (iv) allow greater monetary independence, and (v) prevent financial crisis.

Thailand is one of the good case studies for this subject for three reasons. First, capital account policy had changed substantially over the past two decades — i.e., capital liberalization in the early 1990s, restrictions in 1994 (Asian financial crisis period), and restrictions in capital inflows coupled with liberalization in capital outflows in 2000–2010. Second, there has so far been no comprehensive analysis of the use of capital account policy based on the above five key aspects over the past 15 years. A few recent empirical studies (e.g., Jittrapanun and Prasartset 2009, Coelho and Gallagher 2010) examine the effectiveness of capital controls introduced in the country only in the early 2000s and focus only on a certain aspect, i.e., the effects on capital flows.

Finally, most previous studies use annual information from the *Annual Report on Exchange Arrangement and Exchange Restrictions* published by the International Monetary Fund (IMF) to construct capital restriction indexes. Highly aggregated information may fail to adequately capture changes in the frequency of usage or degree of restrictiveness within (across) a year, thus giving misleading results as to the effectiveness of capital account policy changes. In this study, we construct legal capital account policy indexes using high frequency information published by the central bank on a monthly basis. Furthermore, we disaggregate capital account policies into inflows and outflows as well as to asset

categories to clearly examine the effectiveness of implemented capital account policies in the country.

The paper is divided into the following sections. Section II briefly reviews literature relating to effectiveness of capital account policy. Section III describes capital account policy in Thailand over the past two decades, while Section IV explains how capital account policy indexes are constructed. Section V briefly describes movements of capital flows, exchange rate policy, and capital account policy in Thailand. The methodology used to examine the effectiveness of capital account policies is discussed in Section VI. Section VII presents the results. The final section provides conclusion and policy inferences.

II. LITERATURE SURVEY

Capital account policies are normally used to meet the following five key objectives: (i) to change the volume and composition of capital flows, (ii) to ease the pressure for real exchange rate appreciation, (iii) to stabilize the exchange rate, (iv) to gain greater monetary independence, and (v) to prevent financial crisis (Magud, Reinhart, and Rogoff 2011, Magud and Reinhart 2007). Most of the previous empirical studies pay more attention to examining the impacts of capital control policy on the above five objectives than those of capital liberalization.

Capital controls can be introduced to restrict either (both) capital inflows or (and) outflows, with diverse justifications. While controls on capital inflows are mostly introduced during boom periods to restrict excessive and volatile capital surges, restrictions on outflows are mostly imposed during the bust cycle to limit downward pressure on a domestic currency as well as prevent depletion of foreign exchange reserves. During normal periods, restrictions on capital outflows are implemented mainly to preserve savings for domestic investment.

Regardless of components of capital flows, capital controls come in two broad forms, administrative and market-based controls.[2] Administrative controls restrict capital flows through outright prohibition, by an approval procedure (either rule based or discretionary), or via explicit quantitative restrictions. These measures seek to directly affect the volume of cross-border financial transactions. They had been introduced in many emerging economies. For example, in the early 1990s, Malaysia prohibited nonresidents from purchasing money market securities. In 2009, foreign investors in Taipei,China, after bringing funds into the

[2]Capital controls can be classified as direct and indirect controls (Ariyoshi, 2000). In some studies, they are classified as quantity and price measures (e.g., Neely 1999). These classifications seem to be comparable since most administrative controls are direct and quantity-based, while market-based measures are mostly indirect and price-based.

country, were restricted from parking their money in time deposits and disallowed from extending deposit maturities beyond three months.

Market-based controls restrict capital by introducing additional costs to cross-border financial transactions. Several forms of capital controls belong to this category, including explicit taxation on cross-border financial flows (i.e., Tobin tax), implicit taxation through non-interest-bearing compulsory reserve requirements (i.e., unremunerated reserve requirements), a dual (two-tier) or multiple exchange rate system, and other indirect prudential controls (e.g., reporting requirements for specific transactions). Depending on type, market-based controls can affect only the price of capital or both price and volume.

Instead of imposing capital controls on capital inflows, easing restrictions on capital outflows can be another option to help mitigate the adverse impact of "speculative" capital inflows. Recently, India and Thailand set examples by implementing liberalization policy to encourage capital outflows. For instance, in 2005, firms in India were allowed to invest abroad up to 200% of their net worth without approval from the Reserve Bank of India (upper limit of $100 million per annum), while firms were permitted to remit transfer funds through any authorized foreign exchange dealer (Athukorala 2009).

However, evidence from previous empirical studies has been mixed in terms of the effectiveness of capital account policies. Tamirisa (2004), applying an error-correction model on Malaysian data during the 1990s, shows that effectiveness of implemented capital account policies varied among asset classes. Controls on portfolio inflows helped the country raise the interest rate, while controls on outflows worked in the opposite direction. Controls on international transactions in the domestic currency had insignificant impact on interest rate.

Cardoso and Goldfajn (1998), by estimating a vector autoregression (VAR) model using data from 1988 to 1995, show that capital controls in Brazil had temporary effects in terms of changing the level and composition of capital flows and had no impact in the long run. Edison and Reinhart (2001), examining the 1998 capital control policy in Malaysia, find capital control policies to be effective in terms of allowing greater monetary autonomy and exchange rate stability. Coelho and Gallagher (2010) conclude that an unremunerated reserve requirement (URR) introduced in Colombia and Thailand during 2007–2008 had been modestly successful in reducing overall volume of inflows, but the measure made the exchange rate more volatile.

Some studies view capital control measures to be either ineffective on the key objectives or effective but conditional on certain variables. Edison and Reinhart (2001) discuss how such policies had been of use in Malaysia but not in Brazil and Thailand mainly due to the role of country-specific factors and the difference in type of measures imposed. Jittrapanun and Prasartset (2009) find an insignificant relationship between capital control policy introduced in Thailand

during the 2000s and the volume of capital inflows, though controls worked in the right direction for certain types of inflows such as portfolio investment.

Edwards (1999), in reviewing the effectiveness of capital control policy in Chile, argues that controls on capital inflows introduced between 1991 and 1998 had a very small impact on the interest rate, implying failure to promote monetary autonomy, and an insignificant effect on real exchange rate movement. Although controls helped reduce instability of the Chilean stock market, such controls could not help reduce financial instability overall (in particular, failure to insulate from the Asian financial crisis in 1997–1999).

Edwards (2007), using a large multi-country data set for 1970–2004, shows further how capital controls played a small role in reducing the probability of an abrupt contraction of net capital inflows, with sound macroeconomic stability and strong banking supervision appearing to be more crucial factors. Magud et al. (2011), in a survey of over 30 empirical studies on capital controls mostly in developing economies, find that country-specific factors had been crucial in determining the effectiveness of capital account policy, especially in terms of the level of short-term capital flows to the country.

The ineffectiveness of capital controls may have been because of the ability of investors to evade capital controls. Ariyoshi et al. (2000) argue that in Brazil and Chile, sophisticated instruments in financial market such as derivatives helped investors evade the control measures. In Colombia, investors tended to shift from one type of asset flow that was subject to restrictions to other types of unrestricted flows. The likelihood of investors evading the controls tended to increase when the exchange rate was actively managed and the central bank tried to maintain large interest rate differentials. However, the ineffectiveness of capital controls may have also come from loose legal support to control policies such as delays in repayments on trade finance and simple over-invoicing of imports and under-invoicing of exports.

Beyond these two arguments, the mixed results of capital account measures may simply be due to the problem of capital policy measurement. Most empirical studies available use the IMF's AREAER except for some single-country case studies that use information coming directly from central banks (e.g., Jittrapanun and Prasartset 2009, Coelho and Gallagher 2010). Using information from AREAER, dummy variables are typically applied for each capital policy with the disaggregation varying from study to study.[3] Capital control indexes constructed

[3]For example, the index in Schindler (2009) covers 91 countries and groups capital account measures into six broad categories (other securities, debt securities, money market instruments, collective investment, financial credit, and direct investment). The study distinguishes between restrictions on inflows and outflows and between residents and nonresidents. Johnston and Tamirisa (1998) cover 40 countries and disaggregate capital restriction into 13 categories (following the AREAER report). They distinguish between restrictions on inflows and outflows but not for residents and nonresidents. Ito and Chinn (2008) construct a composite measure from four dummy variables by using principal component for 182 countries. Binary dummy variables are assigned for the following four broad categories: (i) openness of the capital account, (ii) openness of the current account; (iii) stringency of requirements for repatriation, and (iv) existence of multiple exchange rates for capital transactions.

using this information have an advantage in covering a large multi-country data set. However, using highly aggregated information may fail to adequately capture changes in the frequency of usage or degree of restrictiveness of capital controls producing misleading results on their effectiveness.

III. CAPITAL ACCOUNT POLICY IN THAILAND: FIRST LOOK

There are three periods where capital account policies were imposed in Thailand. The first was during 1990–1994 when the central bank introduced capital inflow liberalization. The milestone traced to the acceptance of IMF Article VIII obligations in May 1990 after which capital control measures were progressively relaxed or removed.[4] Commercial banks' net foreign liabilities, for example, were increased from 20% to 25%. The central bank also allowed authorized dealers to lend foreign exchange to nonresidents without limit while lifting the $5 million ceiling (per individual) on commercial bank lending to nonresidents.

The second period began in late 1994 and lasted until 1997, during which the central bank introduced capital inflow restrictions to reduce the volume of inflows and relieve the pressure on the real exchange rate. In late 1994, for example, the central bank cut commercial banks' net foreign liabilities back to the level imposed in 1990. In 1995, it imposed a 7% reserve requirement on commercial banks' nonresident baht deposit. However, investors continued to speculate on the baht prompting the central bank to further strengthen capital inflow controls.

Restrictions on capital outflows were also introduced such as the extension of the 7% reserve requirement to financial companies and financial and securities companies in 1996 and the prohibition of security lending transactions by nonresidents and introduction of so-called "two-tier" market measures in May 1997. With this measure, the Bank of Thailand (BOT) asked for cooperation from domestic financial institutions to limit baht lending to nonresidents. In June 1997, the central bank required conversion of baht proceeds from sales of stock by nonresidents into foreign currency at the onshore exchange rate.

After 1998, the central bank began to liberalize capital outflow restrictions. For example, all restrictions pertaining to baht transfers from the sale of domestic securities by nonresidents that had been imposed in 1997 were lifted. The two-tier market measures were also replaced by the so-called "50-million-baht" guideline. However, to guard against potential speculation, baht credit facilities provided by each financial institution to nonresidents in cases where there were no underlying

[4]See Appendix1 for a chronology of capital restrictions in Thailand.

trade or investment activities in Thailand was made subject to a maximum outstanding limit of B50 million per party.

In the third period, during 2003–2008, the central bank introduced both capital outflow relaxation measures and capital inflow restrictions in response to an influx of short-term capital and the appreciation of both nominal and real (effective) exchange rates. In particular, there had been a sudden increase in nonresident baht accounts from the normal level of B18 billion to B63 billion baht by October 2003.

In 2003, the central bank announced a number of policy measures to relax restrictions on capital outflows, with the aim of promoting Thai residents' investments abroad and opening alternative investment opportunities. Under this measure, institutional investors were allowed to invest more in foreign securities, while the establishment of mutual funds investing in Asian bonds was promoted. Such policies possibly contributed to a rise in Thai residents' demand for foreign securities, as shown by an increase in net capital outflows of securities investment.

To curb speculative capital, a number of inflows restrictions were also introduced beginning 2003. For example, the amount of Thai baht that onshore financial institutions were allowed to borrow short-term (i.e., for less than 3 months) from nonresidents without underlying trade and investment was limited to no more than B50 billion per entity. Subsequently, the central bank required all onshore financial institutions to limit the total daily outstanding balance of nonresident baht accounts to no more than B300 million per nonresident. To reduce the incentive for deposits in nonresident baht accounts, it prohibited financial institutions from paying interest on such accounts (current and savings).

However, the influx of short-term capital into debt securities was still evident along with the noticeable appreciation of baht in both nominal and real terms. In 2006, the central bank decided to impose more measures to guard against possible instability in the economy. It requested financial institutions to refrain from selling or buying all types of debt securities through sell-and-buy-back transactions (all maturities) and asked businesses not to issue or sell short-term debt securities to nonresidents. Other measures were also implemented to reduce the pressure of baht appreciation, including limiting baht borrowings by financial institutions from nonresidents through sell–buy swap transactions when there was no underlying trade and investment in the country to maturities of longer than 6 months.

Nevertheless, the pressure on the baht did not subside. In December 2006, the central bank introduced Chilean-style capital restriction. All foreign transactions, except those related to trade in goods and services, repatriation of investment abroad by residents, and foreign direct investment (FDI), were required to deposit 30% of foreign exchange with the BOT as URR. If funds

remained within Thailand for one year, 30% of capital was refunded. If funds repatriated before a year, only two-thirds of the amount was refunded.

