ADB Forum on the Use of Capital Controls

How Effective are Capital Controls? Evidence from Malaysia
Prema-chandra Athukorala and Juthathip Jongwanich

Comments on “How Effective are Capital Controls? Evidence from Malaysia” Thiam Hee Ng

Effectiveness of Capital Controls: Evidence from Thailand
Juthathip Jongwanich and Archanun Kohpaiboon

Comments on “Effectiveness of Capital Controls: Evidence from Thailand” Eli Remolona

Are Capital Controls Effective? The Case of the Republic of Korea
Soyoung Kim and Doo Yong Yang

Comments on “Are Capital Controls Effective? The Case of the Republic of Korea” Joseph Lim

Fine Tuning an Open Capital Account in a Developing Country: The Indonesian Experience
Sisira Jayasuriya and Shawn Chen-Yu Leu

Comments on “Fine Tuning an Open Capital Account in a Developing Country: The Indonesian Experience” Ravi Balakrishnan

Growth with Resilience in East Asia and the 2008–2009 Global Recession
Lino Briguglio and Stephen Piccinino
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Foreword

This issue of the *Asian Development Review* marks a milestone in the journal’s 29-year history as the publication embarks on the next stage of its evolution toward becoming one of the leading journals on development in Asia. Efforts are underway to upgrade the quality of the journal and increase its ability to serve as a platform for providing knowledge solutions. Beginning in 2013, Dr. Masahiro Kawai will take over the reins of the *Asian Development Review* as its new editor. The journal will be co-owned by the Asian Development Bank and its sister institution, the Asian Development Bank Institute, and published by MIT Press. The journal will be released twice a year, in March and September, instead of its current June and December cycle. The refereeing process has been made more rigorous to be able to select high-quality empirical papers that have relevant policy implications for development issues confronting Asia. I wish to extend my gratitude to everyone who has been part of the success of the *Asian Development Review* thus far and wish Dr. Kawai every success in charting the future course of the journal.

Changyong Rhee
Editor
Preface

Widespread liberalization in the 1980s and 1990s enabled the freer movement of capital across international borders. Alongside large and often volatile movements in capital flows, risks to macro stability and the health of the financial system have led many countries to reconsider the wisdom of continuing to allow unimpeded flows of capital. Asia’s strong recovery in the aftermath of the global financial crisis of 2007–2008 as well as continuing problems in the United States and the European Union presage even larger flows of capital to Asia. This has led to a rethinking about the wisdom of unfettered cross-border capital flows and ways to manage capital flows, including the potential usefulness of capital controls.

The two issues for 2012 cover the proceedings of ADB’s Forum on Capital Controls held on 14 July 2011. The first issue examines the context in which such controls could be useful as part of a broader menu of tools in the policymaker’s toolkit. The second issue assesses the experiences of selected Asian countries in using *de jure* capital controls.
How Effective are Capital Controls? Evidence from Malaysia

PREMA-CHANDRA ATHUKORALA AND JUTHATHIP JONGWANICH

This paper examines the role of capital controls as a macroeconomic policy tool in light of the Malaysian experience. It consists of an econometric analysis of quarterly data over the period 1990–2010 using newly constructed capital inflow and outflow policy indexes as well as analytical narratives of episodes of controls imposed on inflows (1994) and outflows (1998–1999). The findings suggest that well-targeted controls have the potential to tame both short-term capital inflows and outflows without exerting a backwash effect on foreign direct investment, at least in the short to medium term. Controls on capital inflows introduced in the first half of 1994 helped moderate accumulation of short-term capital flows, particularly short-term bank credit. During 1998–1999, carefully designed temporary capital controls were successful in providing Malaysian policymakers a viable setting for applying the standard Keynesian therapy.

JEL classification: F32, F41, O53

I. INTRODUCTION

The orthodox thinking on capital account convertibility during the Bretton Woods era was that capital account opening should be done cautiously and only after substantial progress had been made in restoring macroeconomic stability, liberalizing the trade account, and establishing a strong regulatory framework to foster a robust domestic financial system. Abrupt dismantling of capital controls at an early stage of reforms without achieving these preconditions was thought to be a recipe for exchange rate overvaluation, financial fragility, and eventual economic collapse (Edwards 1984, Corbo and de Melo 1987, McKinnon 1993, Michaely, Papageorgou, and Choksi 1991).

There was, however, a clear shift in policy emphasis in favor of greater capital account opening from about the late 1980s, with the IMF and the United States (US) Treasury adopting this view as a basic tenet of their policy advocacy for developing countries (Bhagwati 1998, Rodrik 2011). This new policy emphasis was reflected in a major decision by the International Monetary Fund (IMF) to pursue capital account opening as one of its operational objectives. In September 1997, at its annual meeting in Hong Kong, China, the Interim...
Committee of the IMF proposed an amendment to the IMF Articles of Agreement with a view to extending the definition of currency convertibility, which was then limited to current account transactions, to encompass capital account transactions.

The push towards capital account opening came under serious reconsideration, however, following the onset of the Asian financial crisis (1997–1998) and the global reverberation that impacted a number of other emerging economies. The observation that the countries succumbing to the crisis had for some years received substantial foreign capital flows raised questions about the role of capital inflows in creating the conditions that generated the crisis or favored its dissemination. Informed opinion swung towards the thinking that those countries still maintaining closed capital account regimes should undertake the liberalization of short-term capital movements only gradually and with extreme caution (Cooper 1999, Bhagwati 1998, Eichengreen 2003, Furman and Stiglitz 1998, Stigliz 2002, Radelet and Sachs 1998, Williamson 1993).

Even the IMF, despite its continuous flirting with mandatory capital account convertibility, became more sympathetic to this cautious approach to the opening of the capital account (Fischer 2004). Krugman (1999) added variety to the debate in the context of the East Asian crisis by arguing in favor of the Keynesian advocacy of using controls on capital outflows as a means of regaining macroeconomic policy autonomy in countries where the currency crisis had rapidly translated into painful economic collapse. In recent years, the case for not only retaining exit controls but also imposing new controls to tame short-term capital inflows gained added emphasis because of the increase in capital inflows to emerging market economies as part of the rapid globalization of capital, a process that intensified following the onset of the global financial crisis (2008–2009).

Critics of capital controls, however, argue that these controls are unlikely to cushion economies against the volatility and unpredictability of capital movement given difficulties involved in the actual implementation. A major doubt about the effectiveness of capital controls as a crisis management tool relates to presumably ample scope for avoidance and evasion, which can simply negate the expected monetary policy autonomy (Hale 1998, Edwards 1999a and 1999b). The general argument here is that the more extensive trade and investment links are, the more difficult and costly it would be to control capital account transactions because of the multiplication in the number of arbitrage possibilities that arise in the course of normal business. The problem with this argument is that it is based on a misleading mixing of “placing funds abroad retail” (retail transfer of funds abroad) by manipulating current account transactions and “exporting capital wholesale” (Williamson 1993, p. 36). There is ample evidence from both developed and developing countries that capital controls are in fact effective in substantially reducing, if not preventing, capital flows of the latter type (Eichengreen 2003, Larrain and Laban 2000, Radelet and Sachs 1998).
This paper aims to inform the policy debate on the effectiveness of capital controls in developing countries through a case study of Malaysia. The Malaysian experience provides an excellent laboratory to investigate these issues given the nature of policy shifts relating to capital account opening over the past four decades. During this period, Malaysia implemented selective capital controls on a temporary basis on two occasions as part of macroeconomic policy, against the backdrop of a long-term commitment to maintaining an open capital account policy regime. In the first half of 1994, capital inflow controls were introduced when the booming economy triggered massive short-term capital inflows jeopardizing macroeconomic stability. Capital outflow controls were the centerpiece of Malaysia’s unorthodox policy response to the Asian financial crisis (1998–1999). This was the first case in postwar economic history of an emerging market economy imposing controls on capital outflows in a crisis context to set the stage for fixing the exchange rate and monetary and fiscal expansion.

The paper is written in three parts. Section II provides an overview of capital account policies in Malaysia. Section III examines the effectiveness of these policies by first constructing indexes based on a carefully compiled chronology of policy changes then using them as the key explanatory variables within a standard vector autoregressive modeling framework to examine the impact of capital account policy on capital flows and other related macroeconomic variables. Section IV supplements the econometric analysis with case studies of capital inflow controls in 1994 and capital outflow controls during 1998–1999. The main findings are summarized in the concluding section. A comprehensive chronology of Malaysia’s capital account policy is provided in the Appendix.

II. CAPITAL ACCOUNT POLICY

Malaysia is unique among developing countries in its long-standing commitment to an open foreign trade regime.1 As an essential element of openness to trade, the Malaysian dollar (renamed ringgit in 1975) remained fully convertible on the current account throughout the post-independence period. Although exporters were required to convert foreign currency sales proceeds into local currency within 6 months, this was not a binding constraint on production for export because the import trade regime remained highly liberal. Despite mandatory approval procedures, the exchange rules relating to all current account transactions remained liberal. With this policy orientation, Malaysia achieved

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1 In a comprehensive study of the patterns and chronology of trade policy reforms during the postwar era, Sachs and Warner (1995) identify Malaysia as one of the eight developing countries whose trade regimes remained open throughout the period. The other seven countries were Barbados; Cyprus; Hong Kong, China; Mauritius; Singapore; Thailand; and Yemen.
Article VIII status (for current account convertibility) under the IMF Articles of Agreement on 11 November 1968, becoming the fourth Asian economy to enter this country league after Hong Kong, China (15 February 1961); Japan (1 April 1964); and Singapore (9 November 1968).

A natural companion to outward-oriented trade policy was a firm commitment to the promotion of foreign direct investment (FDI). FDI approval procedures and restrictions on foreign equity ownership were very liberal by developing country standards even in the 1950s and 1960s at a time when hostility towards multinationals was the order of the day in the developing world. Emphasis on FDI promotion received added impetus with a notable shift in development policy towards export-oriented industrialization in the early 1970s.

The Malaysian policy regime relating to non-FDI capital flows (that is, international flows of purely financial capital) in general, too, was much more liberal throughout the postwar period compared to most other developing countries (Williamson and Mahar 1998). However, liberalization in this sphere was much more cautious and gradual by Malaysia’s own historical record of trade and FDI liberalization. Most restrictions on short-term overseas investment by residents were removed in the 1970s. By the turn of the decade, residents were free to place deposits abroad, lend to nonresidents, purchase immobile properties, or invest in foreign equity, provided such investments were not financed from borrowing in Malaysia. However, there were binding restrictions on short-term capital inflows, foreign share holdings in local brokerage firms, and bank lending to nonresidents.

As part of the reform package implemented in response to the economic crisis during 1985–1986, there was a new emphasis on promoting FDI in the economy. The Investment Coordination Act, promulgated in 1975 to achieve the objective of increased Bumiputera involvement at the enterprise level, was amended in October 1986 to apply only to investments of roughly $1 million or more (the previous threshold was $400,000) or to plants employing more than 75 workers. The amendment also eased limitations on the number of expatriates employed in foreign affiliates. Foreign investors could own 100% of new projects that exported most of their products or sold its products to firms in free trade zones that employ at least 350 full-time Malay workers. The Promotion of Investment Act (1986) strengthened incentives to foreign investors.

In response to the significant deterioration in bank balance sheets during 1985–1986, stringent limits on private foreign borrowing were introduced under the Banking and Financial Regulation Act enacted in 1989. This important legislation required Bank Negara Malaysia (BNM), the central bank, to monitor foreign currency borrowings by residents and domestic borrowing by nonresidents under borrowing/lending ceilings stipulated in foreign exchange regulations (Yousof et al. 1994, BNM 1994). By the mid-1990s, the ceilings on foreign currency
borrowing by residents and domestic borrowing by nonresident-controlled companies stood at RM1 million and RM10 million, respectively.\(^2\)

Promotion of Kuala Lumpur as a global financial center became a key element of Malaysia’s growth euphoria in the late 1980s. As the first step to give momentum to the growth of the Kuala Lumpur Stock Exchange (KLSE) as an independent entity, the government announced on 27 October 1989 the delisting (with effect from 2 January 1990) of Malaysian registered companies from the Stock Exchange of Singapore (SES).\(^3\) This split from SES intended to set the stage for developing the KLSE as an independent exchange to attract international investors in competition with SES.\(^4\) The early 1990s saw a number of initiatives towards further liberalization of portfolio capital inflows to promote trading on the KLSE and increase participation of institutional investors.

In 1992, the Securities Act was passed to enable the establishment of a new securities commission to take over monitoring and supervision of the share market, previously undertaken by the Capital Investment Committee under the jurisdiction of BNM. This initiative gave further impetus to stock market growth under a more flexible operational framework. In the same year, the ceiling on foreign share holdings of local brokerage firms was lifted from 30% to 49%. Tax rates for both foreign and local fund managers were reduced from 30% to 10%.

The Federal Territory of Labuan was inaugurated as an international offshore financial center on 1 October 1990 as part of the government’s long-term plan to enhance the attractiveness of Kuala Lumpur as a regional financial center.\(^5\) It was envisaged that with the Asia and the Pacific region emerging as the fastest growing region in the world, Labuan would play a key role in enhancing the attractiveness of Malaysia as a world investment center (BNM 1994). Licensed offshore banks, offshore insurance entities, and other offshore companies operating in Labuan were declared as nonresidents for exchange control purposes. This initiative enabled these institutions to freely operate foreign currency accounts and move funds into and out of Malaysia without being subject to any exchange control monitoring. Licensed offshore banks were also permitted to accept deposits and grant loans in foreign currency. Investment guidelines were liberalized to allow Malaysian fund management companies to form joint ventures with foreign fund management companies. Management companies of unit trust funds located in Labuan were permitted to invest in Malaysian

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\(^2\)These borrowing limits contributed significantly to limiting external debt exposure of the economy, a significant factor in providing Malaysian authorities with some autonomy in managing the 1997–1998 financial crisis (Athukorala 2002).

\(^3\)The formal share market in Malaysia has a history dating back to 1960 when the Malaysia Stock Exchange (MSE) was set up. Following the termination of currency interchangeability with Singapore, the MSE was separated into the KLSE and SES in 1973. However, there was no legal restriction on the listing of Malaysian company shares on SES until 2 January 1990.

\(^4\)Following the split of KLSE from SES on 2 January 1990, a new “over-the-counter market,” which later came to be known as the central limit over the book (CLOB) market, emerged on the same day in Singapore.

\(^5\)For details on the regulatory framework and incentives offered see BNM 1999, Chapter 13.
securities. Generous tax exemptions were granted to companies incorporated in Labuan and their expatriate employees.\footnote{By the end of 1996, 47 offshore banks, 5 offshore insurance and re-insurance companies, 13 trust companies, and 3 fund management companies had been incorporated in Labuan.}

The ongoing process of capital account opening was temporarily halted in 1994 as the ringgit came under strong buying pressure with the booming economy creating expectations about the currency’s increasing strength. From late 1993, speculators bought ringgit in large amounts, increasing short-term deposits and forward transactions. To avoid an adverse effect on export competitiveness from a sharp exchange rate appreciation, BNM imposed a number of restrictions on capital inflows during January–February 1994. Once speculative pressure subsided, BNM gradually removed the controls and freed up capital flows, completely lifting all restrictions by August 1994 (World Bank 1996, BNM 1999).

In June 1995, the finance minister announced a package of incentives to attract foreign fund managers to Malaysia. Trading in financial derivatives on KLSE was started in 1995 with two instruments, the KLSE composite index futures and 3-month Kuala Lumpur interbank offer rate futures.