The announcement of URR on 18 December 2006 led to panic in financial markets. In the stock market, both share prices and market capitalization plunged noticeably in the first day of implementation of controls and trading had to be suspended during the day to stop investor panic. To regain market confidence, the central bank the following day clarified the implementation of URR measures, i.e., ten categories of capital inflows were exempted from the URR.[5]

Controls on capital inflows, which had been criticized widely, especially the URR, were gradually relaxed in 2007. For particular types of inflows, the central bank introduced the option to either withhold the URR or hedge against foreign exchange risks. The requirement for nonresidents to hold government bonds, treasury bills, and central bank bonds was revoked. Foreign currency borrowings not exceeding $1 million and having a maturity of at least 1 year were exempted from both the URR and the hedge requirement. The central bank also raised the upper limit for foreign currency deposits of Thai residents and allowed residents to deposit foreign currencies originated abroad without proof of evidence of future foreign exchange obligations.

After a period of gradual relaxation of capital controls, the URR was eventually lifted in March 2008. However, certain restrictions were still imposed by the central bank to guard against speculative capital flows and a rapid rise of the baht. These included revising the rules for domestic financial institutions when borrowing baht from and providing baht liquidity to nonresidents.

In addition to capital inflow policies, capital outflow policies were introduced beginning 2006, with the aim of reducing the pressure on the baht. In 2006, for example, the central bank relaxed exchange control regulations on investment in securities abroad and expanded the scope of investment by including investment units issued by foreign mutual funds (excluding hedge funds) under supervisory bodies relating to securities or securities markets that are members of the International Organization of Securities Commissions and securities issued under the Asian Bond Fund project of the Executives' Meeting of East Asia and Pacific Central Banks. In 2007, the central bank also increased the ceiling on Thai direct investment or lending to a business abroad from

[5]These ten categories include: (i) foreign exchange transactions related to current account activities, (ii) inflows for equity investment in companies listed in the stock exchange of Thailand and market for alternative investment (excluding mutual funds and warrants), (iii) foreign direct investment, (iv) investment in real estate such as land and condominiums, (v) foreign currency borrowings transacted prior to 19 December 2006, (vi) currency swap transactions associated with rolling over existing exchange rate hedging contracts with the original financial institution, (vii) foreign currencies bought or exchanged against baht amounting to less than $20,000 or equivalent, (viii) foreign exchange bought or exchanged against baht from clients or authorized money changers in the form of travelers' checks and bank notes; (ix) foreign currencies bought or exchanged against baht (from foreign embassies, foreign consulates, specialized agencies of the United Nations, international organizations/ institutions incorporated in Thailand as well as Thai embassies, Thai consulates, or other Thai government entities located outside Thailand), and (x) foreign currency borrowings of government entities.

$10 million per year to $50 million per year (with BOT approval) and expanded the scope and number of institutional investors.

The relaxation of capital outflows continued during 2008–2010. In 2008, the central bank encouraged portfolio investment abroad by increasing the foreign investment limit of the Securities and Exchange Commission. In 2009, there was a broadening of the type of institutional investors, permitting those registered under Thai law with assets of at least B5 billion and whose principal businesses were in manufacturing, trading, or services, to invest in securities abroad. Previously, only government pension funds, the social security fund, provident funds, mutual funds, securities companies, insurance companies, and specialized financial institutions were allowed to do so. In 2010, the central bank raised the amount Thai companies could lend to non-affiliated companies abroad as well as the outstanding balance limits of foreign currency accounts deposited with funds exchanged from baht.

IV. CAPITAL ACCOUNT POLICY INDEXES

Capital account policy indexes are constructed for Thailand during the period 1990–2010 based on information from notifications, press releases, and speeches related to foreign exchange and the capital account published formally by the central bank. Using all the information available, we are able to construct indexes that capture well changes in capital account policy within (or across) a year.

Most of the previous studies that construct capital restriction indexes (e.g., Schindler 2009, Gochoco-Bautista et al. 2012, Ito and Chinn 2008, Mody and Murshid 2005, Miniane 2004, Johnston and Tamirisa 1998, Tamirisa 1999) make use of information from the AREAER published by the IMF. Although wide country coverage could be obtained from this source, since the information provided was on an annual basis, the indexes could not adequately capture variations in capital restrictions. In addition, many restrictions introduced within a year are not reported in the AREAER, hence the annual indexes are unable to capture the impact of such policies on capital mobility and real exchange rates.

In this study, measures are first divided into two key categories, namely those affecting net capital inflows (liabilities) and those affecting net capital outflows (assets). Within these two categories, measures are further disaggregated into those affecting (gross) inflows and those affecting (gross) outflows. Within the category of inflows and outflows, the measures are further disaggregated according to asset classes, i.e., those affecting FDI, equity securities, debt securities, and other investment flows (including foreign currency holdings and

nonresident baht accounts).[6] Table 1 shows the capital account policy indexes constructed in this study.

Table 1. **Capital Account Policy Indexes**

Liabilities (Net capital inflows)		**Assets (Net capital outflows)**	
Inflow policies	**Outflow policies**	**Inflow policies**	**Outflow policies**
Policies related to FDI	Policies related to FDI	Policies related to FDI	Policies related to FDI
Policies related to	Policies related to	Policies related to	Policies related to
Portfolio	Portfolio	Portfolio	Portfolio
Equity	Equity	Equity	Equity
Debt	Debt	Debt	Debt
Policies related to other investment flows (including financial institution)	Policies related to other investment flows (including financial institution)	Policies related to other investment flows (including financial institution)	Policies related to other investment flows (including financial institution)

Source: Authors' representation.

The disaggregation of capital account measures into various categories help us to clearly examine such policies and gauge their effectiveness. Some policies, e.g., capital outflow restrictions (liability side), can have an impact not only on capital outflows but also on capital inflows, e.g., by discouraging investors from bringing in new money. Thus, disaggregating capital account policies into those affecting the liability side and those affecting the asset side and further according to inflows and outflows help us to identify the effectiveness of such measures. Furthermore, since the central bank introduces different degrees of restriction/liberalization on the various types of capital flows, disaggregation of capital policies according to asset classes is needed.

The capital account policy indexes are constructed by assigning +1 or –1 to each announced measure. Any measure that relaxes inflows and facilitates outflows is assigned +1 regardless of the source of the flows (i.e., whether from residents or nonresidents). Any measure that restricts inflows as well as outflows is assigned –1. The number is scaled by different weights based on direct and indirect impact criteria. The weight is set between 0 and 2—the higher the weight, the more severe the measure, especially from policymakers' point of view. For example, a weight of 2 is assigned when the central bank imposes a tax, URR, a two-tier market, or lifts certain policy measures. The weight is equal to 1 when the central bank requests and/or requires investors or financial institutions to undertake certain measures. A weight of 0.25–0.5 is given when the central bank changes the regulation slightly or seeks the cooperation of or provides a particular option for investors, including financial institutions. The sensitivity of the weights is gauged to ensure the robustness of the indexes. Appendix 2 provides capital

[6] A chronology of capital restriction and liberalization measures adopted in Thailand during 1990–2010 is given in the Appendix 1.

account policy indexes with no weight assigned to the policy measures, which is the methodology used by most of the previous empirical studies.[7]

Once a number (+1 or –1) and weight has been assigned to each measure, the figures are sequentially accumulated over time to arrive at the indexes for each asset class.[8] The indexes are rescaled to lie between 0 and 1 for capital inflow policy, where 1 represents capital liberalization and 0 represents capital inflow restrictions. For the outflow side, the indexes are rescaled to lie between 0 and –1, where 0 represents capital outflow restrictions while –1 refers to capital outflow liberalization. The capital restriction indexes are constructed based on monthly information and the simple average over 3 months is calculated to generate quarterly indexes.

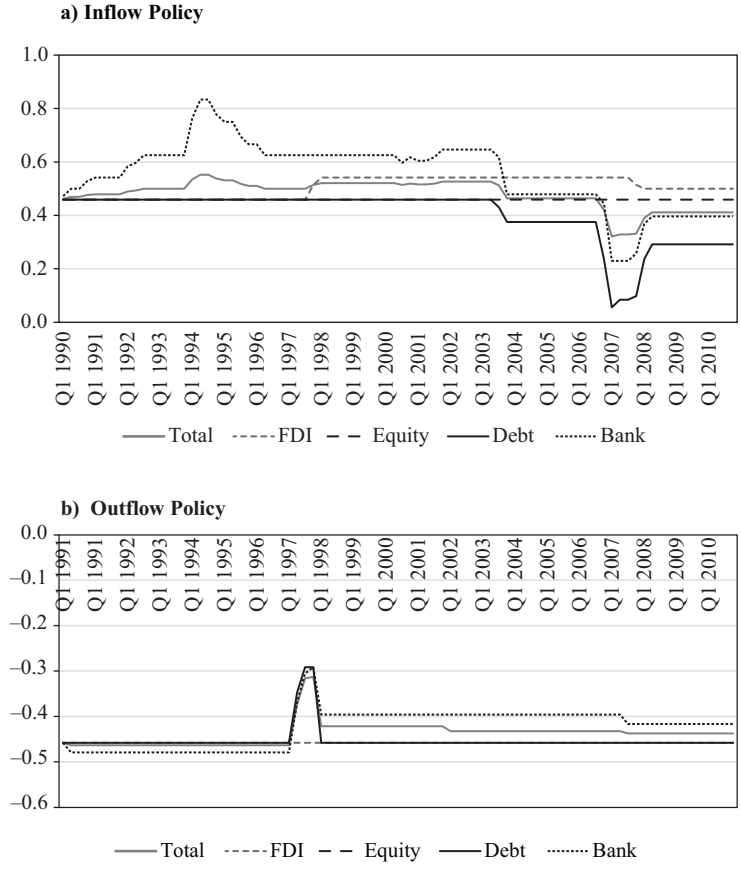
Figures 1–2 show the capital restriction indexes for the liability (inflow and outflow) and asset (outflow) sides. For the liability side, before 1994, capital account policies were liberalized substantially as discussed in the previous section (Figure 1a). Liberalization was mainly due to policies affecting the inflow side, as there was no policy change from the outflow side. The increase of the capital account policy index (inflow side) traced mainly to liberalization in financial institutions affecting other investment inflows as liberalization in other asset categories had been relatively limited. During 1994–1997, the central bank began to introduce measures to limit capital inflows, leading to a decline of capital account policy indexes from the inflow side (Figure 1a). The exception had been FDI inflow policy where the central bank relaxed regulations to facilitate more inflows during the Asian financial crisis, as reflected by a slight increase in the index for FDI in the late 1990s (Figure 1a).

Meanwhile, in 1997, the central bank introduced capital outflow restrictions to reduce the pressure of capital outflows and quell baht speculation. The capital outflow indexes for all categories, except FDI, increased noticeably (Figure 1b). However, the outflow restrictions were relaxed substantially in the following year and gradually liberalized further in succeeding years.

[7] See for example, Schindler (2009), Ito and Chinn (2008), Mody and Murshid (2005), Miniane (2004), Johnston and Tamirisa (1998), and Tamirisa (1999).

[8] Note that to be able to compare the capital account policy indexes across asset types, the maximum accumulation value of a particular asset type is used as a base for the index.

Figure 1. **Capital Account Policy Indexes (Liability side), 1990–2010**



Note: The indexes lie between "0" and "1" for inflow policy, where "0" refers to restrictions while "1" refers to liberalization. For the outflow policy, the indexes lie between "0" and "–1", where "0" refers to restrictions and "–1" refers to liberalization.

Source: Authors' calculation.

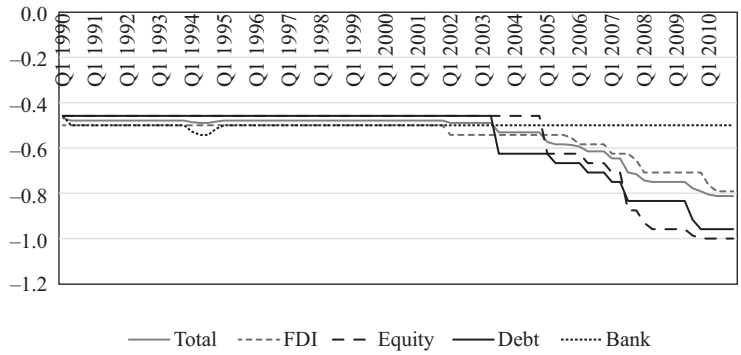
As mentioned in the previous section, a number of restrictions were introduced in 2003 to curb speculative capital inflows. These policies led to a decline in capital inflow restriction indexes, especially in debt securities and financial institutions, in 2003 (Figure 1a). However, because of the continued influx of short-term capital into debt securities and noticeable appreciation of the baht in 2006, additional restriction measures, including URR, were introduced. Such restrictions were reflected in the sharp decline of the indexes in 2006, especially in terms of debt securities and financial institutions (Figure 1a).

Controls on capital inflows were gradually relaxed in 2007 and the URR eventually lifted in March 2008. This resulted in an increase in capital inflow restriction indexes in 2007–2008 (Figure 1a). However, because of certain measures imposed by the central bank, although the URR was abolished, capital restrictions indexes, especially for debt securities, remained relatively high compared to average levels in the early 2000s.

A number of policy measures to relax outflows restrictions from the asset side were subsequently announced after 2003 both in FDI and portfolio investment, while no progress in terms of liberalization was found in financial institutions. The capital account policy indexes shown in Figure 2 clearly point to a progressive relaxation of capital outflow restrictions in FDI, equity, and debt securities. Note that there was no significant change of inflow policy from the asset side.