Malaysia succumbed to the Asian financial crisis in mid-1997 with low foreign debt exposure compared to other crisis-hit countries in East Asia (Indonesia, the Republic of Korea, the Philippines, and Thailand) thanks to prudential regulations implemented by BNM from the late 1980s. However, the booming economy coupled with various government initiatives to promote Kuala Lumpur as a global financial center had resulted in massive accumulation of portfolio capital in the lead-up to the crisis. By the mid-1990s, market capitalization of the KLSE was around 200 billion, with foreign investors accounting for 30%–40% of total capitalization. Net quarterly flow of portfolio capital turned negative in the second quarter of 1997 for the first time after 1991 and total net outflow in the first three quarters of the year amounted to over $11 billion (Athukorala 2002).

The immediate policy reaction to the currency collapse was to directly intervene in share market operation with a view to punishing speculators. On 27 August 1997, the KLSE banned the short-selling of 100 blue-chip stocks and rules were introduced to discourage the sale of stocks: sellers were required to deliver physical share certificates to their brokers before selling and the settlement period was reduced from 5 to 2 days. On 3 September 1997, the Prime Minister unveiled a plan to use funds from the Employees Provident Fund to prop up share prices by buying stocks from Malaysian shareholders—but not foreigners—at a premium above prevailing prices. These moves backfired, triggering a massive sell-off of stocks in KLSE and undermining sentiment on other regional bourses. Ironically, the share purchases sponsored by the government were seen by market participants, both local and foreign, as an opportunity to get rid of Malaysian
shares rather than a reason for holding on to them. The ban on short-selling was lifted in early September 1997. By August 1998, the economy was in recession and there were no signs of achieving currency and share price stability.

The Malaysian leadership opted for managing the crisis on its own while rejecting the conventional IMF path. The lynchpin of this radical policy choice was capital controls, which were expected to set the stage for fixing the exchange rate and provide breathing space for vigorous pursuance of monetary and fiscal expansion to fight recession. With policy autonomy gained through a fixed exchange rate and capital controls, the government swiftly embarked on a recovery package consisting of two key elements: fiscal and monetary stimulants and banking and corporate restructuring (Athukorala 2002). The newly introduced capital controls were gradually relaxed and subsequently removed at successive stages during the next 2 years. On 21 July 2005, the ringgit peg to the dollar was abolished in favor of a managed floating exchange rate system.

Following the onset of the global financial crisis in 2008, share prices in Malaysia fell sharply (by 20% between 2007 and 2009), although the magnitude of the collapse was far less than in the Asian crisis (by 53% between 1996 and 1998). There was also a large exodus of short-term capital, around $6 billion in 2009 (BNM 2010). However, these shocks were well absorbed by the domestic financial markets given ample liquidity in the financial system, a sound banking system, and the strong reserve position of the country. In addition, the broad-based financial sector reforms and capacity building undertaken following the Asian financial crisis had increased the sector’s resilience to financial turmoil. Moreover, Malaysia (and other Southeast Asian countries) had little exposure to collateral debt obligations that originated in the US subprime market (BIS 2009). Therefore, unlike in the 1997–1998 crisis policymakers did not have to contemplate on capital controls as part of the crisis management strategy (Athukorala 2012).

III. EFFECTIVENESS OF CAPITAL CONTROLS: AN ECONOMETRIC ANALYSIS

In this section, we examine the effects of capital account policies on capital flows in Malaysia using quarterly data over the period 1990–2010. We first construct capital policy indexes based on a carefully compiled chronology of policy changes during this period. We then use these indexes as the key explanatory variable within the standard vector autoregressive (VAR) modeling framework to examine the impact of capital account policy on capital flows and other related macroeconomic variables.
A. Capital Account Policy Indexes

Previous studies of capital controls (e.g., Gochoco-Bautista et al. 2012, Schindler 2009, Ito and Chinn 2005, Mody and Murshid 2005, Miniane 2004, Johnston and Tamirisa 1998, and Tamirisa 1999) have used annual information from the IMF’s *Annual Report on Exchange Arrangement and Exchange Restrictions* (AREAER) to construct capital flow restriction indexes (CFRIs). But annual information cannot capture well the variations of capital restrictions. In this study, we construct CFRIs on a quarterly basis by supplementing information reported in AREAER with information pieced together from notifications, press releases, and speeches related to foreign exchange and the capital account issued by BNM. CFRIs are constructed separately for capital inflows and outflows, with each further disaggregated into four categories of capital flows: FDI, equity securities, debt securities, and other investment flows (including foreign currency holdings and nonresident ringgit accounts). The chronology of capital account policy shifts on which the indexes are based is given in the Appendix.

The indexes are constructed by assigning +1 or –1 to each announced measure. Policy changes that facilitate inflows and outflows are assigned +1 and those that restrict inflows and outflows are assigned –1 regardless of whether they relate to transactions by residents or nonresidents. The number is scaled by different weights based on direct and indirect impact criteria. The weight is set at 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 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 between 0.25 to 0.5 is given when the central bank changes the regulation slightly, seeks the cooperation of investors (including financial institutions), or provides them a particular option.

Once the number and weight have been assigned to every measure, the weighted numbers are sequentially accumulated over time to arrive at the CFRI for each asset class. The indexes are rescaled to lie between 0 and 1 for capital inflow policy, where 1 represents capital inflow 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 outflow and inflow restriction indexes we constructed are shown in Figures 1 and 2, respectively. The outflow indexes rose significantly during the Asian financial crisis. This is consistent with the capital outflow control policies introduced during this period. After 1999, the indexes (especially those relating to portfolio capital and other capital outflows) gradually declined.

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7 Note that to be able to compare the control indexes across the asset types, the maximum accumulation value of a particular asset type is used as a base for the index.
as the central bank gradually liberalized restrictions. The index for portfolio outflows increased at a faster rate than that for bank-related outflows during the early period of the crisis. However, after the second quarter of 1999, the speed became slower and policy measures on flows relating to financial institutions became more pronounced. On the inflow side, the indexes have shown a lesser degree of variability throughout the period covered in our estimates. Against this overall pattern, we can observe a mild increase in the inflow indexes, particularly those relating to short-term capital during the capital inflow control episode in the first half of 1994.

![Figure 1. Capital Account Policy Indexes (CAPI): Capital Outflows, 1990–2010](image1)

**Note:** 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 (CAPI): Capital Inflows, 1990–2010](image2)

**Note:** The indexes lie between “0” and “1”, where “0” refers to restrictions while “1” refers to liberalization. 
**Source:** Authors’ calculation.
B. The Model

The analytical tool used for examining the effectiveness of capital restrictions is the standard VAR model. The endogenous variables in the model are capital flows, the real exchange rate, exchange rate volatility, the manufacturing production index, (real) interest rate differentials, and capital control indexes.\(^8\) The exogenous variables are the real gross domestic product (GDP) of G3 countries and the share price indexes of industrialized countries. Since the incidence of capital account policy on each asset class is different, we include capital control indexes separately for each asset class, distinguishing between capital inflow and outflow policies. The variables are defined below.

1. Capital flows

\[\text{Inflows:}\]
- TIF total net capital inflows (% of GDP).
- IFDI net FDI inflows (% of GDP)
- IEQUITY net equity investment inflows (% of GDP)
- IDEBT net debt security investment inflows (% of GDP)
- IDEBTINFLOW gross debt security inflows (% of GDP)
- IBANK net other investment inflows (% of GDP).

\[\text{Outflows:}\]
- TOF total net capital outflows (% of GDP).
- OFDI outward FDI (% of GDP)
- OEQUITY net equity outflows (% of GDP).
- ODEBT net debt security outflows (% of GDP)
- OBANK net other investment outflows (% of GDP)

To facilitate interpretation of the results, 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

\[\text{Inflows}\]^{9}: 
- LIA\_INFDI capital account policy index for FDI inflows
- LIA\_IMPORT capital account policy index for portfolio inflows

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\(^8\)The results were not significantly different when real GDP was used as an alternative variable.

\(^9\)The index ranges from 0 (maximum restrictions) to 1 (liberalization).
LIA_INBANK: capital account policy index for other inflows, especially bank loans.
LIA_INPORTBANK: capital account policy index for portfolio and other inflows.

Outflows\(^{10}\):
AS_OUTPORT: capital account policy index for portfolio outflows.
AS_OUTBANK: capital account policy index for other capital outflows.

3. Real exchange rate
REER: real effective exchange rate\(^{11}\) (2005=100)
(An increase reflects an appreciation.)

4. Exchange rate volatility
FXVO1: exchange rate volatility (baht/$), calculated as the standard deviation of changes in the exchange rate\(^{12}\).
FXVO2: exchange rate volatility (weighted average for key export partners), calculated as the standard deviation of changes in the exchange rate.

5. Real interest rate differentials
RINTEREST: Interest rate differentials between Malaysia’s policy rate and the US 3-month Treasury bill rate, adjusted for consumer price index (CPI) inflation.

6. Manufacturing production index
MPI: Manufacturing production index (2000=100)

The model is,

\(^{10}\)The index ranges from 0 (maximum restrictions) to \(-1\) (liberalization).
\(^{11}\)The results when using the nominal exchange rate were similar to those using the REER but the diagnostic tests using the REER were better.
\(^{12}\)Note that the results when we apply a GARCH or EGARCH model in calculating exchange rate volatility (bilateral and multilateral) are the same as when the standard deviation method is used.
TIF_t = \sum_{i=1}^{n} \alpha_{i,TIF} + \sum_{i=1}^{n} \alpha_{i,FXVOI} + \sum_{i=1}^{n} \alpha_{i,RER} + \sum_{i=1}^{n} \alpha_{i,MP}\_I + \sum_{i=1}^{n} \alpha_{i,RR\_INTEREST} + \sum_{i=1}^{n} \alpha_{i,LIA\_INFDI} + \\
+ \sum_{i=1}^{n} \phi_{i,LIA\_IN\_PORTBANK} + \sum_{i=1}^{n} \phi_{i,LIA\_OUT\_PORTBANK} + \sum_{i=1}^{n} \phi_{i,G3\_GDP} + \sum_{i=1}^{n} \phi_{i,Share} + \epsilon_t

FXVO_{i} = \sum_{i=1}^{n} \phi_{i,TIF} + \sum_{i=1}^{n} \phi_{i,FXVOI} + \sum_{i=1}^{n} \phi_{i,RER} + \sum_{i=1}^{n} \phi_{i,MP}\_I + \sum_{i=1}^{n} \phi_{i,RR\_INTEREST} + \sum_{i=1}^{n} \phi_{i,LIA\_INFDI} + \\
+ \sum_{i=1}^{n} \phi_{i,LIA\_IN\_PORTBANK} + \sum_{i=1}^{n} \phi_{i,LIA\_OUT\_PORTBANK} + \sum_{i=1}^{n} \phi_{i,G3\_GDP} + \sum_{i=1}^{n} \phi_{i,Share} + \epsilon_t

RER_t = \sum_{i=1}^{n} \delta_{i,TIF} + \sum_{i=1}^{n} \delta_{i,FXVOI} + \sum_{i=1}^{n} \delta_{i,RER} + \sum_{i=1}^{n} \delta_{i,MP}\_I + \sum_{i=1}^{n} \delta_{i,RR\_INTEREST} + \sum_{i=1}^{n} \delta_{i,LIA\_INFDI} + \\
+ \sum_{i=1}^{n} \beta_{i,LIA\_IN\_PORTBANK} + \sum_{i=1}^{n} \beta_{i,LIA\_OUT\_PORTBANK} + \sum_{i=1}^{n} \beta_{i,G3\_GDP} + \sum_{i=1}^{n} \beta_{i,Share} + \epsilon_t

MPI_t = \sum_{i=1}^{n} \gamma_{i,TIF} + \sum_{i=1}^{n} \gamma_{i,FXVOI} + \sum_{i=1}^{n} \gamma_{i,RER} + \sum_{i=1}^{n} \gamma_{i,MP}\_I + \sum_{i=1}^{n} \gamma_{i,RR\_INTEREST} + \sum_{i=1}^{n} \gamma_{i,Share} + \epsilon_t

C. Data and Estimation Method

Data on capital inflows and outflows, Malaysian interest rates, the CPI, the manufacturing production index, and nominal and real effective exchange rates are compiled from the Monthly Statistical Bulletin database of BNM. Real GDP of G3 countries and share prices are compiled from the International Financial Statistics database of IMF. All data series are seasonally adjusted.

For the purpose of estimating the model, the period under study is divided into two subperiods: 1990–1999 and 2000–2010. This is done because investors’ responses to capital account policy and other related determinants are likely to be different before and after the Asian financial crisis. For example, controls on capital outflows introduced during the crisis may help increase net capital inflows (i.e., positive relationship between the control index and net capital inflows),
while capital outflow liberalization after the crisis may also help encourage more capital inflows (i.e., negative relationship between the control index and net capital inflows). Thus, the results might be blurred if the model uses the whole sample (1990–2010).

The model is estimated separately for capital inflows and outflows. In addition, to examine the switching effect of capital controls, the model is estimated for the different asset classes: FDI, portfolio investment (equity and debt securities), and other investment flows. The model is estimated for all assets classes for 2000–2010. However, given the data availability, we were able to estimate for only two asset classes (portfolio investment and other investment flows) for 1990–1999.

The Augmented Dickey-Fuller test was used to test the time series properties of the data, and all variables were found to be nonstationary. We therefore use first differences to estimate VAR. The lag length of the variables was decided based on the Akaike information criterion and the sequential modified LR test statistic. In all cases, the one-period lag turned out to be the appropriate choice. This is consistent with the a priori view that capital flows (unlike trade flows) swiftly respond to policy shifts.

The ordering of the variables in VAR estimation is set 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 the capital account policy indexes. However, since the VAR model could be sensitive to the ordering of variables, we check the stability of the results by changing the order of the variables in the model. For example, we tried putting capital account policy indexes first followed by capital flows, exchange rate volatility, the real exchange rate, the manufacturing production index, and the policy rate. The results were remarkably robust to alternative specifications.
D. Results

The estimated VAR models are reported in Table 1. Figures 3–4 show impulse responses of net capital inflows and other key variables to one standard deviation increase in capital account policy indexes during 1990–1999 and 2000–2010, respectively, while Figure 5 shows impulse responses of net capital outflows and other key variables to a one standard deviation increase in capital policy indexes during 2000–2010. For the period 1990–1999, results show that...

Table 1. VAR Estimates

<table>
<thead>
<tr>
<th>D(IPORT_SA)</th>
<th>D(IEQUITY_SA)</th>
<th>D(INONEQUITY_SA)</th>
<th>D(ILoan_SA)</th>
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<td>[–3.62]**</td>
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<td>0.29</td>
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<tr>
<td>[ 1.44]</td>
<td>[ 1.36]</td>
<td>[ 1.27]</td>
<td>[ 1.15]</td>
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<td>[ 5.39]**</td>
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</table>

Note: The results show only the direct impacts of capital account policy. The value in parenthesis is the t-statistic where * = 5%; ** = 10% and *** = 15% significance.

Source: Authors’ calculation.
Table 1b. Results of Capital Account Policy on Net Capital Inflows, 2000–2010

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<th></th>
<th>TIF_SA</th>
<th>D(IFDI_SA)</th>
<th>IMPORT_SA</th>
<th>EQUITY_SA</th>
<th>DEBT_SA</th>
<th>BANK_SA</th>
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</thead>
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<td>[1.70]**</td>
<td>[3.04]*</td>
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</table>

R-squared 0.53 0.58 0.49 0.74 0.46 0.63
Adj. R-squared 0.41 0.47 0.33 0.60 0.21 0.46
Sum sq. resid 0.24 0.01 0.12 0.01 0.07 0.016
S.E. equation 0.08 0.01 0.06 0.02 0.05 0.02
F-statistic 4.25 5.24 2.97 5.38 1.86 3.65
Log likelihood 52.05 116.13 60.41 79.37 52.17 75.54
Akaike AIC –1.91 –4.94 –2.41 –4.21 –2.57 –4.03
Schwarz SC –1.50 –4.52 –1.95 –3.66 –2.06 –3.53
Mean dependent 1.03 –0.00 –1.00 0.99 1.01 1.00
S.D. dependent 0.109323 0.03 0.07 0.04 0.06 0.038

Note: The results show only the direct impacts of capital account policy. The value in parenthesis is the t-statistic where * = 5%; ** = 10% and *** = 15% significance.

Source: Authors' calculation.
Table 1c. Results of Capital Account Policy on Net Capital Outflows, 1999–2010

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<th>D(OFDI_SA)</th>
<th>D(OPORT_SA)</th>
<th>D(OEQUITY_SA)</th>
<th>D(ODEBT_SA)</th>
<th>D(OBANK_SA)</th>
</tr>
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<tr>
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<td>[–3.76]*</td>
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<td>[1.98]**</td>
<td>[1.57]***</td>
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<td>[1.32]***</td>
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R-squared            0.52         0.48          0.56         0.649        0.42
Adj. R-squared       0.40         0.31          0.38         0.48         0.17
Sum sq. resid       0.00          0.00          0.00         0.00         0.04
S.E. equation       0.009648     0.01          0.00         0.01         0.04
F-statistic          4.63         2.96          3.07         4.16         1.70
Log likelihood     143.59       140.50        111.25       115.89       58.79
Akaike AIC          –6.26        –6.02         –6.53        –6.59        –3.14
Schwarz SC          –5.89        –5.57         –6.07        –6.13        –2.68
Mean dependent      0.00         0.00          0.00         0.00         0.00
S.D. dependent      0.01         0.01          0.01         0.01         0.04

Note: The results show only the direct impacts of capital account policy and the data of net equity outflows (OEQUITY), net debt security outflows (ODEBT), and bank lending (OBANK) started in 2002. The value in parenthesis is the t-statistic where * = 5%; ** = 10% and *** = 15% significance.

Source: Authors’ calculation.

controls on outflows of portfolio investment (LIA_OUTPORT) and bank loans (LIA_OUTBANK) tend to reduce outflows and eventually increase net capital inflows. Figure 3a.2 clearly shows the positive and significant response of net portfolio inflows (IPORT) to an increase in restrictions on capital outflows (LIA_OUTPORT). Non-equity investment tends to respond more to such restrictions than equity investment (Figures 3c.2–3c.3). There is also evidence that that an increase in restrictions on other capital outflows including on bank loans (LIA_OUTBANK) leads to a rise in net other investment inflows (IBANK)
to the country (Figure 3h.2). Note that there is no cross effect of restrictions among asset classes, i.e., restrictions imposed on portfolio investment do not impact on other investment inflows. All in all, these results imply that capital outflow controls seem to have been effective in reducing capital outflows and increasing net capital inflows during the crisis period.

Interestingly, the results indicate a negative and significant relationship between portfolio inflow controls (LIA_INPORT) and net portfolio investment inflows (IPORT) (Figure 3a.1). This suggests that restrictions on capital inflows introduced in 1993–1994 were not effective in significantly reducing net portfolio inflows. The same pattern can be observed relating to both equity and non-equity inflows (Figure 3b.1 and 3c.1). Reflecting the ineffectiveness of capital inflow controls, both the real exchange rate (REER) and the interest rate (RINTEREST) did not significantly respond to capital inflow controls (Figures 3d.1 and 3e.1).

By contrast, capital outflow controls introduced during the Asian financial crisis seem to have brought about monetary policy autonomy. The real interest rate declined significantly during 1998–2000 implying that the central bank could stimulate the economy during this period with less concern on capital outflows (Figure 3e.2). Results show capital outflow controls also significantly slow down the depreciation of the exchange rate (Figure 3i.2).

Figure 3. Impulse Responses of Key Variables to Capital Account Policies (Net Capital Inflows: Liability Side), 1990–1999

| a.1) Net Portfolio Investment Inflows to LIA_INPORT | a.2) Net Portfolio Investment Inflows to LIA_OUTPORT |
| b.1) Net Equity Investment Inflows to LIA_INPORT | b.2) Net Equity Investment Inflows to LIA_OUTPORT |

continued.
Figure 3. continued.

c.1) Net Debt Security Investment Inflows to LIA_INPORT

c.2) Net Debt Security Investment Inflows to LIA_OUTPORT

d.1) Real Effective Exchange Rate to LIA_INPORT

d.2) Real Effective Exchange Rate to LIA_OUTPORT

e.1) Real Interest Rate Differentials to LIA_INPORT

e.2) Real Interest Rate Differentials to LIA_OUTPORT

f.1) Exchange Rate Volatility (baht/$) to LIA_INPORT

f.2) Exchange Rate Volatility (baht/$) to LIA_OUTPORT

continued.
Figure 3. continued.

- g.1) Exchange Rate Volatility (weighted average) to LIA_IMPORT
- g.2) Exchange Rate Volatility (weighted average) to LIA_OUTPORT
- h.1) Net Other Investment Inflows to AS_OUTPORT
- h.2) Net Other Investment Inflows to AS_OUTBANK
- i.1) Real Effective Exchange Rate to LIA_INBANK
- i.2) Real Effective Exchange Rate to LIA_OUTBANK
- j.1) Real Interest Rate Differentials to LIA_INBANK
- j.2) Real Interest Rate Differentials to LIA_OUTBANK

Source: Authors’ calculation.
Both capital inflow and outflow policies were liberalized after the Asian financial crisis, with likely impacts on capital movements. Results show liberalization of portfolio inflow policy significantly and positively affected net equity inflows (Figure 4g.1). A similar outcome can be seen relating to the liberalization of financial institution inflow policy on net other investment inflows (Figure 4i.3) and liberalization of FDI inflow policy on net FDI inflows (Figure 4b.1). Interestingly, liberalization of capital outflow policy seems to have had limited effects for 2000–2010. A significant impact of outflow controls is found only in the case of net other investment inflows (IBANK).

Some cross-effects of capital control relaxation among asset classes were found in the period after the Asian financial crisis. Liberalization of financial institution inflow policy (LIA_INBANK), where the speed and magnitude of liberalization tends to be faster than other asset types, could result in a switching effect from equity investment to other investment. This was shown by the negative and significant responses of net portfolio inflows (IPORT) and net equity inflows (IEQUITY) to less stringent financial institution inflow policy (LIA_INBANK) (Figures 4f.3 and 4g.3). Meanwhile, liberalization in portfolio and financial institutions could, to some extent, lead to a switching effect away from FDI. Figure 4b.2 shows the negative relationship between liberalization of portfolio and other investment and net FDI inflows. This may have been the outcome of increasing importance of mergers and acquisitions as a means of FDI investment in recent years. There is no evidence of a significant response of the real exchange rate, real interest rate, and exchange rate volatility to capital inflow or outflow liberalization during the post-crisis period. This may be because the cross effects occurring among asset classes counterbalanced the effects of capital inflow and outflow policy liberalization (Figures 4a.1–4a.3).
Figure 4. Impulse Responses of Key Variables to Capital Account Policies
(Net Capital Inflows: Liability Side), 2000–2010
BNM liberalized capital outflow policy after the Asian financial crisis, especially for financial institutions (AS_OUTBANK) and portfolio investment (AS_OUTPORT), permitting domestic investors to invest overseas. However, the impact of such liberalization is limited with responses of net capital outflows mostly insignificant (Figures 5a–5c, 5f, and 5g). Only net equity outflows seem to have responded significantly to the liberalization. Our results point to a perverse (negative) relationship between liberalization policy and net equity outflows (OEQUITY). This may reflect home bias in equity investment given more
attractive domestic returns compared to investment in other countries in the region. There is no evidence of significant effects of liberalization policy on the real exchange rate, real interest rate, and exchange rate volatility.

Figure 5. Impulse Responses of Key Variables to Capital Account Policies (Net Capital Outflows: Asset Side), 2000–2010

continued.
Figure 5. continued.
IV. TWO CAPITAL CONTROL EPISODES

In Section II, we identified two distinct policy episodes in Malaysia that marked a clear departure from the country’s long-term commitment to an open capital account regime: capital inflow controls in 1994 and capital outflow controls during 1998–1999. In this section, we take a close look at these two episodes to supplement the econometric analysis in the previous section. We examine the nature and magnitude of capital flows that trigger the policy response and the impact of the policy choice on domestic macroeconomic adjustment and economic performance.

A. Capital Inflow Controls, 1994

Following the macroeconomic crisis in the mid-1980s, Malaysia entered a rapid growth phase which lasted until the onset of the Asian financial crisis in mid-1997 (Athukorala 2012). The booming economy coupled with an international interest rate differential of more than 3% per annum in favor of Malaysia triggered strong inflows of foreign capital, with a notable shift in total net flows towards short-term flows (BNM 1999). During the period 1990–1993, total net flows to Malaysia amounted to over 13% of GDP compared to 4.9%
during 1980–1989. In 1993, this figure hit a historical high of 16.8% (Table 2). The share of short-term flows surpassed that of FDI in 1992 and hit an all-time high of 62% in 1993. The short-term inflows took mainly the form of borrowing by commercial banks and increased placement of deposits by both bank and nonbank foreign customers with banks in Malaysia.

Table 2. Malaysia: Net Capital Inflow, a 1990–1996

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>$ million</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Official long-term capital</td>
<td>549</td>
<td>–1249</td>
<td>–356</td>
<td>–1,018</td>
<td>226</td>
<td>58</td>
<td>1,936</td>
<td>226</td>
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<tr>
<td>Foreign direct investment</td>
<td>894</td>
<td>2,780</td>
<td>5,846</td>
<td>4,660</td>
<td>3,036</td>
<td>4,435</td>
<td>3,291</td>
<td>3,858</td>
</tr>
<tr>
<td>Private short term capitalc</td>
<td>6</td>
<td>260</td>
<td>439</td>
<td>4,900</td>
<td>7,029</td>
<td>447</td>
<td>2,305</td>
<td>5,348</td>
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<tr>
<td>Portfolio investment</td>
<td>–26</td>
<td>–213</td>
<td>–1,027</td>
<td>2,788</td>
<td>6,041</td>
<td>934</td>
<td>1,687</td>
<td>2,650</td>
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<tr>
<td>Banking sector borrowing</td>
<td>32</td>
<td>473</td>
<td>1,466</td>
<td>2,112</td>
<td>978</td>
<td>–510</td>
<td>459</td>
<td>1,735</td>
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<tr>
<td>Non-bank private</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>22</td>
<td>158</td>
<td>962</td>
</tr>
<tr>
<td>Borrowingd</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,449</td>
<td>1,790</td>
<td>5,935</td>
<td>8,551</td>
<td>10,291</td>
<td>4,940</td>
<td>7,532</td>
<td>9,432</td>
</tr>
<tr>
<td>Composition of total capital flows (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Official long-term capital</td>
<td>37.9</td>
<td>–69.8</td>
<td>–6</td>
<td>–11.9</td>
<td>2.2</td>
<td>1.2</td>
<td>25.7</td>
<td>2.4</td>
</tr>
<tr>
<td>Foreign direct investment</td>
<td>61.7</td>
<td>155.3</td>
<td>98.5</td>
<td>54.5</td>
<td>29.5</td>
<td>89.8</td>
<td>43.7</td>
<td>40.9</td>
</tr>
<tr>
<td>Private short term capitalc</td>
<td>0.4</td>
<td>14.5</td>
<td>7.4</td>
<td>57.3</td>
<td>68.3</td>
<td>9.0</td>
<td>30.6</td>
<td>56.7</td>
</tr>
<tr>
<td>Portfolio investment</td>
<td>–1.8</td>
<td>–11.9</td>
<td>–17.3</td>
<td>32.6</td>
<td>58.7</td>
<td>18.9</td>
<td>22.4</td>
<td>28.1</td>
</tr>
<tr>
<td>Banking sector borrowing</td>
<td>2.2</td>
<td>26.4</td>
<td>24.7</td>
<td>24.7</td>
<td>9.5</td>
<td>–10.3</td>
<td>6.1</td>
<td>18.4</td>
</tr>
<tr>
<td>Non-bank private</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.4</td>
<td>2.1</td>
<td>10.2</td>
</tr>
<tr>
<td>Borrowingd</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total capital flows as a share of GDP (%)</td>
<td>4.9</td>
<td>4.2</td>
<td>11.7</td>
<td>15.0</td>
<td>16.8</td>
<td>1.7</td>
<td>8.8</td>
<td>9.6</td>
</tr>
<tr>
<td>Growth of Broad money (M3) (%)</td>
<td>4.9</td>
<td>18.2</td>
<td>15.3</td>
<td>19.5</td>
<td>23.2</td>
<td>12.6</td>
<td>22.0</td>
<td>9.6</td>
</tr>
<tr>
<td>Total capital flows as a share of GDP (%)</td>
<td>4.9</td>
<td>4.2</td>
<td>11.7</td>
<td>15.0</td>
<td>16.8</td>
<td>1.7</td>
<td>8.8</td>
<td>9.6</td>
</tr>
</tbody>
</table>

--- Data not available.

Notes:
a Net capital flows comprise net direct foreign investment, net portfolio investment (equity and bond flows), and official and private bank borrowings. Changes in national foreign exchange reserves are not included.
b Annual average.
c Borrowing for a period of one year and below.
d Mostly trade related.


To mop up excess liquidity amidst rising inflationary pressure, BNM first resorted to sterilization operations and raising the statutory reserve requirement for the commercial banks. Despite these measures, excess liquidity in the economy remained high. To discourage capital inflows, an adjustment of the exchange rate (i.e., greater exchange rate flexibility in place of the commitment to the dollar peg) was the standard textbook recipe available to BNM at the time. However, this option was eschewed because of the concern that “allowing the ringgit to appreciate sharply arising from the inflows of funds that were of a very
short-term nature would run the risk of overshooting of the exchange rate,” jeopardizing macroeconomic stability and international competitiveness of the economy (BNM 1999, p 289).

In this context, BNM opted to implement several capital inflow control measures in January and February 1994. As in the case of the 1998–1999 capital control episode, the restrictions were specifically aimed at short-term flows (clearly leaving aside FDI) and were introduced with a clear assurance that they were short-term in nature. These included placing ceilings on external liabilities of commercial banks, banning sales of short-term debt instruments to foreigners, restricting ringgit deposits of foreign institutions to non-interest-bearing accounts, prohibiting non-trade-related currency swaps, and introducing a new maintenance charge on non-interest-bearing foreign deposits (Appendix). Once speculative pressure subsided and the exchange rate returned to the level of late 1993, BNM gradually removed the controls and freed up capital flows, completely lifting all restrictions by August 1994 (World Bank 1996, BNM 1999).

The capital inflow controls were successful in moderating the surge of short-term flows and slowing down domestic monetary expansion. M3 growth moderated from 23.5% in 1993 to 13.1% in 1994. Short-term flows regained momentum following the lifting of controls, reaching 56.7% of total inflows in 1996 but was much lower compared to the average level in 1992–1993. As in the case of the 1998–1999 capital control episode, the restrictions led to widespread concern about a possible contraction in foreign investment flows to Malaysia, both portfolio investment and FDI. Against these gloomy predictions, capital inflows to the country continued to expand at an increasing rate during the ensuing three years. The introduction of specific controls in 1994 did not affect long-term investment flows—FDI inflows showed a sustained increase, amounting to $4.4 billion in 1994 compared to $4.0 billion in 1993.

Following the removal of capital controls, short-term flows increased during the next two years. But in the lead-up to the Asian financial crisis, Malaysia’s exposure to short-term bank borrowing continued to be rather low compared to the other crisis-affected East Asian countries. The share of net short-term bank credit in total capital inflows to Malaysia during 1994–1996 was a mere 22%. Comparable figures for the other countries were: 62% for Indonesia, 56% for the Republic of Korea, 77% for the Philippines, and 83% for Thailand. As we will see in the next section, the exceptionally low exposure to short-term foreign debt was a key factor that enabled Malaysia’s unique policy response to the crisis.