Figure 2. **Capital Account Policy Indexes (Asset side), 1990–2010**

a) Outflow Policy



Note: The indexes lie between "0" and "1" for inflow policy, where "0" refers to restrictions while "1" refers to liberalization. For the outflow policy, the indexes lie between "0" and "–1", where "0" refers to restrictions and "–1" refers to liberalization.

Source: Authors' calculation.

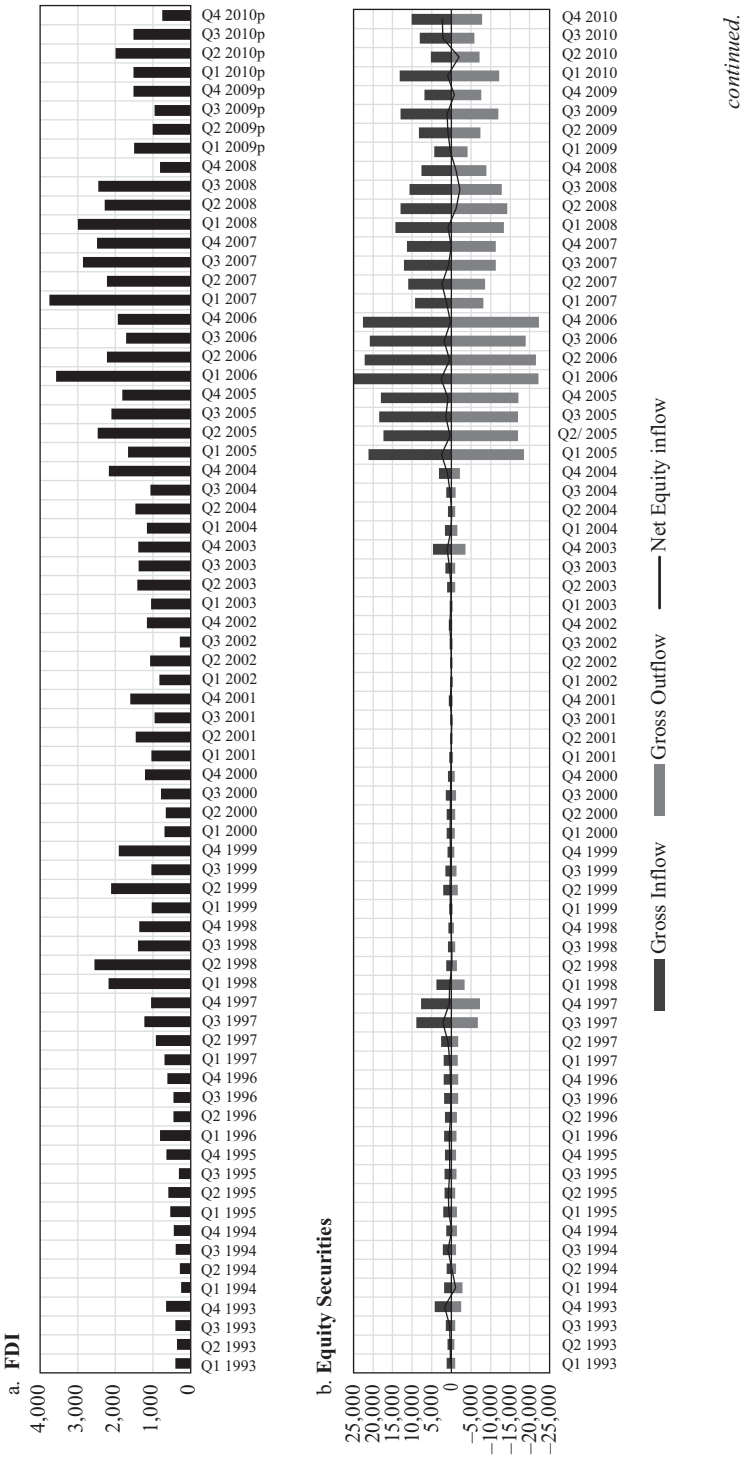
V. CAPITAL MOBILITY AND EXCHANGE RATES IN THAILAND

There were two waves of private capital inflows (liability side) to Thailand over the past two decades. The first began in the latter half of the 1980s, gathered momentum in the early 1990s, and then abruptly ended in 1997 because of the Asian financial crisis. The regional crisis interrupted capital inflows into Thailand, which saw net capital outflows during 1998–2000 (Figure 3). The responses of capital inflows to the crises, however, differed across components. FDI flows proved to be more resilient in the wake of Asian financial crisis than other forms of capital inflows, i.e., portfolio (both equity and debt) and bank loans. While portfolio inflows and bank loans declined substantially during 1998–2002, FDI inflows continued to increase during this period (Figure 3). Figure 3d shows that although the government imposed restrictions on capital inflows during 1994–1997, net other investment inflows still increased. In addition, although the central bank introduced capital outflow controls in 1997–1998, net capital outflows were evident in debt security and other investment flows (Figures 3c–3d).

The second wave began in 2002 and lasted up until 2007. Capital inflows had gathered momentum again in Thailand in 2003, after abruptly ending in 1997 because of the Asian financial crisis (Figure 3). However, the global financial crisis in late 2008 caused a slowdown in cross-border capital inflows to Thailand that year (Figures 3b–3d). Because of strong economic recovery in Thailand (and the rest of Asia) and the country's healthy financial institutions, capital inflows have again shown an increasing trend beginning the second quarter of 2009. The level of net capital inflows in 2009 was close to that in 2007.

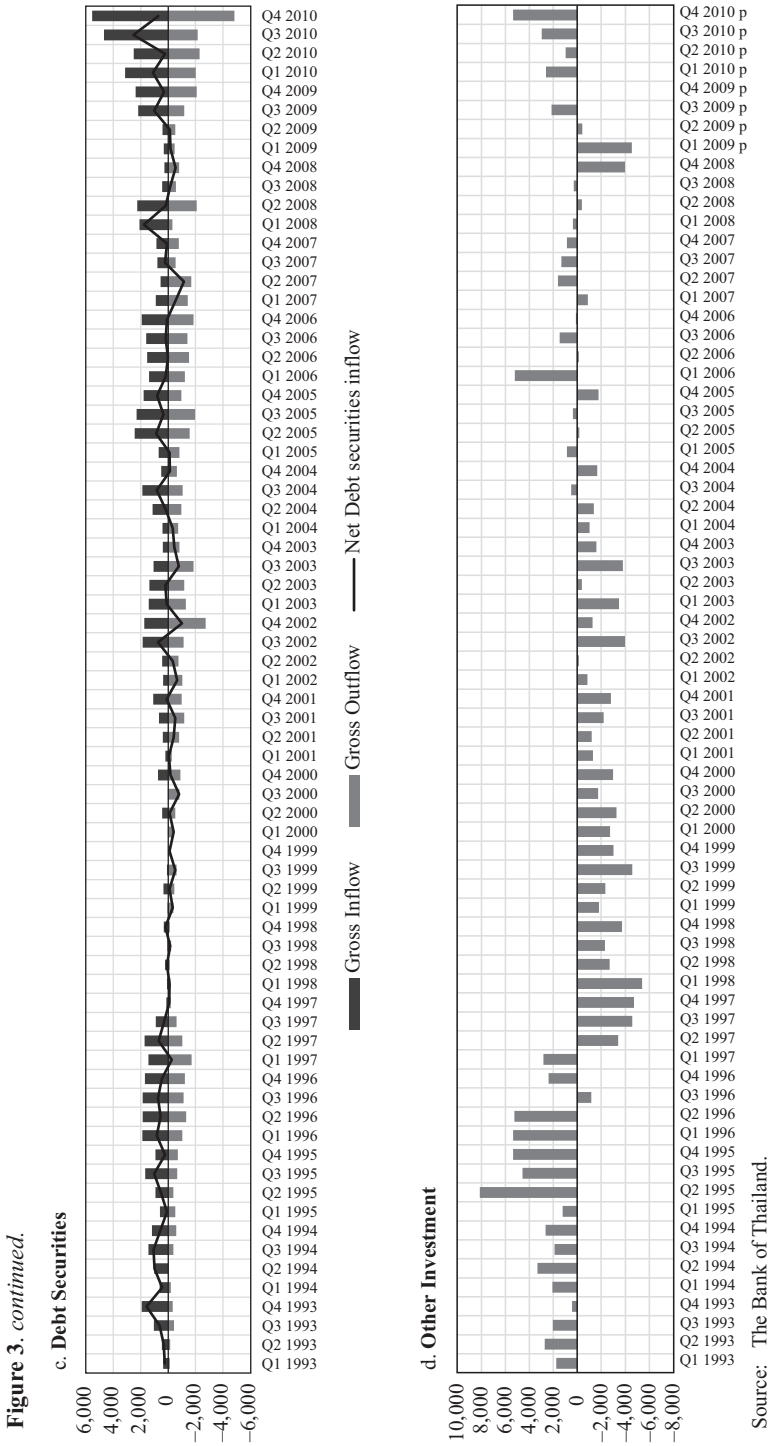
The composition of capital inflows changed after the 1997 Asian financial crisis. Before then, inflows from bank loans had been the key component of total capital inflows in Thailand, accounting for almost 70%, followed by FDI (15%) and debt securities (8%). During the second wave of capital inflows, FDI and equity securities dominated other types of capital inflows, while bank loans registered net inflows in 2006, after prolonged periods of net outflows after the Asian crisis.

Figure 3. **Net Capital Inflows (Liability) and Capital-account Policy Indexes, 1993–2010**



continued.

Figure 3. *continued.*

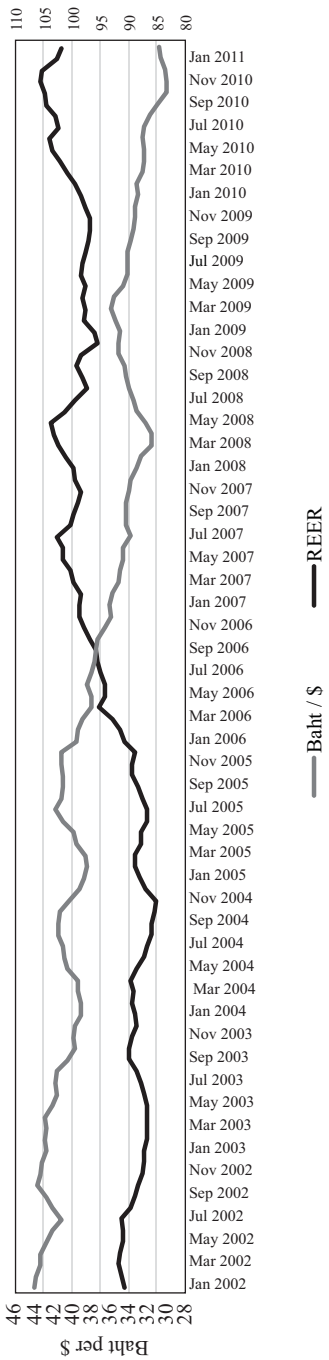


Source: The Bank of Thailand.

As mentioned earlier, after 2003, the central bank saw an influx of short-term capital, especially debt securities, into Thailand fueling worries about the movement of baht in terms of both nominal and real (effective) exchange rates (Figure 4). The nominal exchange rate (baht per dollar) began to appreciate since 2001, but the real effective exchange rate appreciated noticeably from 2005 to mid-2007 (Figure 4). There had also been a sudden increase in the total outstanding amount of nonresident baht accounts. The central bank began to impose restrictions on capital inflows as shown by a decline of capital inflow control indexes (Figure 1a). Interestingly, the central bank had imposed capital inflow controls primarily on debt securities and other investment, while no significant restrictions were placed on equities. Gross and net equity inflows tended to increase during the period of inflow restrictions, especially during 2005–2006 (Figure 3b).

Along with a noticeable rise of capital inflows in 2003–2007, net capital outflows increased substantially in Thailand, reaching $17 billion in 2007 (Figure 5). Because of the global financial crisis, net capital outflows declined in 2008 but a strong economic recovery helped encourage Thai residents to invest overseas again in 2009. Capital outflows during this period largely comprised bank loans, followed by debt securities and FDI. This picture was consistent throughout the region even for net overseas investors in FDI such as the Republic of Korea and Taipei,China.

Figure 4. **The Movements of Nominal (Baht/$) and Real Exchange Rates (2007=100), 2002–2011**



Source: The Bank of Thailand.