B. Capital Outflow Controls, 1998–2002

Malaysia made headlines in the context of the Asian financial crisis by taking an unorthodox (and risky) policy posture where key elements were capital
controls and expansionary macroeconomic policy. As the first step, on 31 August 1998, offshore trading of shares of Malaysian companies was banned in a move to freeze over-the-counter share trading in the central limit order book (CLOB) market in Singapore.\(^{13}\) This was followed by the imposition of comprehensive controls over short-term capital flows, introduction of a 12-month withholding period on the repatriation of proceeds (principal and profit) from foreign portfolio investment (1 September 1998), and fixing of the exchange rate at RM3.80 per $1 (2 September 1998). Other capital control measures employed included bans on: trading in ringgit instruments by offshore banks operating in Malaysia, offering of domestic credit facilities to nonresident banks and stockbrokers, trading in ringgit in overseas markets (predominantly in Singapore), and the use of ringgit as an invoicing currency in foreign trade. There were also stringent limits placed on the approval of foreign exchange for overseas travel and investment by Malaysian nationals (Appendix).

The controls were strong but they were narrowly focused on short-term capital flows. The aim was to make it harder for short-term portfolio investors, both foreign and local, to sell their shares and repatriate proceeds, and for offshore hedge funds to drive down the currency. There was no retreat from the country’s long-standing commitment to an open trade and FDI policy. Current account transactions (with the sole exception of limits on foreign exchange for travel by Malaysian citizens) as well as profit remittance and repatriation of capital by foreign direct investors continued to remain free of control.

In early February 1999, the original 12-month holding restriction on portfolio investment was converted into a two-tier exit levy: 30% on profits made and repatriated within one year and 10% on profits repatriated after one year. In August 1999, the two-tier levy on profit repatriation was replaced by a unified 10% levy. An agreement between the KLSE and the SES reached on 26 February 2000 provided for the transfer of the shares trapped in the CLOB market to the Malaysian stock exchange, which allowed trading to resume. The 10% exit levy was lifted on 1 May 2001.

Following this policy choice, which marked a significant departure from the IMF-centered approach adopted by the other crisis-hit countries in the region, the Malaysian economy recovered smoothly, defying widespread pessimism that prevailed in economic circles at the time. There continues to be, however, an intense debate on whether this episode holds lessons for using capital controls as a tool of crisis resolution: *precedence* does not necessarily imply *causation*.

One can distinguish two alternative views. The first sees the imposition of controls as a case of “locking the stable door after the horse had bolted.” At the time Malaysia made the policy U-turn, capital had already left the country and

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\(^{13}\) At the time, total value of Malaysian shares traded in the CLOB market amounted to $4.2 billion (Far Eastern Economic Review, 9 March 1998). Following the Malaysian move to ban offshore trading of Malaysian company shares, the CLOB market was closed on 15 September 1998.
speculative pressure for capital outflow from the Asian region was coming to an end (e.g., Jomo 2004, Dornbusch 2002). More specifically, the proponents of this view emphasize that not only Malaysia but also the other crisis-hit Asian countries, which maintained open capital accounts under IMF-centered reform packages, began to recover at about the same time. The second view holds that capital controls did play a pivotal role in the recovery by insulating the domestic capital market from the world capital market (with respect to short-term flows) and thus allowing the Malaysian government to engage in fiscal and monetary expansion and to restructure troubled banks and companies (e.g., Corden 2003, Athukorala 2002).

The “barn door” analogy misses the important point that the purpose of capital control was to set the stage for monetary and fiscal expansion by preventing an outflow of funds—both local and foreign-owned—that could occur in response to a lowering of the domestic interest rate relative to world market rates under the new expansionary macroeconomic policy stance. The potential threat of such an outflow was much greater in Malaysia than in other crisis-hit countries because of the pivotal role played by the Singapore money market as a convenient alternative to the domestic market for Malaysian investors.

Singapore was formally separated from Malaysia in 1965 and the KLSE was split from the SES in 1970. However, family ties and business connections between the two countries remained strong. Trade in shares of Malaysian companies in the informal CLOB market was a major activity of both Singaporean and Malaysian brokerage firms. Ringgit was the main, if not the sole, invoicing currency for thriving trade between the two countries (which accounted for over 30% of Malaysia’s total trade by the mid-1990s), and many Singaporean banks and individual money dealers were actively involved in ringgit trading.

A striking feature of capital flight from Malaysia from about early 1998 was that they largely took the form of ringgit (rather than foreign currency) flowing into Singapore. As much as RM25 billion–RM35 billion ($6.3 billion–$8.8 billion) had ended up in Singapore at the height of the crisis in mid-1998 (Tripathi, Dolven, and Keenan 1998). This amounted to 46%–64% of the total domestic supply of currency and demand deposits in Malaysia. These flows were triggered by very attractive money market rates of around 20%–40% in Singapore, which provided a hefty premium over the domestic rate (about 11 percentage points), coupled by a weakening ringgit. Arbitrage between the two rates by money market dealers in both Singapore and Malaysia began putting pressure on the domestic interest rates in Malaysia. Thus, policymakers became increasingly concerned about the “internationalization” of the national currency, which had carried a potential new threat to economic stability and monetary policy autonomy. The strong demand for offshore ringgit and the consequent buildup of offshore ringgit deposits increased the vulnerability of the ringgit, undermining the effectiveness of monetary policy (BNM 1999).
The effectiveness of capital controls in bringing in expected monetary policy autonomy is evident from the dramatic turnaround in the differential between domestic and international interest rates in Malaysia following the imposition of these controls (Figure 6). The differential remained positive and varied in the range of 0.6%–2% during the period before the onset of the crisis then increased to a peak of 8% at the height of the crisis in mid-1998. Following the imposition of capital controls in September 1998, it tended to decline, entering negative territory by March 1999. From then, the differential has remained around −2.5% with little monthly fluctuations. Both the dramatic decline in the differential and its remarkable stability clearly attest to the effectiveness of controls in insulating the domestic interest rate from international financial market developments. This inference based on simple visual inspection of relative movement in interest rates is supported strongly by systematic econometric analyses of Edison and Reinhart (2000), Kaminsky and Schmukler (2001), Kaplan and Rodrik (2002), and Doraisami (2004).

Figure 6: Differential Between Domestic and International Money Market Interest Rates \((r_d - r_f)\) in the Republic of Korea, Malaysia, and Thailand (January 1996–June 2000) (percentage points)

Note: Domestic money market rate used for each of the three countries: Republic of Korea (91-day beneficial certificate rate), Malaysia (3-month Treasury bill rate), and Thailand (3-month repurchase rate on government bonds in the inter-bank market). The 3-month US Treasury bill rate is used as proxy for the international money market rate.


Unlike the situation before imposition of capital controls, short-term capital flows stabilized in the first quarter of 1998. Therefore, the foreign reserve position began to improve in tandem with the surplus in the current account. Total
foreign exchange reserves, which remained around $20 billion from the third quarter of 1997, surpassed the pre-crisis level of $30 billion by the end of 1999. The “errors and omission” item in the balance of payments, which is widely considered to be a convenient indicator of “unofficial” capital flows, in fact shrank following the imposition of capital controls. As foreign exchange controls were targeted carefully on short-term investment flows and trade and FDI-related transactions continued to remain liberal, the policy shift did not result in the emergence of a black market for foreign exchange.

Malaysia was able to ride the crisis without building up a massive debt overhang, as severing the link between international and domestic capital markets helped the authorities to harness domestic finance to implement banking and corporate restructuring programs and for fiscal expansion. Stock public debt as a share of GDP recorded only a mild increase, from 32% in 1996 to 36% in 2000. Almost 85% of the addition to total debt stock during 1998–2000 came from domestic borrowing. The share of foreign debt in the total stock did increase from 12% to 16.6%, but the bulk of it (over 80%) comprised long-term concessionary loans obtained from multilateral financial organizations and foreign governments. By the end of 1999, Malaysia’s foreign exchange reserves stood at $31 billion, providing 300% cover for total outstanding short-term debt.

There is little justification for using the “superiority” yardstick (i.e., whether Malaysia has done better than the other crisis-hit Asian countries) in examining the outcome of Malaysia’s unorthodox policy. This was basically a policy choice made in desperation given the domestic socio-political resistance to going along the IMF path (Crouch 1988). There is no evidence to suggest that Malaysian policymakers expected it to generate a superior outcome. Moreover, the almost unanimous view of the critics at the time was that Malaysia’s non-conventional approach was doomed to fail.

In any case, the available performance indicators are not consistent with the view that Malaysia was slower to recover than the IMF program countries. In a comparison of Malaysia with the Republic of Korea and Thailand, only the Republic of Korea recorded a faster recovery than Malaysia (Figure 7). But the Republic of Korea is a mature industrial nation with a diversified manufacturing base. Moreover, the dominant role played by a few national companies (chaebol) in manufacturing production and trade seems to have put it in a uniquely advantageous position in the recovery process (Corden 2007, Blustein 2003).

In terms of the stage of development and economic structure, undoubtedly the better comparison for Malaysia is Thailand. Malaysia’s recovery rate was much faster and steadier than Thailand’s. The difference in the experiences of the two countries becomes even more significant when one goes beyond aggregate GDP growth to consider other performance indicators. For instance, even in the mid-2000s Thailand continued to rely on massive public sector demand, with private consumption remaining well below pre-crisis levels. By contrast, the
recovery process in Malaysia had become broad-based by late 1999, with rapid recovery in private sector consumption and investment. Unlike in Malaysia, the nonperforming loan ratio of the Thai financial system in the early 2000s remained stubbornly high (nearly 40%) and the volume of real outstanding credit continued to fall (Siamwalla 2000).

Crisis management behind closed doors could well have involved considerable misallocation of resources. There is indeed ample anecdotal evidence of some inappropriate rescue operations. There are also unexplained differences in discount rates applied by the asset management company Danaharta to various assisted banks and the criteria used by Danamodal in setting priorities in injecting capital (Johnson and Mitton 2003). But whether these opaque practices are unique to the capital-control-based crisis management in Malaysia is a debatable issue. Similar concerns have been raised relating to banking and corporate restructuring processes in the Indonesia, Republic of Korea, and Thailand—countries that rode the crisis without capital controls. Moreover, one can reasonably argue (along the lines of Krueger and Tornell 1999) that economic gains associated with the speedy implementation of banking and corporate restructuring in Malaysia might have compensated significantly, if not totally, for these alleged costs. Notwithstanding initial grave misgivings, it is now widely acknowledged that the Malaysian authorities have successfully used

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14Danamodal was established in July 1998 with the main objective of recapitalizing the banking system. Capital injections from Danamodal were destined to enable institutions to restore their capital adequacy ratios to 9%.
the shelter provided by capital controls to implement the most effective and far-reaching financial system cleanup among the crisis countries (Fischer 2004).

V. CONCLUDING REMARKS

The purpose of this paper is to inform the contemporary policy debate on the effectiveness of capital controls in developing countries through a case study of Malaysia. Following a comprehensive survey of capital account policy in Malaysia since the early 1970s, we have probed the role of capital outflow controls in Malaysia’s policy response to the Asian financial crisis and provided an econometric analysis of the impact of capital account policies on capital flows.

The results of our econometric analysis suggest that capital outflow controls are effective in reducing capital outflows, in particular portfolio and bank borrowings. However, we failed to find a significant negative impact of capital inflow controls on portfolio investment inflows. There is also no evidence to suggest that FDI inflows or outflows are sensitive to capital account policies. This presumably reflects the fact that the Malaysian policy regime relating to FDI has remained virtually fully liberal throughout the period under study (and hence little variability in the capital account policy indexes relating to FDI).


Our analysis of the Malaysian policy response to the Asian financial crisis suggests that the carefully designed temporary capital controls were successful in providing Malaysian policymakers a viable setting for aiding the recovery process through standard Keynesian therapy. Capital controls also assisted banking and corporate restructuring by facilitating the mobilization of domestic resources, and more importantly, by providing a cushion against possible adverse impacts on market sentiment of “national” initiatives.

Evidence from the two event studies also corroborates the inference we drew from the econometric analysis that controls specifically targeted at short-term capital flows do not have an adverse backwash effect on FDI at least in the short to medium term. Of course other countries should be cautious in deriving policy lessons from Malaysia because a number of factors specific to Malaysia seem to have significantly conditioned the outcome of the capital-control-based recovery package.
# APPENDIX

## A CHRONOLOGY OF CAPITAL CONTROL MEASURES IN MALAYSIA

<table>
<thead>
<tr>
<th>Date</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1992</strong></td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>Total borrowing by residents in foreign currency from domestic commercial and merchant banks to finance imports of goods and services was restricted to the equivalent of RM1 million.</td>
</tr>
<tr>
<td>July</td>
<td>Borrowing under the export credit refinance facilities (both pre- and post-shipment) by nonresident-controlled companies would be considered domestic borrowing.</td>
</tr>
<tr>
<td>October</td>
<td>Offshore guarantees obtained by residents to secure domestic borrowing, except offshore guarantees (whether dominated in ringgit or foreign currency) without recourse to Malaysian residents and obtained from the licensed offshore banks in Labuan to secure domestic borrowing, were deemed as foreign borrowing. In cases where an offshore guarantee is denominated in ringgit, it was subject to the condition that, in the event the guarantee is called on, the licensed offshore banks in Labuan must make payments in foreign currency (with some exceptions), not in ringgit.</td>
</tr>
<tr>
<td>November</td>
<td>The guidelines on foreign equity capital ownership were liberalized. Companies exporting at least 80% of their production were no longer subject to any equity requirement, whereas companies exporting between 50% and 79% of their production were permitted to hold 100% equity, provided that they have invested $50 million or more in fixed assets or completed projects with at least 50% local value added and that company's products do not compete with those produced by domestic firms. These guidelines were not to apply to sectors in which limits on foreign equity participation have been established.</td>
</tr>
<tr>
<td>December</td>
<td>Residents and the offshore companies in Labuan were prohibited from transacting with the currency of the Former Yugoslav Republic without specific prior approval from the Controller of Foreign Exchange.</td>
</tr>
<tr>
<td><strong>1993</strong></td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>Nonresident controlled companies involved in manufacturing and tourism-related activities were freely allowed to obtain domestic credit facilities to finance the acquisition and/or the development of immovable property required for their own business activities.</td>
</tr>
<tr>
<td><strong>1994</strong></td>
<td></td>
</tr>
<tr>
<td>17 January</td>
<td>A ceiling was placed on outstanding net external liability position of domestic banks (excluding trade-related inflows or for FDI in Malaysia)</td>
</tr>
<tr>
<td>24 January</td>
<td>Restriction on sales of short-term monetary instruments to nonresidents. The restriction applied only to instruments used by BNM to influence liquidity in the market: negotiable instruments of deposit, Bank Negara bills, Treasury bills, government securities (including Islamic securities) with a remaining maturity of one year or less.</td>
</tr>
<tr>
<td>1 February</td>
<td>The list of securities on the prohibition list for selling to nonresidents was extended to cover private debt securities (including commercial papers but excluding securities convertible to ordinary shares) with maturity of one year or less, covering both initial issues and the subsequent secondary market trade.</td>
</tr>
<tr>
<td>February</td>
<td>Prohibition of forward transactions (bid side) and non-trade-related swaps by commercial banks with foreign customers to curtail the speculative activities of offshore agents seeking long positions in ringgit.</td>
</tr>
<tr>
<td>August</td>
<td>Residents were permitted to sell to nonresidents any Malaysian securities. Prohibition on forward transactions and non-trade swaps by commercial banks were lifted.</td>
</tr>
<tr>
<td>Date</td>
<td>Events</td>
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</tr>
<tr>
<td>December</td>
<td>Residents may borrow in foreign currency up to a total of the equivalent of RM5 million from nonresidents and from commercial and merchant banks in Malaysia. Nonresident-controlled companies were allowed to obtain credit facilities, including immovable property loans, up to RM10 million without specific approval, provided that at least 60% of their total credit facilities from banking institutions were obtained from Malaysian-owned financial institutions. Nonresidents with valid work permits may obtain domestic borrowing to finance up to 60% of the purchase prices of residential property for their own accommodation.</td>
</tr>
<tr>
<td>1995</td>
<td>A ceiling of the net external liability position of domestic banks was lifted.</td>
</tr>
<tr>
<td>January</td>
<td>Corporate residents with a domestic credit facility were allowed to remit funds up to the equivalent of RM10 million for overseas investment purposes each calendar year.</td>
</tr>
<tr>
<td>June</td>
<td>Controls were imposed on banks to limit outstanding non-commercial-related ringgit offer-side swap transactions (i.e., forward order/spot purchases of ringgit by foreign customers) to $2 million per foreign customer or its equivalent. Hedging requirements of foreigners were imposed (excluding trade-related and genuine portfolio and foreign direct investment ). Residents are allowed to enter into non-commercial-related swap transaction up to a limit (no limits previously). A ban on short-selling of the listed securities on KLSE was introduced to limit speculative pressures on stock prices and exchange rates.</td>
</tr>
<tr>
<td>August</td>
<td>A requirement introduced to repatriate all ringgit held offshore (including ringgit deposits in overseas banks) by 1 October 1998 (BNM approval thereafter). Approval requirement was imposed for transfer of funds between external accounts (freely allowed previously) and for the use of funds other than permitted purposes. Licensed offshore banks were prohibited from trade in ringgit assets. A limit was introduced on exports and imports of ringgit by resident and nonresident travellers. Residents were prohibited from granting ringgit credit facilities to nonresident corresponding banks and stockbroking companies (subject to a limit previously). All imports and exports were required to be settled in foreign currency. Residents were prohibited from obtaining ringgit credit facilities from nonresidents. All purchases and sales of ringgit facilities can only be transacted through authorized depository institutions. Approval requirement for nonresidents to convert RM in external account into foreign currency, except for purchases of RM assets, conversion of profits, dividends, interest, and other permitted purposes.</td>
</tr>
<tr>
<td>Date</td>
<td>Events</td>
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</tr>
<tr>
<td></td>
<td>A 12-month waiting period was introduced for nonresidents wishing to convert Malaysian ringgit proceeds from the sale of Malaysian securities held in external accounts (excluding FDI, repatriation of interest, dividends, fees, commissions, and rental income from portfolio investment).</td>
</tr>
<tr>
<td></td>
<td>A prior approval requirement was imposed for all residents intending to invest abroad (in any form) beyond a certain limit.</td>
</tr>
<tr>
<td></td>
<td>A specific limit on exports of foreign currency by residents and up to the amount brought into Malaysia for nonresidents.</td>
</tr>
<tr>
<td></td>
<td>Trading in Malaysia shares on Singapore's central limit order book (CLOB) OTC market actually became prohibited as a result of strict enforcement of the existing law requiring Malaysian shares to be registered in KLSE prior to trade.</td>
</tr>
<tr>
<td>December</td>
<td>Residents were allowed to grant loans to nonresidents for purchases of immovable properties from 12 December 1998 to 12 January 1999.</td>
</tr>
<tr>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>Designated nonresident accounts for future trading were allowed and exempted from the 12-month holding period.</td>
</tr>
<tr>
<td></td>
<td>Capital flows for the purpose of trading derivatives on the commodity and monetary exchange of Malaysia and the Kuala Lumpur options and financial futures exchange were permitted for nonresidents without being subject to the rules governing external accounts when transactions were conducted through “designated external account” that could be treated with tier-1 commercial banks in Malaysia.</td>
</tr>
<tr>
<td>February</td>
<td>The 12-month waiting period was replaced with a graduated exit levy system on the repatriation of the principal of capital investments (in shares, bonds, and other financial instruments, except for property investments) made prior to 15 Feb 1999. The levy decreased over the duration of the investment and thus penalized earlier repatriations—the levy was 30% if repatriated in less than 7 months after entry, 20% if repatriated in 7–9 months, and 10% if repatriated in 9–12 months. No levy, on principle, if repatriated after 12 months.</td>
</tr>
<tr>
<td>February</td>
<td>Repatriation of funds relating to investments in immovable property was exempted from the exit levy regulations</td>
</tr>
<tr>
<td>March</td>
<td>The ceiling on the import and export of ringgit for border trade with Thailand was raised.</td>
</tr>
<tr>
<td></td>
<td>Investors in MESDAQ (Malaysian Exchange of Securities Dealing and Automated Quotation) were exempted from the exit levy introduced on 15 February 1999.</td>
</tr>
<tr>
<td>July</td>
<td>Residents were allowed to grant overdraft facility in aggregate not exceeding RM200 million for intraday, and not exceeding RM5 million for overnight to a foreign stockbroking company subject to certain conditions</td>
</tr>
<tr>
<td>September</td>
<td>Commercial banks were allowed to enter into short-term currency swap arrangement with nonresident stockbrokers to cover payment for purchases of shares on the KLSE and in outright ringgit forward sale contracts with nonresidents who have firm commitment to purchase shares on the KLSE, for maturity periods not exceeding five working days and with no rollover option.</td>
</tr>
<tr>
<td>October</td>
<td>Residents are allowed to grant ringgit loans to nonresidents for purchases of immovable properties from 29 October 1999 to 7 December 1999.</td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>Funds arising from the sale of securities purchased by nonresidents on the CLOB market can be repatriated without payment of an exit levy.</td>
</tr>
<tr>
<td>Date</td>
<td>Events</td>
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<td>---------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>April</td>
<td>Nonresident-controlled companies raising domestic credit through private debt securities were exempted from the RM19 million limit and the 50:50 requirement for issuance of private debt securities on tender basis through the fully automated system for tendering.</td>
</tr>
<tr>
<td>June</td>
<td>Administrative procedures were issued to facilitate classification of proceeds from the sale of CLOB securities as being free from levy.</td>
</tr>
<tr>
<td>July</td>
<td>Residents and nonresidents were no longer required to make a declaration in the travel's declaration for as long as they carry currency notes and/or travellers’ checks within the permissible limits. For nonresidents, the declaration was incorporated into the embarkation card issued by the immigration department.</td>
</tr>
<tr>
<td>September</td>
<td>Licensed offshore banks in the Labuan international offshore financial center were allowed to invest in ringgit assets and instruments in Malaysia for their own accounts only and not on behalf of clients (and not financed by ringgit borrowing).</td>
</tr>
<tr>
<td>December</td>
<td>Foreign-owned banks in Malaysia were allowed to extend up to 50% (from 40%) of total domestic credit facilities to nonresident-controlled companies, in case of credit facilities extended by resident banks. This is to fulfil Malaysia's commitment under General Agreement on Trade in Services. Licensed company banks were allowed to extend intraday overdraft facilities not exceeding RM200 million in aggregate and overnight facilities not exceeding RM10 million (previously RM5 million) to foreign stockbroking companies and foreign global custodian banks.</td>
</tr>
<tr>
<td>2001</td>
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</tr>
<tr>
<td>February</td>
<td>The exit levy on profit repatriated after one year from the month the profits are realized was abolished. Portfolio profits repatriated within one year remained subject to the 10% levy.</td>
</tr>
<tr>
<td>May</td>
<td>The 10% exit levy imposed on profits arising from portfolio investments repatriated within one year of realization was abolished.</td>
</tr>
</tbody>
</table>
| June    | All controls on the trading of futures and options by nonresidents on the Malaysia Digital Enterprise Exchange (MDEX) were eliminated. The commodity and monetary exchange of Malaysia and the KLSE were merged to form the MDEX.  

Resident insurance companies were allowed to extend ringgit policy loans to nonresident policy holders with the terms and conditions of the policies. The amount of ringgit loans extended may not exceed the policy's attended cash surrendered value and may be for the duration of the policies. |
| July    | Resident financial institutions were allowed to extend ringgit loans to nonresidents to finance the purchase or construction of any immovable property in Malaysia (excluding financing for purchases of land only) up to a maximum of three property loans in aggregate. |
| 2002    |                                                                                                                                                                                                 |
| November | Banks are allowed to extend additional ringgit credit facilities to nonresidents up to an aggregate of RM5 million per nonresident to finance projects undertaken in Malaysia. Prior to this, credit facilities in ringgit to nonresidents for purposes other than purchases of three immovable properties or a vehicle were limited to RM200,000. |
| December | In addition to obtaining property loans to finance new purchases or construction of any property in Malaysia, nonresidents may also refinance their ringgit domestic property loans. The above is subject to a maximum of three property loans. 

The limit of RM10,000 equivalent in foreign currency for investment abroad by residents under the employee share option/purchase scheme was removed. Effective this date, general permission was granted for overseas investment for this purpose. |
<table>
<thead>
<tr>
<th>Date</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2003</strong></td>
<td></td>
</tr>
<tr>
<td><strong>March</strong></td>
<td>Banking institutions as a group were permitted to extend ringgit overdraft facilities, not exceeding RM500,000 in aggregate to a nonresident customer if the credit facilities were fully covered at all times by fixed deposits placed by the nonresident customer with the banking institutions extending the credit facilities.</td>
</tr>
<tr>
<td><strong>April</strong></td>
<td>Exporters were allowed to retain a portion of their export proceeds in foreign currency accounts with onshore licensed banks in Malaysia with overnight limits ranging between the equivalent of $1 million and $70 million or any other amount that has been approved (previously, the limit was between $1 million and $10 million).</td>
</tr>
<tr>
<td></td>
<td>Residents were allowed to sell up to 12 months forward foreign currency receivables for ringgit to an authorized dealer for any purpose, if the transaction was supported by a firm underlying commitment to receive such currency.</td>
</tr>
<tr>
<td></td>
<td>The maximum amount of payment of profits, dividends, rental income, and interest to a nonresident on all bona fide investments that may be remitted without prior approval, but upon completion of statistical forms, was increased from RM10,000 to RM50,000 or its equivalent in foreign currency per transaction.</td>
</tr>
<tr>
<td><strong>May</strong></td>
<td>The threshold level for acquisition by foreign and Malaysian interests exempted from foreign investment committee (FIC) approval was raised from RM5 million to RM10 million. Acquisition proposals by licensed manufacturing companies were centralized at the Ministry of International Trade and Industry, while corporate proposals were centralized at the Securities Commission. These proposals no longer required FIC consideration.</td>
</tr>
<tr>
<td><strong>June</strong></td>
<td>Foreign equity holdings in manufacturing projects were allowed up to 100% for all types of investment.</td>
</tr>
<tr>
<td><strong>2004</strong></td>
<td></td>
</tr>
<tr>
<td><strong>April</strong></td>
<td>Residents were allowed to sell forward non-export foreign currency receivables for ringgit or another foreign currency to an authorized dealer or an approved merchant bank for any purpose, provided the transaction is supported by an underlying commitment to receive currency.</td>
</tr>
<tr>
<td></td>
<td>Residents with permitted foreign currency borrowing were allowed to enter into interest rate swaps with onshore licensed banks, approved merchant banks, or licensed offshore banks in Labuan, provided that the transaction was supported by a firm underlying commitment.</td>
</tr>
<tr>
<td></td>
<td>Resident individuals with funds abroad (not converted from ringgit) were allowed to maintain non-export foreign currency accounts offshore without any limit imposed on overnight balances.</td>
</tr>
<tr>
<td></td>
<td>Resident companies with domestic borrowing were allowed to open non-export foreign currency accounts with licensed onshore banks in Malaysia to retain foreign currency receivables other than export proceeds with no limit on the overnight balances.</td>
</tr>
<tr>
<td></td>
<td>Resident companies without domestic borrowing were allowed to open non-export foreign currency accounts in licensed offshore banks in Labuan up to an overnight limit of $500,000 or its equivalent.</td>
</tr>
<tr>
<td>Date</td>
<td>Events</td>
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<tr>
<td></td>
<td>Resident individuals were permitted to open foreign currency accounts to facilitate payments for education and employment overseas with an aggregate overnight limit equivalent to $150,000 with Labuan offshore banks. Previously, the limit was $100,000 ($50,000 for overseas banks).</td>
</tr>
<tr>
<td></td>
<td>Resident individuals who have foreign currency funds were allowed to invest freely in any foreign currency product offered by onshore licensed banks.</td>
</tr>
<tr>
<td></td>
<td>The amount of export proceeds that residents may retain in foreign currency accounts with licensed onshore banks was increased from the range of $1 million to $70 million to the range of $30 million to $70 million.</td>
</tr>
<tr>
<td></td>
<td>The controller of foreign exchange (COFE) approval was required for the issuance of ringgit bonds in Malaysia by multinational development institutions and foreign multinational corporations.</td>
</tr>
<tr>
<td></td>
<td>Resident banks and nonbanks were permitted to extend ringgit loans to finance or refinance the purchase or construction of any immovable property in Malaysia (excluding financing for purchases of land only) up to a maximum of three property loans in aggregate.</td>
</tr>
<tr>
<td></td>
<td>The limit for banking institutions on loans to nonresidents (excluding stockbroking companies, custodian banks, and correspondent banks) was raised from RM200,000 to RM10,000,000.</td>
</tr>
<tr>
<td></td>
<td>Licensed insurers and <em>takaful</em> operators (Islamic insurance) were allowed to invest abroad up to 5% of their margins of solvency and total assets. These entities were also allowed to invest up to 10% of net asset value (NAV) in their own investment-linked funds.</td>
</tr>
<tr>
<td></td>
<td>Unit trust management companies were allowed to invest abroad the full amount of NAV attributed to nonresidents and up to 10% of NAV attributed to residents without prior COFE approval. In addition, fund/asset managers were allowed to invest abroad up to the full amount of investments of nonresident clients and up to 10% of investments of their resident clients.</td>
</tr>
<tr>
<td></td>
<td>Bank Negara Malaysia (BNM) liberalized its foreign exchange administration rules to facilitate multilateral development banks (MDBs) or multilateral financial institutions (MFIs) in raising ringgit-denominated bonds in the Malaysian capital market.</td>
</tr>
<tr>
<td></td>
<td>The size of the bond to be issued by MDBs or MFIs should be large enough to contribute to the development of the domestic bond market, and the minimum tenure of the bonds should be 3 years. Ringgit funds raised from the issuance of ringgit-denominated bonds could be used either in Malaysia or overseas. MDB or MFI issuers and nonresident investors of ringgit-denominated bonds could maintain, without restrictions, foreign currency accounts or ringgit accounts as external accounts with any onshore licensed bank in Malaysia. MDBs, MFIs, or nonresident investors would be allowed to enter into forward foreign exchange contracts or swap arrangements to hedge ringgit exposure, and MDB or MFI issuers would be allowed to enter into interest rate swap arrangements with onshore banks.</td>
</tr>
</tbody>
</table>
BNM liberalized rules to facilitate foreign multinational corporations (MNCs) in raising ringgit-denominated bonds in the Malaysian capital market. The ringgit funds raised from such issues could be used in Malaysia or overseas. MNC issuers and nonresident investors of ringgit-denominated bonds could maintain, without restrictions, foreign currency accounts, or ringgit accounts as external accounts with any onshore licensed bank. MNC issuers or nonresident investors would be allowed to enter forward exchange contracts or swap arrangements to hedge ringgit exposures, and MNC issuers would be allowed to enter interest rate swap arrangements with onshore banks.