Figure 5: **Net Capital Outflows (Asset) and Capital-account Policy Indexes, 1993–2010**

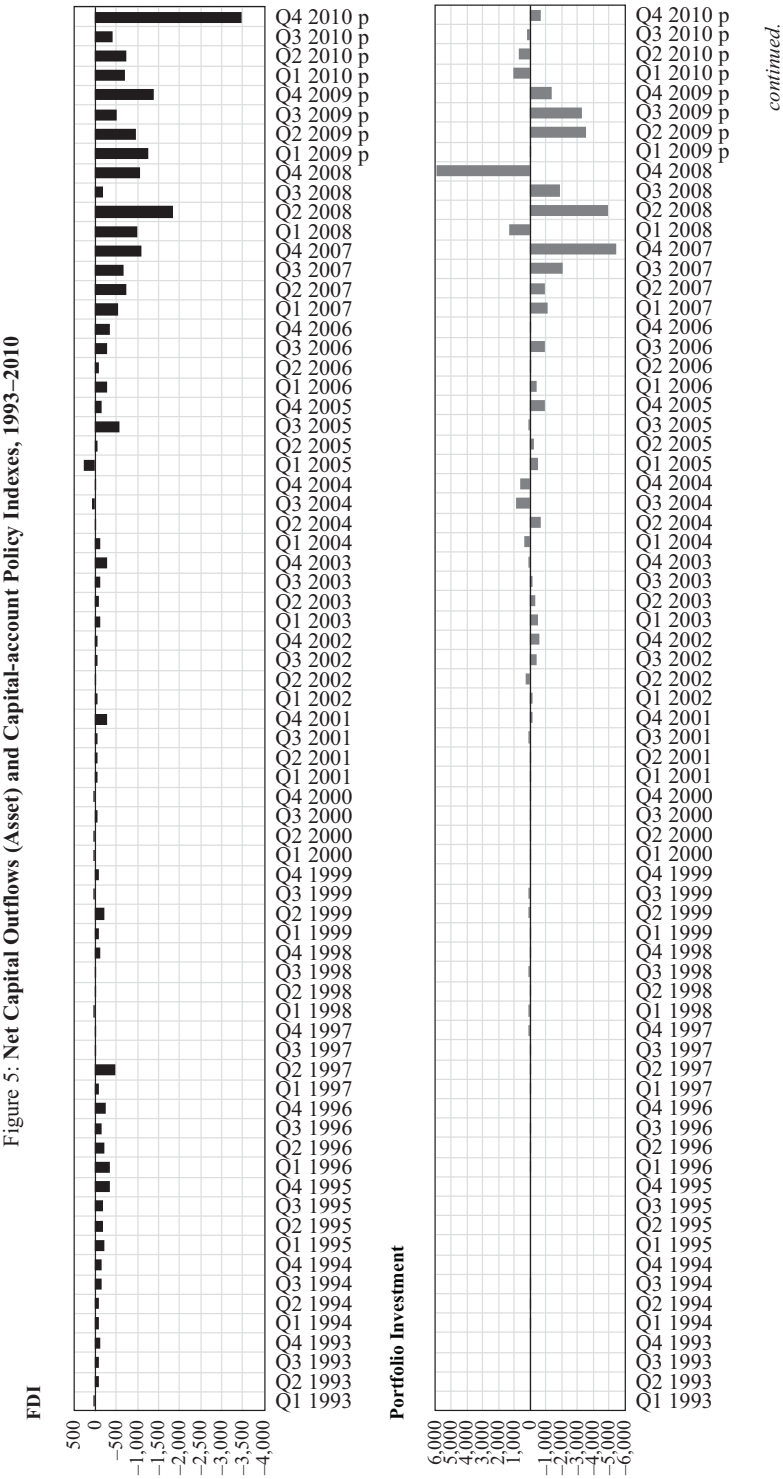


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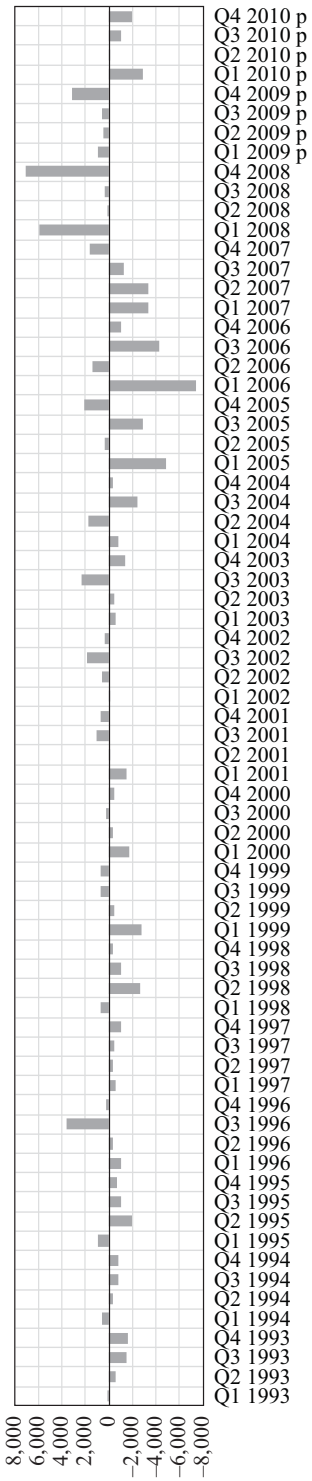
Figure 5. *continued.*



Source: The Bank of Thailand.

VI. ASSESSING EFFECTIVENESS OF CAPITAL RESTRICTIONS

The vector autoregressive (VAR) model is applied in this study to assess the effectiveness of capital restrictions introduced in Thailand during 1993–2010. The VAR model is applied to two different periods, 1993–1999 and 2000–2010. This is done because behavior of investors in response to the key determinants, including capital account policy, may differ before and after the Asian financial crisis. In addition, key policy measures that encourage residents to invest overseas began only in the early 2000s.

Since the central bank introduced measures aimed not only at affecting net capital inflows but also at encouraging residents to invest overseas, the VAR model is applied separately to net capital inflows (liabilities) and net capital outflows (assets). To clearly examine the effects of measures, especially a possible switching effect, the model is applied to different asset classes, including FDI, portfolio investment (equity and debt securities), and other investment flows.

The variables included in the VAR model are the theoretical determinants of capital flows that cover the five key aspects considered in assessing the effectiveness of capital account policy. The endogenous variables in the model, therefore, include: capital flows, the real exchange rate, exchange rate volatility, the manufacturing production index, (real) interest rate differentials, and capital control indexes. The exogenous variables are the real gross domestic product (GDP) of G3 countries and the share prices of industrialized countries. Since the degree of capital account policy differs per asset class, we include capital control indexes separately for each asset class as well as for capital inflow and outflow policies.

All in all, the variables in the model are composed of:

(1) **Capital flows**

1.1. For the liability side, capital flows (seasonally adjusted) are divided into:

TIF	= total net capital inflows (% of GDP)
IFDI	= net FDI inflows (% of GDP)
IEQUITY	= net equity investment inflows (% of GDP)
IEQUIINFLOW	= gross equity inflows (% of GDP)
IDEBT	= net debt security investment inflows (% of GDP)
IDEBTINFLOW	= gross debt security inflows (% of GDP)
Iother	= net other investment inflows (% of GDP)

1.2. For the asset side, capital flows (seasonally adjusted) are divided into:

TOF = total net capital outflows (% of GDP)
OFDI = outward FDI (% of GDP)
OFDIOUTFLOW = gross outward FDI (% of GDP)
OEQUITY = net equity outflows (% of GDP)
OEQUIOUTFLOW = gross equity outflows (% of GDP)
ODEBT = net debt security outflows (% of GDP)
ODEBTOUTFLOW = gross debt security outflows (% of GDP)
Oother = net other investment outflows (% of GDP)
OotherOUTFLOW = gross other investment outflows (% of GDP)

Note that to be able to interpret the results easily, a positive sign is assigned to all asset types of capital outflows. A higher positive value implies a larger volume of capital outflows.

(2) **Capital account policy indexes**[9]

2.1. For the liability side, different sets of capital account policy indexes are included for the periods 1993–1999 and 2000–2010.

2.1.1. For 1993–1999, the capital account policy indexes are:

LIA_INFDI = capital account policy index for FDI inflows
LIA_INBANK = capital account policy index for other inflows, especially for financial institutions
LIA_OUTEXFDI= capital account policy index for capital outflows, excluding FDI

2.1.2 For 2000–2010, the capital account policy indexes (footnote 9) are:

LIA_INEXFDI = capital account policy index for capital inflows, excluding FDI
LIA_OUTEXFDI = capital account policy index for capital outflows, excluding FDI

2.2 For the asset side, where capital account policies had been employed beginning the early 2000s, the capital account policy indexes are:

AS_OUTFDI = capital account policy index for FDI outflows
AS_OUTPORT = capital account policy index for other capital outflows, especially portfolio investment

[9]The indexes range from 0 (maximum restrictions) to 1 (liberalization) for inflows, and from 0 (maximum restrictions) to 1 (liberalization) and from 0 (maximum restrictions) to –1 (liberalization) for outflows.

(3) **Real exchange rate**

REER = real effective exchange rate, constructed by the BOT (2007=100). An increase in the REER reflects an appreciation.[10]

(4) **Exchange rate volatility**

FXVO1 = exchange rate volatility (baht/$), calculated by the standard deviation of changes in exchange rate.[11]

FXVO2 = exchange rate volatility (weighted average for key export partners), calculated by the standard deviation of changes in the exchange rate.

(5) **Real interest rate differential**[12]

RINTEREST = real interest rate differential between the Thai policy rate and the US 3-month Treasury bill rate, adjusted using consumer price index (CPI) inflation.

(6) **Manufacturing production index**[13]

MPI = Manufacturing production index, (2000=100).

Data on capital inflows and outflows, interest rates, CPI, the manufacturing production index, and nominal and real effective exchange rates are from the BOT. Real GDP of G3 countries and share prices are from the International Financial Statistics of the IMF.

The Augmented Dickey-Fuller test is used to test the stationarity of the data.[14] The selected lag length of the VAR model is based on the Akaike information criterion and sequential modified LR test statistic. We set the ordering of the variables by listing the policy variables last, after the other key economic variables, i.e., capital flows, exchange rate volatility, the real exchange rate, the manufacturing production index, the policy rate, and capital account

[10] The results when using the nominal exchange rate were similar to those using the REER but the diagnostic tests using the REER perform better.

[11] Note that the results when we apply GARCH or EGARCH model in calculating exchange rate volatility (bilateral and multilateral) are the same as when the standard deviation method is used.

[12] Note that we also apply other interest rates in both countries but the results are virtually unchanged. Since one of our objectives is to examine impacts of capital account policy on monetary independence, policy rates seem to be more relevant in the VAR model.

[13] Note that the results when applying MPI or real GDP are not significantly different.

[14] According to the test, all variables are nonstationary so that we use first differences, which provide superior diagnostic tests, to perform VAR.

policy indexes. For example, during 2000–2010, the VAR model for net total capital inflows (liability side) is as follows:

$$TIF_t = \sum_{i=1}^{n} \alpha_{1i} TIF_{t-i} + \sum_{i=1}^{n} \alpha_{2i} FXVOl_{t-i} + \sum_{i=1}^{n} \alpha_{3i} RER_{t-i} + \sum_{i=1}^{n} \alpha_{4i} MPI_{t-i} + \sum_{i=1}^{n} \alpha_{5i} RRINTEREST_{t-i} +$$
$$\sum_{i=1}^{n} \alpha_{6i} LIA\_INEXFDI_{t-i} + \sum_{i=1}^{n} \alpha_{7i} LIA\_OUTEXFDI_{t-i} + \sum_{i=1}^{n} \alpha_{8i} G3GDP_{t-i} + \sum_{i=1}^{n} \alpha_{9i} Share_{t-i} + \varepsilon_{1t}$$

$$FXVOl_t = \sum_{i=1}^{n} \varphi_{1i} TIF_{t-i} + \sum_{i=1}^{n} \varphi_{2i} FXVOl_{t-i} + \sum_{i=1}^{n} \varphi_{3i} RER_{t-i} + \sum_{i=1}^{n} \varphi_{4i} MPI_{t-i} +$$
$$\sum_{i=1}^{n} \varphi_{5i} RRINTEREST_{t-i} + \sum_{i=1}^{n} \varphi_{6i} LIA\_INEXFDI_{t-i} + \sum_{i=1}^{n} \varphi_{7i} LIA\_OUTEXFDI_{t-i}$$
$$+ \sum_{i=1}^{n} \varphi_{8i} G3GDP_{t-i} + \sum_{i=1}^{n} \varphi_{9i} Share_{t-i} + \varepsilon_{1t}$$

$$RER_t = \sum_{i=1}^{n} \delta_{1i} TIF_{t-i} + \sum_{i=1}^{n} \delta_{2i} FXVOl_{t-i} + \sum_{i=1}^{n} \delta_{3i} RER_{t-i} + \sum_{i=1}^{n} \delta_{4i} MPI_{t-i} + \sum_{i=1}^{n} \delta_{5i} RRINTEREST_{t-i} +$$
$$\sum_{i=1}^{n} \delta_{6i} LIA\_INEXFDI_{t-i} + \sum_{i=1}^{n} \delta_{7i} LIA\_OUTEXFDI_{t-i} + \sum_{i=1}^{n} \delta_{8i} G3GDP_{t-i} + \sum_{i=1}^{n} \delta_{9i} Share_{t-i} + \varepsilon_{1t}$$