2005

Residents without domestic credit facilities were allowed to invest abroad in foreign currency, to be funded either from their own foreign currency or from conversion of ringgit funds. Individuals with domestic credit facilities were allowed to invest abroad any amount of their foreign currency funds or convert ringgit up to RM100,000 per annum for such purposes.

Corporations with domestic credit facilities were also allowed to use their foreign currency funds or convert ringgit up to RM10 million per annum for investment in foreign currency assets. These corporations must have a minimum shareholders’ fund of RM100,000 and must be operating for at least 1 year.

The threshold for investing abroad funds attributed to residents by a unit trust company was increased to 30% (from 10% previously) of the NAV of all resident funds managed by the unit trust company. Still no restrictions were placed on investment abroad for funds attributed to nonresident clients.

Fund managers could now invest abroad any amount of funds belonging to nonresident clients and resident clients that do not have any domestic credit facilities. They were also free to invest up to 30% of funds of resident clients with domestic credit facilities. Currently they could invest only 10% of resident funds, irrespective of whether the resident clients have any domestic credit facilities.

Residents were now free to open a foreign currency account (FCA) onshore or offshore (except for export FCA). No specific prior permission was required and no limit on the amount of foreign currency funds a resident could retain onshore or offshore. Residents without any domestic credit facilities were allowed to convert any amount of ringgit funds for credit into FCAs maintained onshore or offshore.

A resident corporation with domestic credit facilities was allowed to convert ringgit up to RM10 million in a calendar year for credit into its FCA.

A resident individual with domestic credit facilities was also allowed to convert ringgit for credit into FCA as follows: for education or overseas employment purposes (up to $150,000 for credit into onshore FCA or FCA maintained with offshore banks in Labuan and up to $50,000 for credit into overseas FCA) and for other purposes (up to RM100,000 per annum).

Exporters could now retain any amount of their foreign currency export proceeds onshore with licensed banks (the previous limit of between $30 million and $100 million abolished). All export proceeds continue to be required to be repatriated to Malaysia onshore.
### Date | Events
--- | ---
2007 April | Resident corporation, on a per corporate group basis, could now obtain foreign currency credit facilities up to the aggregate of RM50 million equivalent. The foreign currency borrowing could be used to finance overseas investment up to RM10 million equivalent.  
  The aggregate limit for foreign currency borrowing by individuals was also increased from RM5 million to RM10 million equivalent. The funds could be used for any purpose, including financing overseas investments.  
  The rules for domestic borrowing by nonresident-controlled companies were fully liberalized via the removal of the RM50 million limit and the 3:1 gearing ratio requirement.  

2007 April | The net open position limit of licensed onshore banks was abolished. Previously, the open position limit had been capped at 20% of the banks' capital base. The limits imposed on licensed onshore banks for foreign currency accounts maintained by residents were also removed. Investment banks in Malaysia were allowed to undertake foreign currency business subject to a comprehensive supervisory review on the capacity and capability of the investment banks.  
  Further flexibility for nonresident stockbroking companies and custodian banks were given further flexibility in obtaining ringgit overdraft facilities from licensed onshore banks by: removing the previous overdraft limit of RM200 million; and expanding the scope on utilization of the overdraft facility to include ringgit instruments settled through the Real Time Electronic Transfer of Funds and Securities System and Bursa Malaysia. Previously, utilization of the facility had been confined to shares traded on Bursa Malaysia.  
  The limit on the number of residential or commercial property loans obtained by nonresidents was abolished. Under the previous policy, nonresidents were allowed to obtain a maximum limit of three property loans from residents to finance the purchase or construction of residential or commercial properties in Malaysia. Licensed onshore banks were allowed to appoint overseas branches of their banking group as a vehicle to facilitate the settlement of any ringgit assets of their nonresident clients. Also removed were restrictions on Labuan offshore banks from transacting in ringgit financial products on behalf of nonresident clients.  
  The limit on foreign currency borrowing that can be obtained by resident corporations from licensed onshore banks and nonresidents as well as through issuance of onshore foreign currency bonds was increased to RM100 million equivalent in aggregate and on corporate group basis from the previous RM50 million equivalent. The proceeds could be used for domestic purposes or offshore investment. Residents were allowed to hedge foreign currency loan repayment up to the full amount of underlying commitment.  
  Flexibilities for resident individuals and corporations to invest in foreign currency assets were enhanced by the following:  
  i. Resident individuals with domestic ringgit borrowing could now invest in foreign currency assets up to RM1 million per calendar year from the previous limit of RM100,000; and  
  ii. Resident corporations with domestic ringgit borrowing could now invest in foreign currency assets up to RM50 million per calendar year from the previous limit of RM10 million.
The limit for resident institutional investors investing in foreign currency assets was increased as follows:

i. Unit trust companies—up to 50% of NAV attributable to residents from 30% of NAV previously

ii. Fund management companies—up to 50% of funds of resident clients with domestic credit facilities from 30% previously.

iii. Insurance companies and takaful operators—up to 50% of NAV of investment-linked funds marketed from the from 30% of NAV previously.

### June

Licensed onshore banks were also allowed to appoint overseas branches of their banking group to facilitate the settlement of any ringgit assets of their nonresident clients. Ringgit transactions undertaken by the overseas branches were subjected to the following conditions:

i. Overseas branches must conduct only straight passthrough transactions matched with a back-to-back arrangement on exchange rate, amount, and value date with the licensed onshore bank. There should be:
   - no gapping of the ringgit positions in the books of the overseas branches;
   - no ringgit account, physical withdrawal or transfer of ringgit at the overseas branches (all ringgit settlements must be made onshore); and
   - no public display of the ringgit exchange rate by the overseas branches.

ii. The arrangement could be made available only to nonresident investors with firm underlying commitment to purchase or sell ringgit assets.

### October

The registration requirement on forward foreign exchange contracts exceeding RM50 million equivalent per contract for permitted capital account transactions and anticipatory current account transactions was abolished.

The registration requirement on ringgit-denominated loans exceeding RM50 million extended by a resident to a nonresident to finance or refinance the purchase or construction of residential and commercial properties in Malaysia was abolished.

The registration requirement on investment in foreign currency assets exceeding RM50 million equivalent by a resident (individual or company on corporate group basis) without domestic ringgit borrowing was abolished.

On foreign currency borrowing by residents:

i. The registration requirement on foreign currency borrowing in aggregate between RM50,000,001 and up to RM100 million equivalent by a resident company on corporate group basis from licensed onshore banks and nonresidents was abolished.

ii. The registration requirement on foreign currency borrowing exceeding RM50 million equivalent by an approved operational headquarters from licensed onshore banks and nonresidents to finance its own operation was abolished.

iii. The registration requirement on foreign currency borrowing exceeding RM50 million equivalent by a resident company from another resident company within the same corporate group using proceeds from an initial public offering on foreign stock exchanges was abolished.

On prepayment or repayment of foreign currency borrowing by residents:

i. The registration requirement on prepayment exceeding RM50 million equivalent on permitted foreign currency borrowing from a nonresident lender was abolished.

ii. Repayment of foreign currency borrowing with no fixed tenure or repayment schedule is deemed to be a prepayment, and therefore, registration requirement was also abolished.
<table>
<thead>
<tr>
<th>Date</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>On investments of Islamic funds in foreign currency assets:</td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>To further promote Malaysia as an Islamic financial center and a center for origination of Shariah-compliant investment instruments, the thresholds (50% of the NAV for unit trust companies and total funds attributable to residents with domestic ringgit borrowing for fund management companies) on investments of Islamic funds in foreign currency assets were abolished.</td>
</tr>
<tr>
<td>ii.</td>
<td>The investment in foreign currency assets by conventional funds managed by the unit trust and fund management companies continued to be subject to the existing thresholds of 50% of the NAV and the total funds attributable to resident clients with domestic ringgit borrowing.</td>
</tr>
<tr>
<td>To provide greater flexibility to nonresident investors in managing their ringgit exposure, the requirement for a nonresident to reinvest within 7 working days the proceeds arising from the sale of ringgit assets prior to the maturity of the forward foreign exchange contract in order to continue with the existing forward foreign exchange contract, was abolished. With the abolition, a nonresident is allowed to continue with the existing forward foreign exchange contract entered with a licensed onshore bank for: proceeds arising from the sale of ringgit assets sold prior to the maturity of the forward foreign exchange contract, and income from the ringgit assets.</td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>Resident companies with export earnings were allowed to pay another resident company in foreign currency for the settlement of purchases of goods and services. The objective of this liberalization was to enhance Malaysia’s competitiveness by reducing the cost of doing business for resident companies. With the liberalization, exporters would have greater control and flexibility in the management of their foreign currency cash flow and thereby more effectively settle their domestic and overseas transactions.</td>
</tr>
<tr>
<td>2008</td>
<td>A resident company maintaining an overseas account, including a foreign currency account with a licensed offshore bank in Labuan, was no longer required to submit an overseas account statement. Similarly, a resident company maintaining an inter-company account with a nonresident company no longer needed to submit an inter-company account statement.</td>
</tr>
<tr>
<td>May</td>
<td>On borrowing in foreign currency by residents:</td>
</tr>
<tr>
<td>i.</td>
<td>A resident company was now free to borrow any amount in foreign currency from its nonresident nonbank parent company; other resident companies within the same corporate group in Malaysia (previously, approval had been required for any amount); and licensed onshore banks.</td>
</tr>
<tr>
<td>ii.</td>
<td>A resident company was free to obtain any amount of foreign currency supplier’s credit for capital goods from nonresident suppliers; and</td>
</tr>
<tr>
<td>iii.</td>
<td>A resident company or individual was free to refinance outstanding approved foreign currency borrowing, including principal and accrued interest.</td>
</tr>
<tr>
<td>The thresholds for foreign currency borrowing of RM100 million in aggregate by a resident company on a corporate group basis and RM10 million for a resident individual would no longer be applicable for the above financing activities.</td>
<td></td>
</tr>
<tr>
<td>On borrowing in ringgit by residents from nonresidents:</td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>A resident company was now allowed to borrow in ringgit, including through the issuance of ringgit-denominated redeemable preference shares or loan stocks, any amount from its nonresident nonbank parent company to finance activities in the real sector in Malaysia and up to RM1 million in aggregate from other nonresident non-bank companies and individuals for use in Malaysia.</td>
</tr>
<tr>
<td>Date</td>
<td>Events</td>
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<tr>
<td>ii. A resident individual was now allowed to borrow in ringgit up to RM1 million in aggregate from nonresident nonbank companies and individuals for use in Malaysia.</td>
<td></td>
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<tr>
<td></td>
<td>Previously, borrowing in ringgit in any amount from nonresidents required prior permission of the COPE.</td>
</tr>
<tr>
<td></td>
<td>On lending in ringgit by residents to nonresidents:</td>
</tr>
<tr>
<td>i.</td>
<td>A resident company or individual was now free to lend in ringgit in any amount to nonresident nonbank companies and individuals to finance activities in the real sector in Malaysia (previously, only allowed up to RM10,000).</td>
</tr>
<tr>
<td>ii.</td>
<td>A licensed onshore bank was now free to lend in ringgit in any amount to nonresident nonbank companies and individuals to finance activities in the real sector in Malaysia (previously, only allowed up to RM10 million in aggregate).</td>
</tr>
<tr>
<td>October</td>
<td>To promote Malaysia as an international Islamic financial center, the following changes were announced by the BNM (with immediate effect):</td>
</tr>
<tr>
<td>i.</td>
<td>All international Islamic banks were now allowed to conduct the following transactions with any person in or outside Malaysia: buy or sell foreign currency against another foreign currency or borrow or lend in foreign currency.</td>
</tr>
<tr>
<td>ii.</td>
<td>All international Islamic banks, international takaful operators, and international currency business units of licensed onshore banks, takaful operators, or retakaful operators[^15] were allowed to make payments in foreign currency to resident intermediaries (individuals and companies) for the financial services rendered by the intermediaries to these institutions.</td>
</tr>
<tr>
<td>2010</td>
<td>April</td>
</tr>
<tr>
<td></td>
<td>Resident futures brokers were allowed to make payments to nonresidents for foreign currency-denominated derivatives (other than currency contracts) transacted on overseas specified exchanges.</td>
</tr>
<tr>
<td></td>
<td>Residents were allowed to transact foreign currency-denominated derivatives (other than currency contracts) on the overseas specified exchanges only through resident futures brokers as follows: any amount, for transactions that are supported by firm underlying commitment; and subject to limits on investment in foreign currency assets, for transactions that are not supported by firm underlying commitment.</td>
</tr>
<tr>
<td></td>
<td>In undertaking the above, resident futures brokers were required to ensure that the resident clients comply with the limits on investment in foreign currency assets if the derivative transactions were not supported by firm underlying commitment, and that the derivatives transacted on the overseas specified exchanges do not involve ringgit directly or indirectly.</td>
</tr>
</tbody>
</table>

[^15]: See definition of takaful and retakaful operators in Kettell (2011).
REFERENCES


Comments on How Effective are Capital Controls?  
Evidence from Malaysia  
Prema-chandra Athukorala and Juthathip Jongwanich

THIAM HEE NG

Thank you very much for the very interesting and informative paper on capital controls in Malaysia. I think the author has provided a very useful summary of the capital control regimes in Malaysia leading up to the financial crisis. The author has also done a very good job of compiling all the capital control measures and summarizing these in an index so that we can see the changes in the capital controls regime in Malaysia.

The main objective of the paper is to evaluate the effectiveness of capital control measures that were imposed in Malaysia in September 1998. The paper argued that it was successful in the sense that it provided the policy space to pursue an expansionary policy that would have not been possible without capital controls.

I suggest that the author elaborate more on the following issues:

1. The capital control measure imposed in September 1998 came quite long after the crisis began in Malaysia. I suppose that it was imposed after substantial capital had left Malaysia. Were the capital controls effective in stopping further capital outflow, and was it too late since all the capital that wanted to leave had already left Malaysia? At the same time, over the period leading to September 1998, there was a substantial depreciation of the ringgit and, together with the imposition of the capital controls, the exchange rate was pegged at RM380 to the dollar from around RM250/$, so there was a substantial depreciation. With a much devalued currency, the incentive for further outflows has also been reduced so I think that is one thing that should be examined further.

2. I suggest that the author provide more elaborate discussion of Figure 1, which plots the interest rate trends for the Republic of Korea, Malaysia, and Thailand and shows that the trend is very similar for all three countries. All countries managed to reduce their respective interest rates during the period. However, the interest rate in Thailand, which did not impose any capital control, fell at the same rate as in Malaysia. It was unclear if the capital controls were needed.

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1 These issues were subsequently discussed and clarified in the final paper.
One reason that the author suggests was that there is a close link between Malaysia and Singapore, and hence there is much greater potential for capital outflows from Malaysia. It was mentioned that around 40% of Malaysia's M1 is deposited in Singapore. However, if a substantial part of Malaysian currency is already in Singapore, how much further outflow could there be?

In the paper, the author also argued that capital controls allowed Malaysia to restructure its banks at a lower cost. In terms of the banking sector, Malaysia had better initial conditions than Thailand. Banks in Malaysia were in much greater shape and, hence, it is not surprising that bank restructuring costs were much less in Malaysia than in Thailand. Furthermore, Malaysia had much less short-term foreign borrowings compared to Thailand. I suggest that a comparison between Malaysia and Thailand be made in this regard.

For the interest of the forum today, it may be interesting to have more discussion on the capital controls on inflows that were introduced in 1996 in Malaysia. The paper suggested that this was a temporary short-term measure for relieving appreciation pressure on the Malaysian Ringgit. I think this is very interesting because this may have been the more effective capital measure in the sense that it is possible that it restricted Malaysian short-term borrowings in the period leading up to the Asian financial crisis, thus allowing it to enter the crisis with lower short-term borrowings than affected countries such as the Republic of Korea and Thailand.

Finally, I think it would be interesting to examine the long-term impact of capital controls. How would it affect long-term investor perception of the country?

On the econometrics, I think a 1-period lag structure, which was used in the paper, is insufficient to capture the impact of capital controls. The paper used quarterly data over a 10-year span or 40 observations. I am a bit concerned about the degrees of freedom in the VAR analysis.\(^2\)

Another econometric issue is the use of the capital control index to evaluate how they were successful in affecting capital outflows. However, by definition these capital outflows have been affected by the capital controls. I would be surprised if it would be otherwise. If not then they may have used other channels of capital flow. One concern about measures of capital controls is that they can be easily evaded through other means of capital flight. Therefore if you limit capital flows in portfolio and bank borrowings, the official reported figure would obviously show that they have an impact but there may be other forms of capital flight occurring.

\(^2\)The authors conducted robustness tests and discussed this in the final paper.
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. 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
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. 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

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2Capital 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

³For 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. 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

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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

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5These 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
Table 1. Capital Account Policy Indexes

<table>
<thead>
<tr>
<th>Liabilities (Net capital inflows)</th>
<th>Assets (Net capital outflows)</th>
</tr>
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<tbody>
<tr>
<td>Inflow policies</td>
<td>Outflow policies</td>
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<tr>
<td>Policies related to FDI</td>
<td>Policies related to FDI</td>
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<tr>
<td>Portfolio</td>
<td>Portfolio</td>
</tr>
<tr>
<td>Equity</td>
<td>Equity</td>
</tr>
<tr>
<td>Debt</td>
<td>Debt</td>
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<tr>
<td>Policies related to other</td>
<td>Policies related to other</td>
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<tr>
<td>investment flows</td>
<td>investment flows</td>
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<tr>
<td>(including financial institution)</td>
<td>(including financial</td>
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<td></td>
<td>institution)</td>
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<tr>
<td>Policies related to FDI</td>
<td>Policies related to</td>
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<tr>
<td>Portfolio</td>
<td>Portfolio</td>
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<tr>
<td>Equity</td>
<td>Equity</td>
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<tr>
<td>Debt</td>
<td>Debt</td>
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<tr>
<td>Policies related to other</td>
<td>Policies related to other</td>
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<tr>
<td>investment flows</td>
<td>investment flows</td>
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<tr>
<td>(including financial institution)</td>
<td>(including financial</td>
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<td></td>
<td>institution)</td>
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</tbody>
</table>

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

6A 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.\footnote{See for example, Schindler (2009), Ito and Chinn (2008), Mody and Murshid (2005), Miniane (2004), Johnston and Tamirisa (1998), and Tamirisa (1999).}

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.\footnote{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.} 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.
Figure 1. Capital Account Policy Indexes (Liability side), 1990–2010

a) Inflow Policy

b) 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.
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**

![Outflow Policy Chart](chart)

- **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.

c. Debt Securities

![Graph showing Debt Securities]

- Gross Inflow
- Gross Outflow
- Net Debt securities inflow


d. Other Investment

![Graph showing Other Investment]

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

continued.
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:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIF</td>
<td>total net capital inflows (% of GDP)</td>
</tr>
<tr>
<td>IFDI</td>
<td>net FDI inflows (% of GDP)</td>
</tr>
<tr>
<td>IEQUITY</td>
<td>net equity investment inflows (% of GDP)</td>
</tr>
<tr>
<td>IEQUIINFLOW</td>
<td>gross equity inflows (% of GDP)</td>
</tr>
<tr>
<td>IDEBT</td>
<td>net debt security investment inflows (% of GDP)</td>
</tr>
<tr>
<td>IDEBTINFLOW</td>
<td>gross debt security inflows (% of GDP)</td>
</tr>
<tr>
<td>Iother</td>
<td>net other investment inflows (% of GDP)</td>
</tr>
</tbody>
</table>
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**

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**

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

(4) **Exchange rate volatility**

\[
\text{FXVO1} = \text{exchange rate volatility (baht/$), calculated by the standard deviation of changes in exchange rate.}\]
\[
\text{FXVO2} = \text{exchange rate volatility (weighted average for key export partners), calculated by the standard deviation of changes in the exchange rate.}\]

(5) **Real interest rate differential**

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

(6) **Manufacturing production index**

\[
\text{MPI} = \text{Manufacturing production index, (2000=100).}\]

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. 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.
EFFECTIVENESS OF CAPITAL CONTROLS: EVIDENCE FROM THAILAND

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

\[
TIF_t = \sum_{i=1}^{n} \alpha_i TIF_{t-i} + \sum_{i=1}^{n} \alpha_i FXVO_{t-i} + \sum_{i=1}^{n} \alpha_i RER_{t-i} + \sum_{i=1}^{n} \alpha_i MPI_{t-i} + \sum_{i=1}^{n} \alpha_i RRINTEREST_{t-i} + \\
\sum_{i=1}^{n} \alpha_{i,TIF} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,FXVO} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,RER} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,OUTEXFDI} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,G3GDP} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,Share} LIA_{ti} + \epsilon_t
\]

\[
FXVO_t = \sum_{i=1}^{n} \phi_i TIF_{t-i} + \sum_{i=1}^{n} \phi_i FXVO_{t-i} + \sum_{i=1}^{n} \phi_i RER_{t-i} + \sum_{i=1}^{n} \phi_i MPI_{t-i} + \\
\sum_{i=1}^{n} \phi_{i,TIF} LIA_{ti} + \sum_{i=1}^{n} \phi_{i,FXVO} LIA_{ti} + \sum_{i=1}^{n} \phi_{i,RER} LIA_{ti} + \sum_{i=1}^{n} \phi_{i,OUTEXFDI} LIA_{ti} + \\
+ \sum_{i=1}^{n} \phi_{i,G3GDP} LIA_{ti} + \sum_{i=1}^{n} \phi_{i,Share} LIA_{ti} + \epsilon_t
\]

\[
RER_t = \sum_{i=1}^{n} \delta_i TIF_{t-i} + \sum_{i=1}^{n} \delta_i FXVO_{t-i} + \sum_{i=1}^{n} \delta_i RER_{t-i} + \sum_{i=1}^{n} \delta_i MPI_{t-i} + \sum_{i=1}^{n} \delta_i RRINTEREST_{t-i} + \\
\sum_{i=1}^{n} \delta_{i,TIF} LIA_{ti} + \sum_{i=1}^{n} \delta_{i,FXVO} LIA_{ti} + \sum_{i=1}^{n} \delta_{i,RER} LIA_{ti} + \sum_{i=1}^{n} \delta_{i,OUTEXFDI} LIA_{ti} + \sum_{i=1}^{n} \delta_{i,G3GDP} LIA_{ti} + \sum_{i=1}^{n} \delta_{i,Share} LIA_{ti} + \epsilon_t
\]

\[
MPI_t = \sum_{i=1}^{n} \beta_i TIF_{t-i} + \sum_{i=1}^{n} \beta_i FXVO_{t-i} + \sum_{i=1}^{n} \beta_i RER_{t-i} + \sum_{i=1}^{n} \beta_i MPI_{t-i} + \sum_{i=1}^{n} \beta_i RRINTEREST_{t-i} + \\
\sum_{i=1}^{n} \beta_{i,TIF} LIA_{ti} + \sum_{i=1}^{n} \beta_{i,FXVO} LIA_{ti} + \sum_{i=1}^{n} \beta_{i,RER} LIA_{ti} + \sum_{i=1}^{n} \beta_{i,OUTEXFDI} LIA_{ti} + \sum_{i=1}^{n} \beta_{i,G3GDP} LIA_{ti} + \sum_{i=1}^{n} \beta_{i,Share} LIA_{ti} + \epsilon_t
\]

\[
RINTEREST_t = \sum_{i=1}^{n} \gamma_i TIF_{t-i} + \sum_{i=1}^{n} \gamma_i FXVO_{t-i} + \sum_{i=1}^{n} \gamma_i RER_{t-i} + \sum_{i=1}^{n} \gamma_i MPI_{t-i} + \sum_{i=1}^{n} \gamma_i RRINTEREST_{t-i} + \\
\sum_{i=1}^{n} \gamma_{i,TIF} LIA_{ti} + \sum_{i=1}^{n} \gamma_{i,FXVO} LIA_{ti} + \sum_{i=1}^{n} \gamma_{i,RER} LIA_{ti} + \sum_{i=1}^{n} \gamma_{i,OUTEXFDI} LIA_{ti} + \sum_{i=1}^{n} \gamma_{i,G3GDP} LIA_{ti} + \sum_{i=1}^{n} \gamma_{i,Share} LIA_{ti} + \epsilon_t
\]

\[
LIA_{INEXFDI} = \sum_{i=1}^{n} \phi_i TIF_{t-i} + \sum_{i=1}^{n} \phi_i FXVO_{t-i} + \sum_{i=1}^{n} \phi_i RER_{t-i} + \sum_{i=1}^{n} \phi_i MPI_{t-i} + \sum_{i=1}^{n} \phi_i RRINTEREST_{t-i} + \\
\sum_{i=1}^{n} \phi_{i,TIF} LIA_{ti} + \sum_{i=1}^{n} \phi_{i,FXVO} LIA_{ti} + \sum_{i=1}^{n} \phi_{i,RER} LIA_{ti} + \sum_{i=1}^{n} \phi_{i,OUTEXFDI} LIA_{ti} + \sum_{i=1}^{n} \phi_{i,G3GDP} LIA_{ti} + \sum_{i=1}^{n} \phi_{i,Share} LIA_{ti} + \epsilon_t
\]

\[
LIA_{OUTEXFDI} = \sum_{i=1}^{n} \alpha_i TIF_{t-i} + \sum_{i=1}^{n} \alpha_i FXVO_{t-i} + \sum_{i=1}^{n} \alpha_i RER_{t-i} + \sum_{i=1}^{n} \alpha_i MPI_{t-i} + \sum_{i=1}^{n} \alpha_i RRINTEREST_{t-i} + \\
\sum_{i=1}^{n} \alpha_{i,TIF} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,FXVO} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,RER} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,OUTEXFDI} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,G3GDP} LIA_{ti} + \sum_{i=1}^{n} \alpha_{i,Share} LIA_{ti} + \epsilon_t
\]

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

a.1) Total net capital inflows to LIA_INBANK
b.1) Real exchange rate to LIA_INBANK
c.1) Exchange rate volatility (baht/$) to LIA_INBANK
d.1) Exchange rate volatility (weighted average) to LIA_INBANK

a.2) Total net capital inflows to LIA_INFDI
b.2) Real exchange rate to LIA_INFDI
c.2) Exchange rate volatility (baht/$) to LIA_INFDI
d.2) Exchange rate volatility (weighted average) to LIA_INFDI

a.3) Total net capital inflows to LIA_OUTEXFDI
b.3) Real exchange rate to LIA_OUTEXFDI
c.3) Exchange rate volatility (baht/$) to LIA_OUTEXFDI
d.3) Exchange rate volatility (weighted average) to LIA_OUTEXFDI

continued.
Figure 6. continued.
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 (I\text{other}), with Figure 6j.3 showing a significant negative impulse response of other investment inflows (I\text{other}). 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

[Diagrams showing impulse responses for total net capital inflows to LIA_INEXFDI, total net capital inflows to LIA_OUTEXFDI, exchange rate volatility to LIA_INEXFDI, exchange rate volatility to LIA_OUTEXFDI, and exchange rate volatility (weighted average) to LIA_INEXFDI, exchange rate volatility (weighted average) to LIA_OUTEXFDI]
Figure 7. continued.

d.1) Real effective exchange rate to LIA_INEXFDI

d.2) Real effective exchange rate to LIA_OUTEXFDI

e.1) Real interest rate to LIA_INEXFDI

e.2) Real interest rate to LIA_OUTEXFDI

f.1) Net FDI inflow to LIA_INEXFDI

f.2) Net FDI inflow to LIA_OUTEXFDI

g.1) Net equity investment inflows to LIA_INEXFDI

g.2) Net equity investment inflows to LIA_OUTEXFDI
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
Figure 8. continued.

- e.1) Real interest rate to AS_OUTFDI
- e.2) Real interest rate to AS_OUTPORT
- f.1) Outward FDI to AS_OUTFDI
- f.2) Outward FDI to AS_OUTPORT
Figure 8. continued.

- g.1) Gross outward FDI to AS_OUTFDI
  
- g.2) Gross outward FDI to AS_OUTPORT

- h.1) Net equity outflows to AS_OUTFDI
  
- h.2) Net equity outflows to AS_OUTPORT

- i.1) Net debt security outflows to AS_OUTFDI
  
- i.2) Net debt security outflows to AS_OUTPORT

- j.1) Net other investment outflows to AS_OUTFDI
  
- j.2) Net other investment outflows to AS_OUTPORT
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


<table>
<thead>
<tr>
<th>Date</th>
<th>Events</th>
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</table>
| 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.  
          November  Increase in the maximum net foreign assets of banks from 20% to 25%.  
          |                                                                                                                                                                                                                                                                                                                                 |
| 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.  
          August  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.  
          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.  
          |                                                                                                                                                                                                                                                                                                                                 |
| 1997   | 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.

<table>
<thead>
<tr>
<th>Date</th>
<th>Events</th>
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| 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** | 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).                                                                                                           |
| 2000     | **August**  
Specified the types of permissible options and transactions and tightened the implementation of documentation requirements on banks’ clients to prove their underlying transactions.                                                                 |
| **October** | Reminder to banks of the existing prohibition of outright forward baht sales with delivery dates of less than 2 days for no underlying transaction.                                                                                                                                   |
| **November** | 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. |
| **December** | 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. |
| 2001     | **September**  
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.                                                                                                           |
| 2002     | **January**  
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.

<table>
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<tr>
<th>Date</th>
<th>Events</th>
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| 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.

<table>
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<tr>
<th>Date</th>
<th>Events</th>
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<tbody>
<tr>
<td>July</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>November</td>
<td>Reduction in the foreign ownership for financial institutions to 49%, from 100%.</td>
</tr>
<tr>
<td>December</td>
<td>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.</td>
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### Appendix 1. continued.

<table>
<thead>
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<th>Date</th>
<th>Events</th>
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<tbody>
<tr>
<td>2008</td>
<td>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).</td>
</tr>
<tr>
<td></td>
<td>Lifting of URR measures.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>2009</td>
<td>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.</td>
</tr>
<tr>
<td>2010</td>
<td>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.</td>
</tr>
</tbody>
</table>

Appendix 2. Capital Account Policy Indexes, Without Weights

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

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

Outflow policy

![Graph showing Capital Account Policy Indexes (Asset side), 1990–2010](image)

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.
REFERENCES


Comments on Effectiveness of Capital Controls:
Evidence from Thailand
Juthathip Jongwanich and Archanun Kohpaiboon

ELI REMOLONA

Examining the Five Dimensions of Effectiveness and the Results

The paper finds that the different types of capital controls are effective in terms of affecting the volume and composition of flows. Using the real effective exchange rate, however, it finds that capital controls do not relieve the pressure of the domestic currency to appreciate. It also looks at two measures of volatility based on the nominal exchange rate to the dollar and the export-weighted bilateral exchange rate and confirms that capital controls stabilize the exchange rate.

The paper likewise examines whether capital controls affect monetary independence. However, I think the duration of maturities of the interest rates used to derive the interest rate differentials (i.e., between the 14-day repurchase rate and the US 3-month Treasury bill rate) are non-matching. In examining the effect of capital controls on monetary autonomy, instead of looking at the policy rates, I think one must look at the interest rates that matter that are further down the yield curve. In the case of the US, for instance, the interest rates that matter are somewhere between the 2-year and 5-year interest rates.