$$MPI = \sum_{i=1}^{n} \beta_{1i} TIF_{t-i} + \sum_{i=1}^{n} \beta_{2i} FXVOl_{t-i} + \sum_{i=1}^{n} \beta_{3i} RER_{t-i} + \sum_{i=1}^{n} \beta_{4i} MPI_{t-i} + \sum_{i=1}^{n} \beta_{5i} RRINTEREST_{t-i} +$$
$$\sum_{i=1}^{n} \beta_{6i} LIA\_INEXFDI_{t-i} + \sum_{i=1}^{n} \beta_{7i} LIA\_OUTEXFDI_{t-i} + \sum_{i=1}^{n} \beta_{8i} G3GDP_{t-i} + \sum_{i=1}^{n} \beta_{9i} Share_{t-i} + \varepsilon_{1t}$$

$$RINTEREST_t = \sum_{i=1}^{n} \gamma_{1i} TIF_{t-i} + \sum_{i=1}^{n} \gamma_{2i} FXVOl_{t-i} + \sum_{i=1}^{n} \gamma_{3i} RER_{t-i} + \sum_{i=1}^{n} \gamma_{4i} MPI_{t-i} + \sum_{i=1}^{n} \gamma_{5i} RRINTEREST_{t-i} +$$
$$\sum_{i=1}^{n} \gamma_{6i} LIA\_INEXFDI_{t-i} + \sum_{i=1}^{n} \gamma_{7i} LIA\_OUTEXFDI_{t-i} + \sum_{i=1}^{n} \gamma_{8i} G3GDP_{t-i} + \sum_{i=1}^{n} \gamma_{9i} Share_{t-i} + \varepsilon_{1t}$$

$$LIA\_INEXFDI_t = \sum_{i=1}^{n} \phi_{1i} TIF_{t-i} + \sum_{i=1}^{n} \phi_{2i} FXVOl_{t-i} + \sum_{i=1}^{n} \phi_{3i} RER_{t-i} + \sum_{i=1}^{n} \phi_{4i} MPI_{t-i} + \sum_{i=1}^{n} \phi_{5i} RRINTEREST_{t-i} +$$
$$\sum_{i=1}^{n} \phi_{6i} LIA\_INEXFDI_{t-i} + \sum_{i=1}^{n} \phi_{7i} LIA\_OUTEXFDI_{t-i} + \sum_{i=1}^{n} \phi_{8i} G3GDP_{t-i} + \sum_{i=1}^{n} \phi_{9i} Share_{t-i} + \varepsilon_{1t}$$

$$LIA\_OUTEXFDI_t = \sum_{i=1}^{n} \omega_{1i} TIF_{t-i} + \sum_{i=1}^{n} \omega_{2i} FXVOl_{t-i} + \sum_{i=1}^{n} \omega_{3i} RER_{t-i} + \sum_{i=1}^{n} \omega_{4i} MPI_{t-i} + \sum_{i=1}^{n} \omega_{5i} RRINTEREST_{t-i} +$$
$$\sum_{i=1}^{n} \omega_{6i} LIA\_INEXFDI_{t-i} + \sum_{i=1}^{n} \omega_{7i} LIA\_OUTEXFDI_{t-i} + \sum_{i=1}^{n} \omega_{8i} G3GDP_{t-i} + \sum_{i=1}^{n} \omega_{9i} Share_{t-i} + \varepsilon_{1t}$$

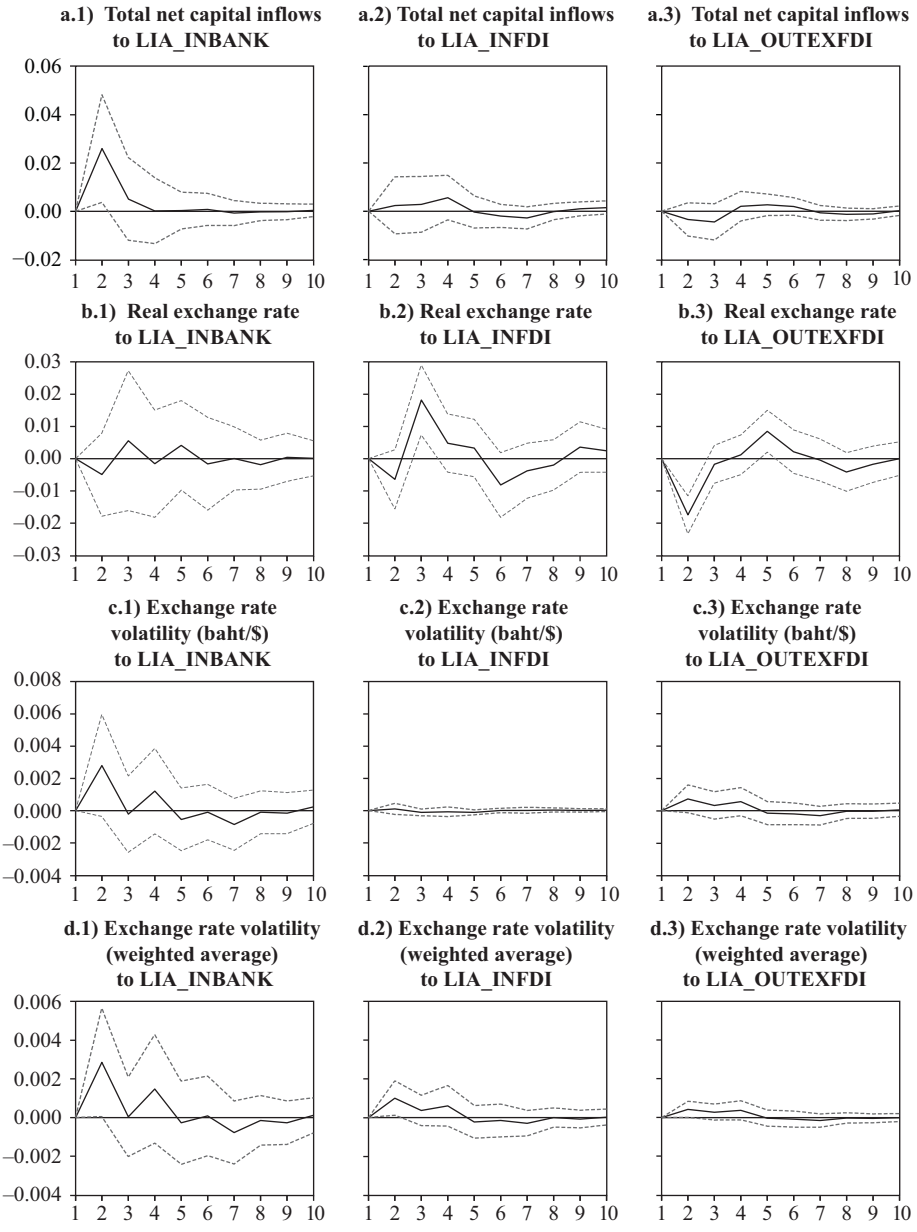
Note that the sensitivity of the model is tested by changing the order of the variables. Results show that the model is not significantly sensitive to the ordering of the variables.

VII. RESULTS

Figures 6–8 show impulse responses of key variables to a one standard deviation increase in capital account policy indexes for the liability side during 1993–1999, the liability side during 2000–2010, and the asset side during 2000–2010, respectively. For 1993–1999, results show that capital inflow policy, especially on other investment flows (LIA_INBANK), had a significant and positive impact on net capital inflows, while there was no significant impact of capital outflow policy (Figure 6a). The positive and significant impulse response of net capital inflows reflects how capital inflow liberalization in 1993–1994 tended to increase the volume of capital inflows in Thailand, while capital inflow restrictions introduced in 1995–1996 tended to reduce the volume of capital inflows. The positive and significant response of net capital inflows to capital inflow policy on financial institutions traced mainly to net equity inflows, as the impact on net FDI and other investment inflows (Iother) was insignificant (Figure 6f–6h). The latter result shows the ineffectiveness of capital inflow controls introduced in the late 1990s in reducing the volume of other investment inflows.

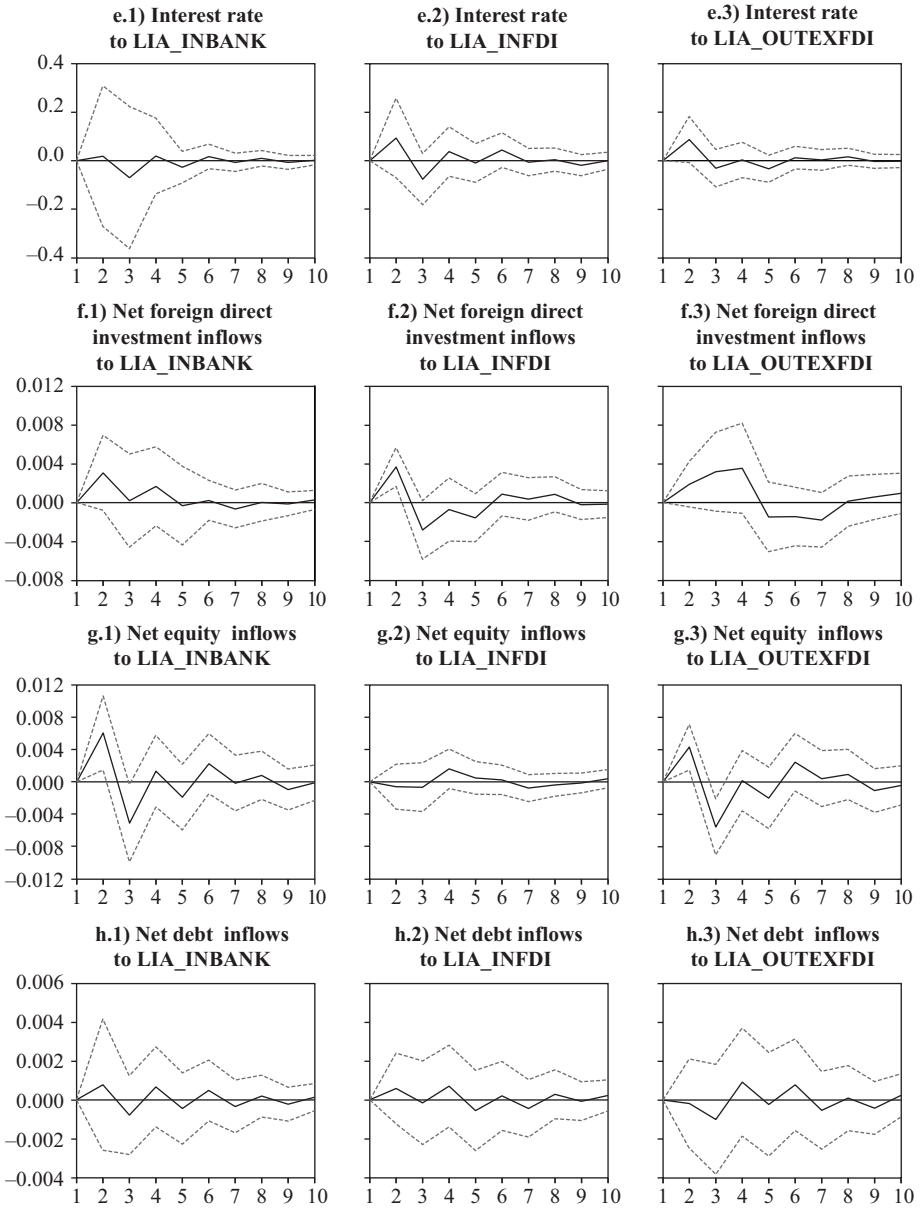
The results show that capital account policy on FDI inflows (LIA_INFDI) had a positive and significant impact only on net FDI inflows (Figure 6f). This implies that liberalization of FDI policy during the Asian financial crisis was able to attract more FDI into Thailand. This is consistent with the "fire sale" phenomenon occurring during the crisis period. Most FDI inflows were in the form of mergers and acquisitions.

Figure 6. **Impulse Responses of Key Variables to Capital Account Policies (Liability side), 1993–1999**



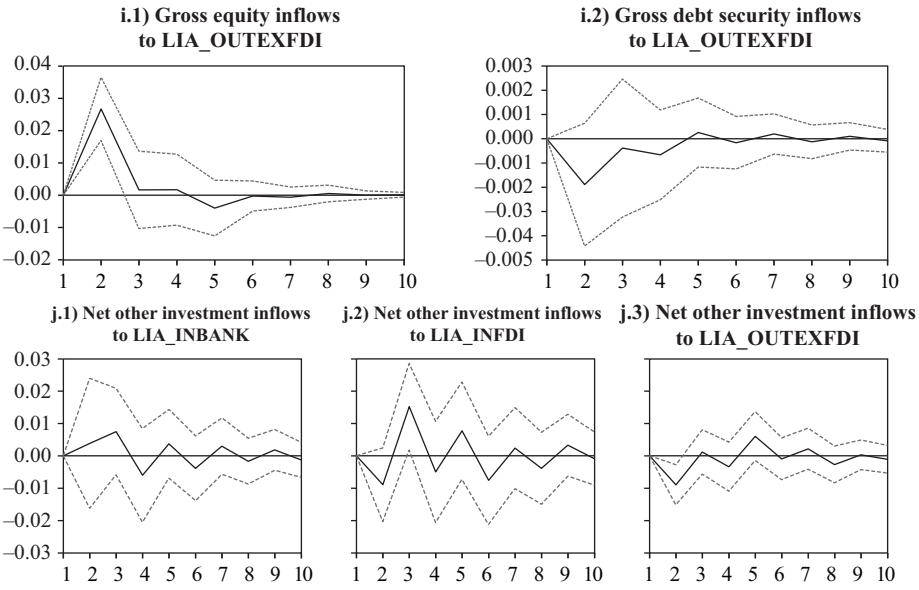
continued.

Figure 6. *continued.*



continued.

Figure 6. *continued.*



Source: Authors' calculation.

Capital outflow restrictions (LIA_OUTEXFDI) introduced during the 1997–1998 crisis had no significant impact on net capital inflows (Figure 6a.3). The negative relationship between these two variables, though not significant, reflects how outflow restrictions led to capital flight in the economy, i.e., lower net capital inflows (more capital outflows than inflows). Capital flight had seemingly been dominated by other investment inflows (Iother), with Figure 6j.3 showing a significant negative impulse response of other investment inflows (Iother). Interestingly, capital outflow restrictions led to more net equity inflows, but because outflows from other investment flows dominated, we saw a negative, but not significant, impact of outflow restrictions on net capital inflows. It is noteworthy that our results are robust even when we use gross equity inflows (Figure 6i.1–6i.2)[15]

Capital outflow restrictions had a significant effect on the real exchange rate, but toward greater depreciation as implied by the negative impulse responses (Figure 6b.3). This possibly reflects ineffectiveness of capital outflow policy in limiting capital flight. Similar results apply to exchange rate volatility (both baht/$ and weighted average), i.e., capital outflow restrictions were not able to reduce exchange rate volatility during the crisis period (Figures 6c.3 and 6d.3). Instead, the positive relationship implies that restrictions made the exchange rate

[15]Note that during 1993–1999, gross capital inflows were available only for equity and debt securities.

more volatile. Note that capital inflow policy, for both FDI and other inflows, did not have a significant impact on the real exchange rate (Figure 6b.1–6b.2).

For monetary independence, our results show that, to some extent, capital outflow controls were able to provide temporary monetary independence to the central bank (Figure 6e.3). This is reflected in the positive and significant impact of capital outflow controls on the interest rate differential. The positive relationship means controls allowed the central bank to raise the interest rate to limit capital outflows. However, the effect seems to be short-lived, i.e., only two quarters after implementing the policy.

Figure 7. **Impulse Responses of Key Variables to Capital Account Policies (Liability side), 2000–2010**

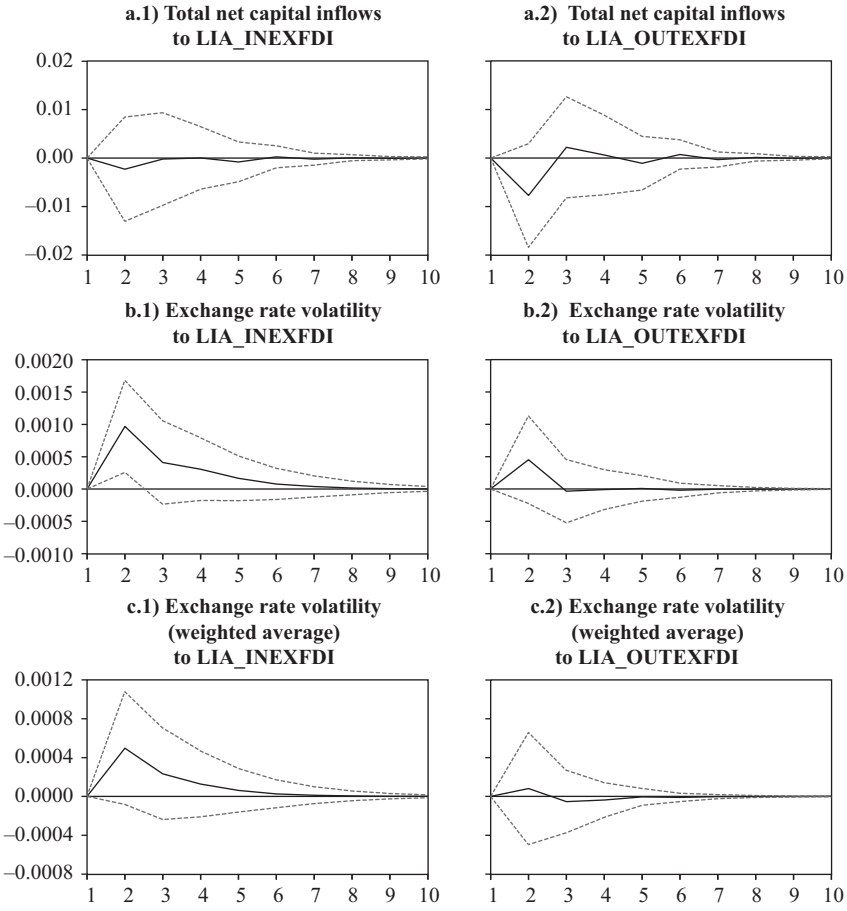


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Figure 7. *continued.*

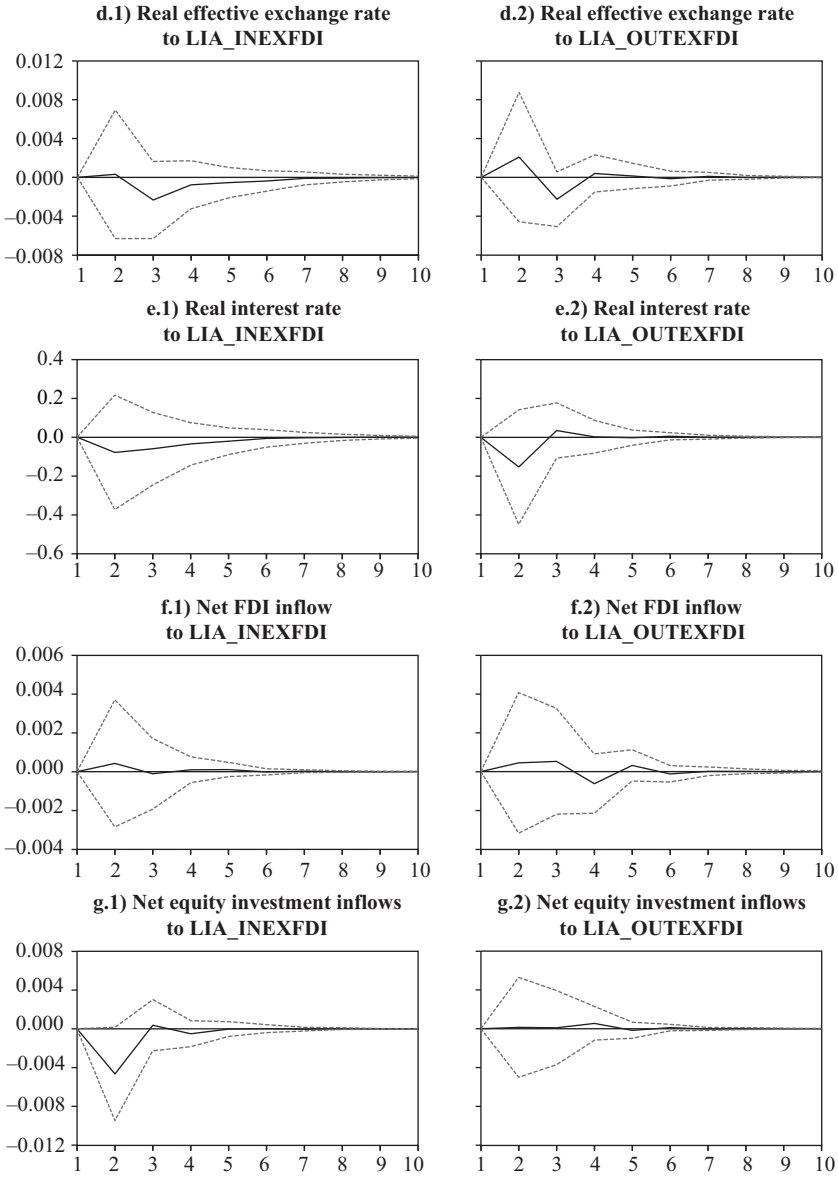

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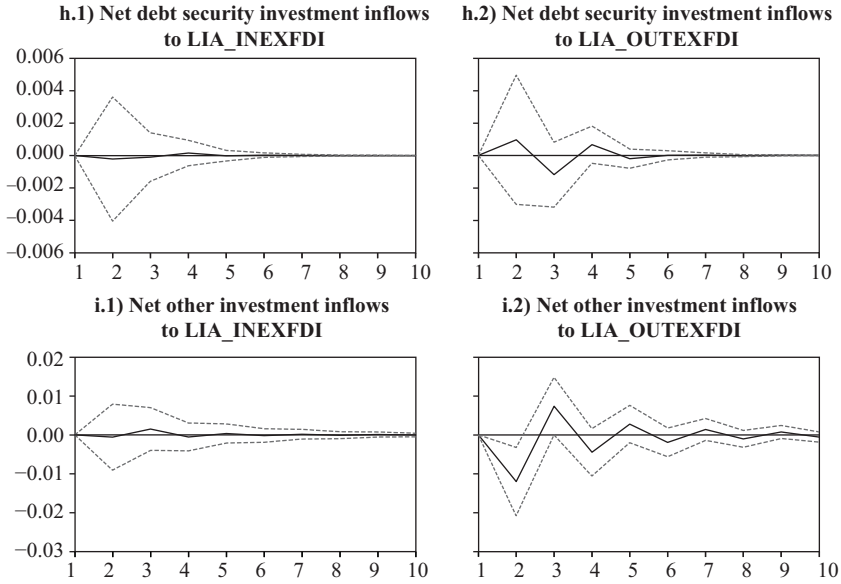
Figure 7. *continued.*



Source: Authors' calculation.

During 2000–2010, capital inflow restrictions (LIA_INEXFDI) appeared to have no significant impact on net capital inflows (Figure 7a.1). Responses of net debt security investment, other investment, and FDI inflows were quite weak (Figures 7h.1,7i.1, and 7f.1). By contrast, results show a significant and negative impact of capital inflow restrictions on net equity inflows implying that inflow restrictions introduced during the period encouraged investors to invest more in the equity market (Figure 7g.1). This switching effect may have occurred because most of the restriction policies were introduced to limit debt securities and other investment inflows, while no significant policy had been imposed on equity inflows.

In addition to the switching effect, the gradual liberalization of capital outflow controls after the Asian financial crisis seems to have contributed to a rise in capital inflows to the country. Results show that capital outflow policy (LIA_OUTEXFDI) during 2000–2010 had negative and significant impacts on net other investment inflows (Figure 7i.2), implying that liberalization led to a rise in other investment inflows. There was, however, no significant response for the other flows, i.e., FDI, equity, and debt securities, to such liberalization, and thus outflow liberalization had an insignificant impact on net capital inflows (Figure 7a.2).

The insignificant effect of capital inflow restrictions as well capital outflow liberalization on net capital inflows likely led to the insignificant response of the

real exchange rate and interest rate differential to such policies (Figure 7e). This suggests that capital inflow restrictions introduced in the early 2000s did not have an effect in either preventing baht appreciation or providing monetary independence. Interestingly, however, capital inflow restrictions seem to temporarily have limited the volatility of the exchange rate in relation to the dollar as evidenced by a positive and significant relationship between exchange rate volatility and capital inflow restrictions (Figure 7b.1). This suggests that capital inflow restrictions, at the very least, can slow the path of capital movements in the economy, especially to the US currency.

For the asset side, during 2000–2010, results show that capital outflow liberalization had an impact on net total capital outflows mainly due to liberalization of portfolio investment (AS_OUTPORT) rather than FDI liberalization (AS_OUTFDI) (Figure 8a). Debt securities responded the most to portfolio liberalization policy (Figures 8h.2, 8i.2, and 8j.2). Interestingly, there appears to be a positive relationship (almost significant at 5%) between equity securities and portfolio outflow policy, reflecting how liberalization failed to encourage Thai residents to invest abroad. This may reflect home bias and unclear opportunities in other markets, especially in developed countries.

Figure 8. **Impulse Responses of Key Variables to Capital Account Policies (Asset side), 2000–2010**

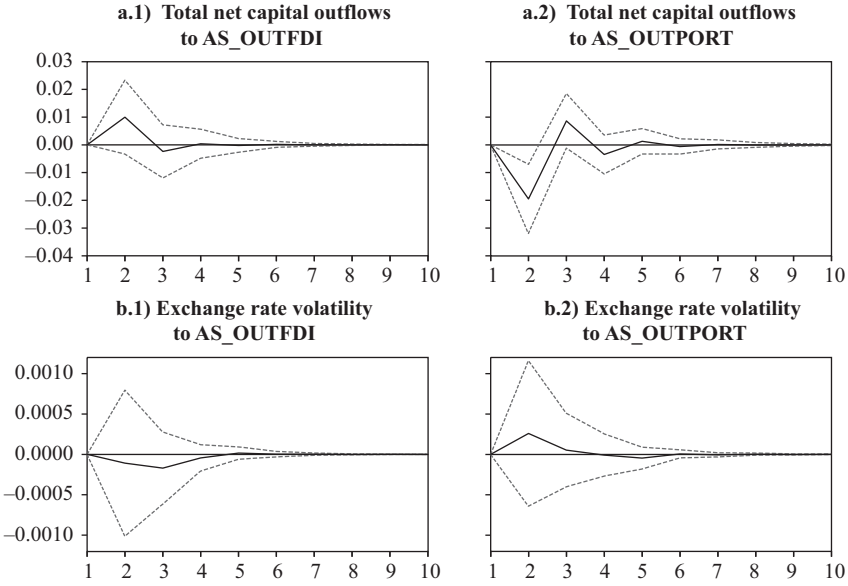


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Figure 8. *continued.*

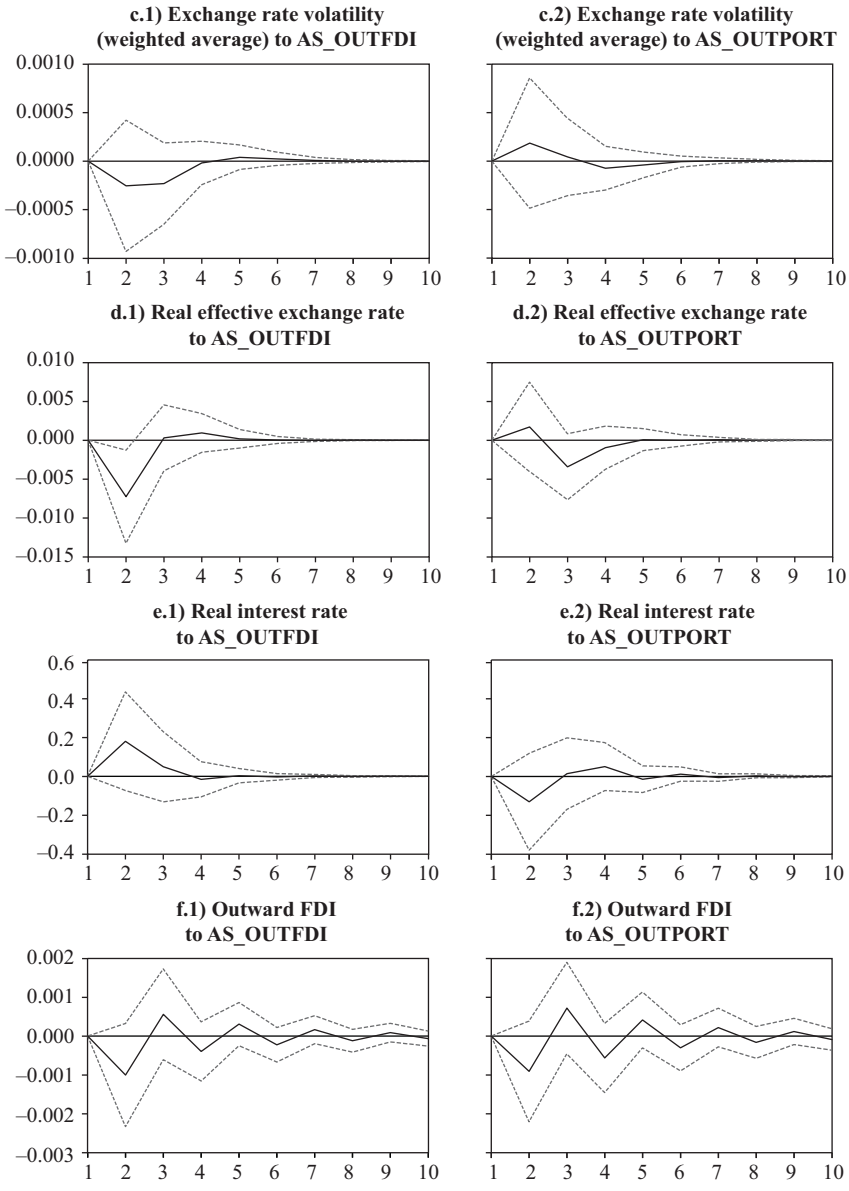

Figure 8. *continued.*

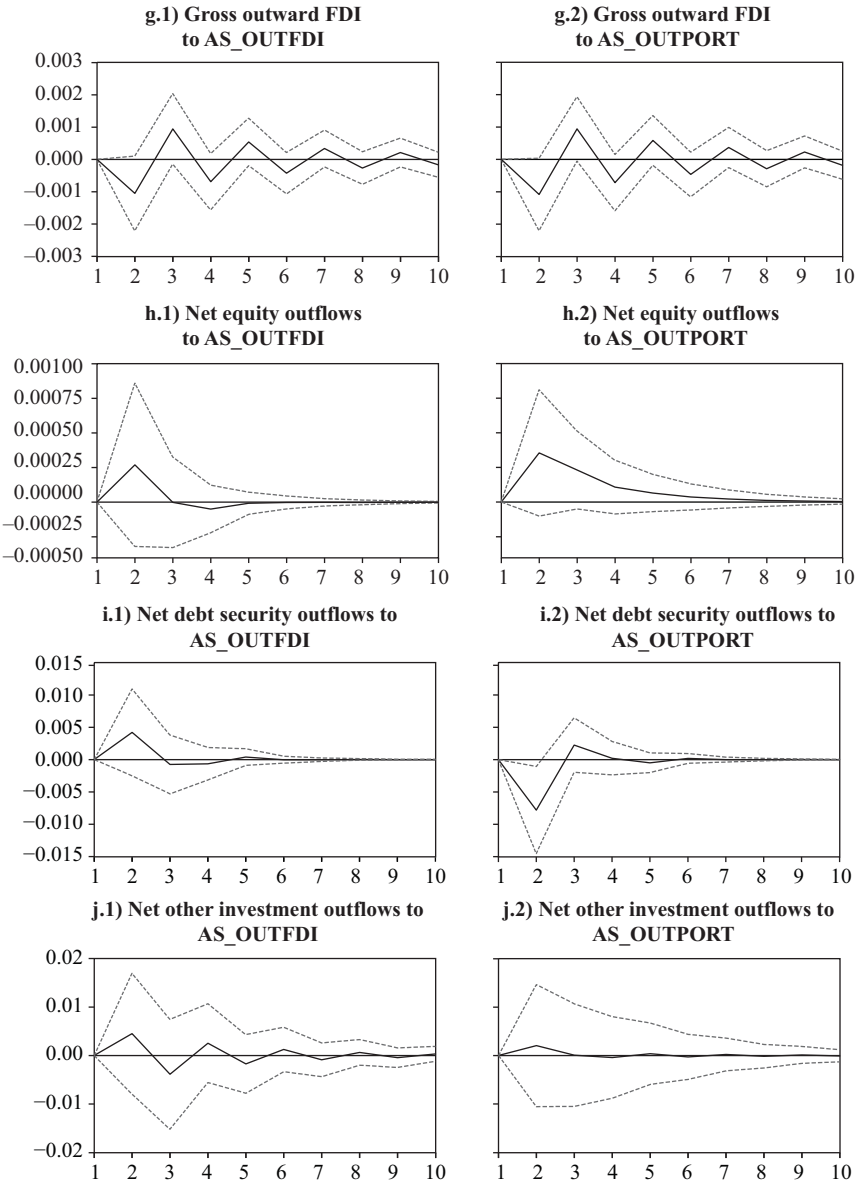

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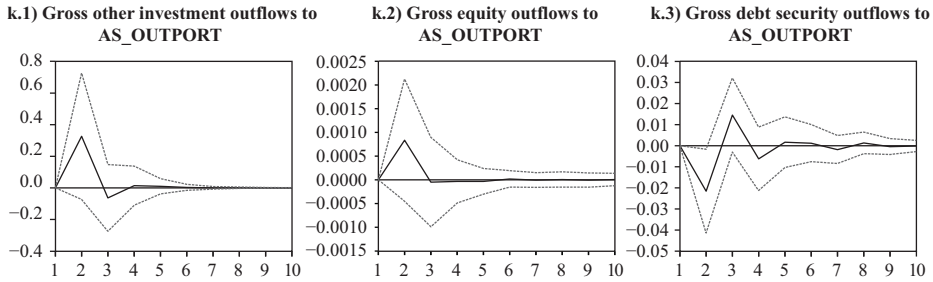
Figure 8. *continued.*



Source: Authors' calculation.

Results show a significant impact of FDI and portfolio outflow liberalization particularly on gross FDI outflows (Figure 8g.1–8g.2), possibly because recently, in addition to cash, issuance of common stock and exchange of stocks have become popular forms for cross-border merger and acquisition (M&As) payments. Policy relating to portfolio investment apparently helped to facilitate and boost cross-border FDI, especially M&As. However, because of high returns of FDI investment abroad in 2000–2010 (i.e., high inflows), the liberalization policy on FDI and portfolio investment outflows showed a weak relationship with net FDI outflows (Figures 8f.1–8f.2).

Liberalization policy on capital outflows (asset side) tended to have insignificant impacts on real exchange rate movements (Figure 8d.2). Liberalization on FDI had a significant impact but the responses were temporary, lasting only three quarters (Figure 8d.1). Results additionally show how outflow liberalization did not help reduce exchange rate volatility (Figures 8b–8c). The liberalization process also did not have a significant impact on real interest rate differentials, implying that monetary independence was not evident in response to capital outflow liberalization (Figure 8e).

CONCLUSIONS

This study uses a VAR model to examine the effectiveness of capital account policy in Thailand during the period 1993–2010. Effectiveness here covers five key aspects, mainly the ability to: (i) change the volume and composition of capital flows, (ii) relieve the pressure of real exchange rate appreciation, (iii) stabilize exchange rate movements, (iv) provide more monetary independence, and (v) prevent financial crisis.

Our results show that capital account liberalization policy tends to be more effective than capital restriction policy in changing the volume of capital flows. Particularly, capital outflow policy (asset side) in 2000–2010 seemed to

encourage Thai residents to invest more abroad. Meanwhile, capital inflow liberalization policy (liability side) in the early 1990s tended to have a positive effect on total net capital inflows. However, liberalization in capital outflows tended to be longer lasting than that in capital inflows in response to a one-off policy change.

Capital account policy can possibly change the composition of capital flows. The liberalization of FDI inflow policy (liability side) during the Asian financial crisis helped stimulate FDI inflows to the country even as other investment, particularly bank loans, exited. We found that the composition of capital shifted more towards long-term capital. In 2000–2010, the nexus between capital inflow restrictions and composition change was not clear. However, our results show that there was a switching effect from more capital-restricted asset classes, i.e., debt securities and other investment, toward less restricted ones (equity securities and FDI). The impact tended to be temporary though in response to a policy change.

The effect of inflow restrictions and outflow liberalization on the real exchange rate has been rather limited. During the crisis period, our results show that imposing capital outflow restrictions led to greater depreciation. Although capital restrictions could not influence the direction and level of the real exchange rate, we found that they helped limit the fluctuation of the nominal exchange rate in 2000–2010, especially comparing with the dollar.

Capital inflow restrictions, especially in 2000–2010, could not significantly help the central bank gain more monetary autonomy. Interestingly, during the Asian crisis period, we found that capital outflow restrictions could, to some extent, help the central bank temporarily raise domestic interest rates to limit capital outflows. However, it seems that capital account policy, especially capital outflow restrictions (liability side), could not help prevent a crisis. Particularly, they could not stop the reversal of capital outflows, resulting in greater depreciation of the exchange rate during the crisis periods.

All in all, our results imply that, unless carefully designed, capital control measures to deter short-term disruptive inflows (and reversals) may not be successful in carrying out the intent of policymakers. Even when they are effective, outcomes are likely to be temporary. The more effective and permanent way to shift the composition of foreign capital toward less volatile longer-term inflows is to improve the investment climate and develop domestic financial markets including local currency bond markets.

Appendix 1

A Chronology of Capital Account Policy in Thailand, 1990–2010

Date		Events
1990	April	Extension of the maximum holding period for foreign exchange acquired from all sources from 7 days to 15 days after receipt. This foreign exchange could be deposited at a commercial bank provided the outstanding balance did not exceed $500,000 per individual and $5 million per legal entity.
		Increase in the maximum net foreign assets of banks from 20% to 25%.
	November	Increase in a commercial bank's net foreign liabilities to 25% from 20%.
1991	April	Permission to the general public to conduct foreign exchange transactions directly with commercial banks.
1993	March	Bangkok International Banking Facilities (BIBF) licenses to domestic and foreign financial institutions granted by the Bank of Thailand (BOT).
	October	Request for commercial banks to announce the minimum lending rate (MLR), minimum retail rate (MRR), and maximum margin to be added to the MRR as a reference rate for customers other than those eligible for the MLR.
1994	February	Increase in the annual ceiling on foreign exchange sales or withdrawals from foreign exchange deposits for the purpose of investing abroad or lending to domestic subsidiaries that commercial banks were authorized to approve from $5 million to $10 million.
		Permission to authorized dealers to lend foreign exchange to nonresidents without limit. Lifting of the $5 million per individual limit on commercial bank lending to nonresidents.
	August	Permission to financial companies to open representative offices abroad and to BIBF to establish branches in provincial areas.
	November	Reduction in ceiling of net foreign liability and assets to 15% and 20% from 20% and 25%, respectively.
1995	August	Imposed 7% reserve requirement on a commercial bank's nonresident baht deposits.
	October	Rise in the minimum disbursement size for BIBF (out–in) loans to individuals from $500,000 to $2 million.
1996	April	Extension of 7% reserve requirement to financial companies and financial and securities companies.
		Grant of the second round BIBF license to foreign banks. Permission to upgrade branches of foreign banks to full option.
1997	May	Prohibition of security lending transactions by nonresidents.
		Introduction of the so called "two-tier" market measure. With this measure, the BOT asked for cooperation from domestic financial institutions to limit baht lending to nonresidents.
	June	Requirement for baht proceeds from sales of stock by nonresidents to be converted into foreign currency at the onshore exchange rate.
1977	September	Repatriation of export proceeds exceeding B500,000 within 120 days from the date of export and the surrender to authorized banks within 15 days.
	November	Lifting of the foreign ownership limit of 25% for financial institutions on a case-by-case basis (period of 10 years).

continued.

Appendix 1. *continued.*

Date		Events
1998	January	Lifting of all restrictions pertaining to transfer of Thai baht from the sale of domestic securities by nonresidents imposed in 1997.
		Surrender of proceeds from exports to authorized banks within 7 days of receipt.
		Requirement for commercial banks to maintain at least 6% of their nonresident foreign exchange deposits.
		Replacement of two-tier market measures with the so-called "50-million-baht" guideline. To guard against potential speculation, Thai baht credit facilities provided by each financial institution to nonresidents in cases where there are no underlying trade or investment activities in Thailand were made subject to a maximum outstanding limit of B50 million per party.
	October	It was clarified that in applying the maximum outstanding limit of B50 million, the nonresident's head office, branch representative offices, and affiliated companies are counted as one entity.
2000	August	Prescription of penalty for violation of the maximum outstanding limit on baht credit to nonresidents (e.g., 10 days suspension of repurchase transaction with BOT).
	October	Specified the types of permissible options and transactions and tightened the implementation of documentation requirements on banks' clients to prove their underlying transactions.
	November	Reminder to banks of the existing prohibition of outright forward baht sales with delivery dates of less than 2 days for no underlying transaction.
	December	Prohibition against residents' use of foreign exchange for domestic payments. Foreign capital may be brought into the country without restriction but proceeds must be surrendered to authorized banks or deposited in foreign currency accounts with authorized banks in Thailand within 7 days of receipt.
2001	September	Permission to financial institutions to extend direct loans in Thai baht with collateral to nonresident natural persons permitted to work in Thailand. Financial institutions may issue letters of guarantee to nonresidents when there is a standby letter of credit from financial institutions abroad.
2002	January	Permission to Thai residents to purchase immovable assets for residential purposes up to the equivalent of $5 million (without approval).
		Permission to Thai resident to purchase foreign shares under employee stock option plans up to the equivalent of $100,000 without BOT approval.
2003	September	Limiting the amount of Thai baht that onshore financial institutions can borrow short-term from nonresidents without underlying trade or investment to no more than B50 million. The measures were extended to tighten a loophole. The measure covers direct borrowing, issuance of short-term debt instruments to nonresidents, buying of foreign exchange/Thai baht outright forward, sell/buy foreign exchange/Thai baht swap, and other derivative transactions.
	October	Requirement for all onshore financial institutions to limit the total daily outstanding balance of nonresident baht accounts to no more than 300 million baht per nonresident. BOT prohibits financial institutions from paying interest on such current and savings accounts except for fixed accounts with maturity of at least 6 months.

continued.

Appendix 1. ***continued.***

Date		Events
2005	April	Relaxation of investment in securities abroad by institutional investors (six institutions). In addition to debt securities, the BOT extended the relaxation to include investment units issued by foreign mutual funds (excluding hedge funds) under the supervisory bodies that are members of the International Organization of Securities Commissions (IOSCO) or distributed in the countries whose securities exchange are members of the World Federation of Exchange (WFE) (not more than $1,500 million).
	December	Increase the amount of Thai direct investment or lending to a business abroad to not exceeding $10 million per year (with BOT approval).
2006	April	Relaxation of investment in securities abroad by institutional investors (six institutions). In addition to debt securities, the BOT extended the relaxation to include investment units issued by foreign mutual funds (excluding hedge funds) under the supervisory bodies that are members of IOSCO or distributed in the countries whose securities exchange are members of the WFE and securities issued under the Asian Bond Fund Project of the Executive Meeting of East Asia and Pacific Central Banks (not more than $2,000 million).
	November	Permission to financial institutions to undertake foreign exchange/baht derivative transactions with nonresidents without approval from BOT. Permission for transactions which are comparable to providing Thai baht liquidity to nonresidents or borrowings in Thai baht from nonresidents without underlying trade and investment in Thailand in amounts not more than B50 million per group of nonresidents. Such rules on borrowings without underlying trade and investment in Thailand shall be applied for maturities of not more than 3 months.
	December	Requirement to deposit 30% of foreign exchange with BOT as unremunerated reserve requirement (URR) for all foreign transactions, except those related to trade in goods and services, repatriation of investment abroad by residents, and FDI. The full amount of capital will be refunded after funds have remained within Thailand for a period of one year. If funds are repatriated earlier, only two-thirds of the amount will be refunded. Permission for financial institutions' borrowings of Thai baht from nonresidents through sell–buy swap transactions when there are no underlying trades and investments in Thailand for a maturity of longer than 6 months.
2007	January	Increase in the amount of Thai direct investment or lending to a business abroad (affiliated companies) from a maximum of $10 million per year to $50 million per year (with BOT approval).
		Permission for a Thai juristic person to invest in or lend to a business abroad (holding shares or ownership of the Thai juristic person not less than 10%) not exceeding $20 million per person per year.
		Provision of additional option for a particular type of inflows to either withhold the URR or hedge against FX risks.

continued.

Appendix 1. *continued.*

Date	Events
	Permission for foreign currencies received from abroad without future foreign exchange obligations to be deposited in the foreign currency accounts with an outstanding balance of all accounts not exceeding $50,000 for an individual or $2 million for a juristic person. The maximum outstanding balance of the deposit with obligations remains at $500,000 for an individual and $50 million for a juristic person.
July	Permission for companies registered in the Stock Exchange of Thailand to buy foreign exchange for their investment abroad with a limit of $100 million per year.
	Relaxation of the regulation on foreign portfolio investment by institutional investors, allowing them to invest in the form of deposits with financial institutions abroad without seeking approval from the central bank.
	Relaxation of the regulation on foreign currencies received from abroad by increasing the amount of total outstanding balance. For foreign currency accounts with future foreign exchange obligations, the total outstanding balance for all foreign currency accounts can be up to the obligations within the next 12 months but not exceeding $1 million for an individual or $100 million for a juristic person. For foreign currency accounts with no future foreign exchange obligations, the total outstanding balance for all foreign currency accounts can be up to $100,000 for an individual or $5 million for a juristic person.
November	Reduction in the foreign ownership for financial institutions to 49%, from 100%.
December	Rise in the limit and expansion of the scope for investment and lending abroad for Thai companies as follows: (i) a parent company in Thailand can transfer funds for the purpose of direct investment in subsidiaries and affiliated companies abroad in an aggregate amount not exceeding $10 million per year, and (ii) a subsidiary company in Thailand can transfer funds for the purpose of direct investment in, or lending to, a parent company abroad, subsidiaries, and affiliated companies of the parent company abroad, in an aggregate amount not exceeding $100 million per year.
	Increase in the limit for purchase of properties abroad from $1 million to $5 million.
	Exemption of foreign currency borrowings, in an amount not exceeding $1 million, as specified on the relevant agreement or contract, and having a maturity of at least 1 year, by Thai juristic persons from both the URR and the fully hedged requirement.
	Rise in the maximum limit of Thai residents' foreign currency deposits and permission to Thai residents to deposit foreign currencies originated abroad without proof of evidence of future foreign exchange obligations. Foreign currency accounts with funds originating from domestic sources, for deposits without future foreign exchange obligations, the total outstanding balances are limited to $100,000 for an individual or $300,000 for a juristic person.

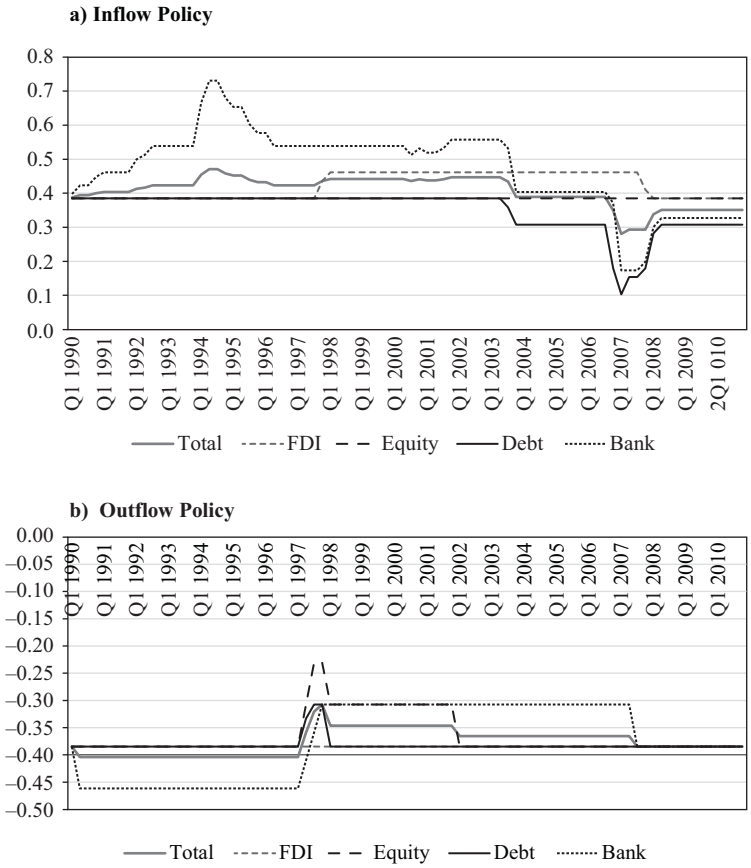
Appendix 1. *continued.*

Date		Events
2008	February	Increase in the foreign investment limit approval of the Securities and Exchange Commission (SEC) to $30 billion for allocation to securities companies, mutual fund companies, and individual investors (through investments with private funds or securities companies).
		Lifting of URR measures.
		Revision of the rule for domestic financial institutions' baht borrowings from nonresidents, reducing the limit for transactions with no underlying trade or investment for all maturities to no more than B10 million outstanding balance per group of nonresidents so as to limit channels of speculation. Revision of the rules regarding the provision of Thai baht liquidity by domestic financial institutions to nonresidents by expanding each institution's limits for transactions with no underlying trade or investment to no more than B300 million outstanding balance per group.
2009	August	Increase in types of institutional investors, allowing juristic persons that are registered under Thai law with assets of at least B5,000 million and whose principal businesses are in manufacturing, trading, or services, to invest in securities abroad not exceeding $50 million per entity. Previously, only government pension funds, social security fund, provident funds, mutual funds, securities companies, insurance companies, and specialized financial institutions were allowed.
2010	February	Increase in the amount limit for purchase of immovable properties abroad from $5 million per year to $10 million per year.
		Permission for Thai companies to lend to non-affiliated companies abroad, which previously required approval, up to $50 million. Increase in the outstanding balance limits of foreign currency accounts deposited with funds exchanged from Thai baht.
		Permission for Thai companies to freely invest abroad in the form of direct investment. Increase in the quota of approvals for portfolio investment granted by the SEC from $30 billion to $50 billion for allocation to investors under its supervision.

Sources: Bank of Thailand, available at www.bot.or.th and Jongwanich (2006).

Appendix 2. **Capital Account Policy Indexes, Without Weights**

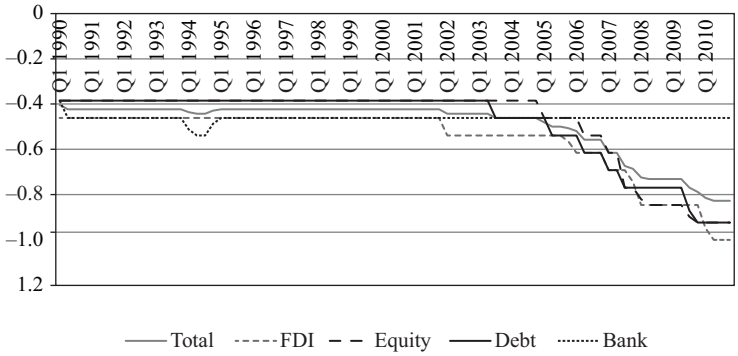
Figure 1. **Capital Account Policy Indexes (Liability side), 1990–2010**



Note: The indexes lie between "0" and "1" for inflow policy, where "0" refers to restrictions while "1" refers to liberalization. For the outflow policy, the indexes lie between "0" and "–1", where "0" refers to restrictions and "–1" refers to liberalization.

Source: Authors' calculation.

Figure 2. **Capital Account Policy Indexes (Asset side), 1990–2010**
Outflow policy



Note: The indexes lie between "0" and "1" for inflow policy, where "0" refers to restrictions while "1" refers to liberalization. For the outflow policy, the indexes lie between "0" and "–1", where "0" refers to restrictions and "–1" refers to liberalization.

Source: Authors' calculation.

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