The paper also examines whether controls prevent a crisis. However, this aspect is difficult to examine in the context of one country. I think it is better examined in a cross-country study.

Role of the Narrative in the Construction of the Index

The paper presents a 20-year narrative which I think is very important for a country paper such as this, as it provides important insights that are helpful for the construction of monthly de jure capital controls indexes by asset type and direction of flow.

For instance, consider the interesting December 2006 episode when Thailand experienced a surge in the value of the Thai baht. Since the surge was mostly due to the large inflows in the bond market, the controls imposed were mostly aimed at the bond market. However, looking at the actual flows, there was hardly any reaction in that market. Instead, the most forceful reaction was in the equity market. This is a very interesting phenomenon that is opposite of what we expect. I think that if you find an episode like this, it is interesting to examine

Eli Remolona is chief representative for Asia and the Pacific of the Bank of International Settlements.
whether it is a one-time phenomenon and whether you can draw some general conclusions from it. In other words, the narrative and econometrics parts of the paper should inform each other.

**De facto Instead of De jure Controls**

An early literature on interest rate convergence (Edwards and Kahn 1986) suggests that when you look at convergence in interest rates, de jure capital controls are not as binding as they seem. I think it would be in the right direction to look at de facto capital controls. In this region, for instance, one sign that exchange restrictions are binding is the activity in the non-derivable forward (NDF) market, say in the People’s Republic of China, Malaysia, the Philippines, and Thailand. One measure of stringency in exchange rate restrictions is the difference between the interest rate that is implied in an NDF contract offshore and the actual domestic interest rate.
Are Capital Controls Effective?
The Case of the Republic of Korea
SOYOUNG KIM AND DOO YONG YANG

Capital controls have recently attracted interest as capital surges in emerging market economies threaten to bring about economic instability and heighten difficulties in implementing macroeconomic policies. While an option that can be taken to deal with huge capital inflows involves the use of capital controls, there is no consensus on their effectiveness. Against this background, our paper aims to investigate the effectiveness of capital controls in the Republic of Korea. This paper first reviews the history of capital account policy, which can be divided into five stages: (i) gradual liberalization during the 1980s and early 1990s, (ii) acceleration of liberalization during the early and mid-1990s, (iii) the big-bang approach to liberalization during the Asian financial crisis, (iv) liberalization for facilitation of capital market development beginning the late 1990s, and (v) the conservative approach during the global financial crisis. To quantify the trends, this paper constructs measures of capital account control/liberalization based on the official record of government policies. In the second part, it discusses the effects of capital account control/liberalization in four ways. First, the behavior of key macro variables in the Republic of Korea is reviewed by comparing the periods before and after serious capital account liberalization. Second, the effects of shocks to the capital account control/liberalization indexes on capital flows are examined using a VAR model. Third, the effects of the United States (US) monetary policy shocks on capital flows and the interest rate of the Republic of Korea are examined for the period of capital controls and the period of capital account liberalization. Fourth, a simple event study is conducted of recent capital control measures. The empirical results based on VAR models show that shocks to capital account controls do not have significant effects on capital flows in most cases. However, capital flows, the current account, and the exchange rate were far more volatile in the period of a liberalized capital account. It is also interesting that during the latter period, the Republic of Korea did not gain monetary autonomy despite adopting a freely floating exchange rate. This result may be related to volatile capital flows under a liberalized capital account. Finally, the results of the event study tend to support the effectiveness of capital controls in altering the composition of capital flows.

JEL classification: F3
I. INTRODUCTION

The influx of capital inflows has been one of the more difficult problems of emerging market economies. Such economies suffer from rapid capital inflows and outflows, generating boom–bust cycles. In the initial period of capital surges, one finds real exchange rate appreciation, domestic credit expansion, consumption and investment booms, and asset price bubbles. Over time, however, the process tends to reverse itself—real exchange rate appreciation worsens the international competitiveness of firms and brings about a current account deficit, influencing foreign investors to lower their view on the domestic market and withdraw capital investment. Therefore, net capital inflows turn into capital outflows, which end the boom phase and start the bust phase. The economy may eventually collapse.

Even if no such dramatic cycles are found, volatile capital flows are likely to increase the volatility of the economy. Volatile capital flows tend to increase the volatility of the exchange rate, liquidity, and asset prices. This makes it hard for policymakers to implement monetary and exchange rate policy to mitigate the negative effects of capital inflows on the economy.

Capital controls are a common tool for mitigating the negative effects of capital inflows in emerging market economies. While these can take a variety of forms, for countries that have substantially liberalized the capital account, more market-based controls (such as a tax on inflows) have been the predominant option in recent years. To these countries, returning to the days of draconian capital controls or recreating a system of extensive administrative controls is not really a viable option.

Evidence on the effectiveness of capital controls is mixed. Experiences of various countries suggest that what the best market-based controls can be expected to do is lengthen the maturity of inflows and change the composition, with little impact on volume. The effectiveness of any control measure tends to weaken over time, as agents in the markets may find ways to circumvent them through various channels. At the same time, capital controls produce adverse effects: they tend to increase domestic financing costs, reduce market discipline, lead to inefficient allocation of financial capital, distort decision making at the firm level, and be difficult and costly to enforce.

Even though most Asian emerging market economies have liberalized the capital account after the Asian crisis, Indonesia, Malaysia, the Philippines, and Thailand still maintain some control over foreign capital flows, especially short-term capital flows. Thailand limits domestic banks’ baht borrowing from offshore parties. In December 2006, Thailand’s policy authorities announced unremunerated reserve requirements against portfolio inflows, but the subsequent adverse reaction of the equity market led them to apply the policy only to fixed income inflows. Reserve requirements were removed completely in March 2008.
This episode illustrates the difficulty of maintaining capital controls. The story may be different for countries that have not substantially opened their capital account such as the People’s Republic of China (PRC) and India. In some ways, they appear to be successful in managing the process of gradual capital account liberalization through the use of investor-based controls and prudential-like measures. In particular, both are concerned with currency mismatches in the banking sector. The PRC extended to foreign banks the long-standing restrictions on domestic banks’ ability to borrow dollars abroad to fund dollar assets in the PRC. In India, the government set a limit on external commercial borrowing in August 2007 when commercial borrowing soared. While firms were still able to borrow abroad in foreign currency, their ability to convert the foreign currency into rupees to finance spending in India was limited to $20 million per year.

This paper analyzes the effectiveness of capital controls in the Republic of Korea, which has an interesting history in that area. Before the Asian crisis, the country successfully controlled capital inflows and outflows while undertaking gradual capital account liberalization. It started to accelerate capital account liberalization from the early 1990s, but the financial crisis occurred in 1997. Although this crisis was at least partially due to capital account liberalization, the Republic of Korea ended up with an almost fully liberalized capital account to recover from the crisis, making it difficult for the country to manage capital flows. The foreign exchange market was in turmoil during the recent global financial crisis, after which the country chose to adopt market-based restrictions on capital flows such as more liberalized measures on capital outflows and strengthened financial supervision and regulation. This experience, by analyzing the effectiveness of capital restriction measures, provides an important lesson to other emerging market economies.

Section II provides a brief history of capital flows and capital controls in the Republic of Korea and constructs capital account control/liberalization indexes. Section III shows the capital flows and major macroeconomic variables of the country in relation to capital account policy. Section IV empirically analyzes the effects of shocks to capital account policy on capital flows using the measures constructed in Section II. Section V investigates the effects of US monetary policy shocks on various Korean variables for the period before and after capital account liberalization in order to discuss monetary independence and capital flow behavior. Section VI provides a simple event study to analyze the effectiveness of capital controls in recent years. Section VII summarizes the results.
II. CAPITAL CONTROLS AND CAPITAL ACCOUNT CONTROL/LIBERALIZATION INDEXES IN THE REPUBLIC OF KOREA

This section gives a brief summary of capital liberalization in the Republic of Korea and constructs capital account control/liberalization indexes based on public information.

A. Brief History of Capital Liberalization in the Republic of Korea

Capital market liberalization in the Republic of Korea can be divided into five distinct stages based on economic environment, incentives, and policy orientation. The early stage of capital market opening, the 1980s to the early 1990s, was a time of gradual approach. During this stage, the government had been cautious in opening the capital market to foreign investors because of concerns over the influx of capital inflows. Prior to the liberalization of the capital market, financial deregulation measures in the Republic of Korea had first been initiated in 1979 with the privatization of banks, free entry of nonbank financial intermediaries, introduction of new financial instruments, etc. After the launching of the deregulation processes, capital market liberalization measures took off in the first half of the 1980s. Domestic banks were allowed to borrow from abroad, foreign investors permitted to participate in the Korean stock market through investment trust funds, and the Korea Fund listed on the New York Stock Exchange (NYSE).

Throughout the 1980s, the policy of the Korean government on capital flows depended on the current account balance. Under a pegged exchange rate regime, capital inflows were used to accommodate the overall balance of payments (BOP). Therefore, the overall BOP fluctuated around a net zero balance, and the current account and capital account moved in opposite directions (Kim, Kim, and Wang 2004). In 1988, the Korean government formally accepted the obligations of Article VIII, Sections 2–4 of the International Monetary Fund’s (IMF’s) Articles of Agreement and abolished its remaining restrictions on payments and transfers for current account transactions.

Despite a series of capital account liberalization measures, the Korean government maintained a gradual approach and thus a considerable number of capital controls on foreign exchange and cross-border capital transactions remained. For example, the opening of the domestic bond market was given special attention because interest rate differentials were still large.\footnote{Permitting foreign participation in equity markets has tended to precede the opening of domestic fixed-income markets in most developing countries. Ironically, this sequencing seems to be motivated by reluctance to share real returns on fixed-income claims that exceed worldwide real returns with foreigners. In practice, however, real yields gained by equity holders have often been exceeded by large multiple real yields on fixed-income securities (Fry 2000).}
capital outflows were liberalized, capital inflows in the form of foreign portfolio investment remained subject to various ceilings and other regulations. However, large domestic firms (the chaebols) were severely critical of the remaining restrictions and thus claimed that rigid control on capital inflows undermined the international competitiveness of domestic firms in the world market due to high financial costs.

The second stage came with increasing pressure for capital market openness in the early 1990s. With the intent to join the Organisation for Economic Co-operation and Development (OECD), the Republic of Korea accelerated its capital account liberalization in the early 1990s. In 1992, foreign investors were given permission to purchase Korean stocks comprising up to 3% of outstanding shares of each company per individual, but no more than 10% of a company in total. In June 1993, the Korean government put out a blueprint for financial sector liberalization that would ease restrictions on foreign exchange transactions, e.g., by widening the daily won–dollar trading margins, expanding limits on foreign investments in the stock market, and permitting long-term commercial loans (see details in Park 1995).

Further capital account liberalization became inevitable when the Republic of Korea joined the OECD in 1996. However, the Korean government was not without reservations. In the OECD membership negotiations, the Republic of Korea was reluctant to liberalize its capital account out of concern that foreign capital inflows would increase dramatically due to the interest rate differential. The government had thus planned to delay the capital account liberalization until interest rates converged significantly.

The 1997–1998 currency crisis marked the third stage of capital market liberalization. The opening of capital markets in the Republic of Korea had been carried out under a big bang approach during this period, orchestrated by international financial institutions such as the IMF and the World Bank. Most capital account and foreign exchange restrictions that prevented or hindered capital inflows and outflows by both domestic residents and nonresidents were then lifted, making the level of openness of the country’s capital markets comparable to that of advanced countries. Indeed, there had been a tremendous impact on capital market structure and activity. Due to the series of liberalization measures after the crisis, foreign investments into the capital market significantly increased since 1999.

The outbreak of the financial crisis in the Republic of Korea changed the climate of capital market liberalization. In order to overcome the currency crisis,

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2The remaining restrictions were as follows: nonresidents’ holdings limited to a maximum of 20% of the outstanding shares of each company and nonresidents’ holdings up to 5%, holdings of bonds by nonresidents allowed indirectly through the Korean Trust and Country Fund, direct holdings allowed only for convertible bonds issued by small and medium enterprises, limits placed on domestic companies’ use of foreign commercial loans to just the importation of capital goods, and for FDI, a cap on the permitted period for delayed payment of imports (up to 120 days).
the Korean government aimed for far more extensive capital market opening. A variety of policies to induce foreign capital in an attempt to overcome the currency crisis were developed and measures for capital account liberalization undertaken. It was ironic that the Republic of Korea ended up with a fully liberalized capital account despite the fact that the 1997 crisis was at least partly due to volatile capital flows under a liberalized capital account.

The individual shareholding limit for foreigners increased drastically from 7% to 50% on 11 December 1997, and the ceiling was lifted completely on 25 May 1998. On the other hand, ceilings imposed on foreign purchases of listed shares issued by two large public enterprises, Korea Electric Power Corporation (KEPCO) and Pohang Iron and Steel Corporation (POSCO), remained at 30%.

All restrictions on the foreign purchase of debt securities were abolished after the 1997 crisis. The Republic of Korea fully opened the domestic bond market to foreign investors in order to induce capital inflows. All restrictions previously in force regarding the purchase by nonresidents of listed or unlisted and guaranteed or nonguaranteed bonds issued by small or medium size enterprises and other firms were eliminated. The ceilings imposed on foreign purchases of public debt instruments were also abolished.

Nonresidents could freely open deposit accounts in foreign currency with resident institutions in the Republic of Korea. However, restrictions applied to nonresidents’ accounts in Korean won as the domestic currency account could not freely be converted into foreign currency and transferred abroad unless designated as a free-won account. For the purpose of portfolio investment, foreign investors need some guarantee of convertibility of the domestic currency. As of December 1997, all domestic enterprises, regardless of size, were allowed to borrow overseas without limit for as long as the maturity did not exceed one year. All short-term money market instruments, such as commercial paper and trade bills, were also completely liberalized on 25 May 1998 thus bringing the level of openness of the country’s capital markets at par with advanced economies.

The fourth stage of capital liberalization, the late 1990s to the early 2000s after the crisis seemingly passed, can be characterized as a period of facilitation of capital market development. In the 2000s, the government grew increasingly concerned about the rapid increase in capital inflows. The country encouraged more overseas investment by financial institutions and individuals to mitigate the negative effects of the huge capital inflows into the domestic capital market. In 2006, the limit on FDI overseas investment by domestic residents was relaxed to include the purchase of overseas real estate. In 2007, a temporary tax exemption for 3 years was applied to capital gains generated from overseas stock investment by domestic investment trust and investment companies. The government also eased regulations to boost overseas real estate investment through indirect investment.
The fifth stage can be characterized by its conservative approach. Since the 1970s, the direction of capital market liberalization had always been toward greater openness. However, this attitude dramatically changed beginning the global financial crisis in 2008. In the early 2000s, the Republic of Korea experienced a surge in short-term borrowing by foreign banks due to the expectation of won appreciation and mismatches in the forward market. However, the global financial crisis in 2008 and the resulting dollar liquidity squeeze reversed the direction of capital flows, highlighting the need for financial regulation, supervision and capital controls.

Measures to prevent such capital swings and rapid changes in dollar liquidity were consequently introduced. These included the strengthening of financial supervision of foreign bank branches in 2008, as well as tightening of regulations on the liquidity of domestic financial firms, an increase in the liquidity ratio of foreign exchange, and improvement of risk management on foreign exchange transactions in 2009. Therefore, after the global financial crisis, the country adopted a more cautious stance on cross-border capital market transactions and strengthened financial regulation and supervision related to cross-border capital flows to prevent instability of domestic financial markets.

B. Capital Account Control/Liberalization Indexes

To analyze the effect of capital controls on the macroeconomy in the Republic of Korea, capital account control/liberalization indexes are constructed.\(^3\) We collect data on capital account policy based on information from the Bank of Korea’s *Daily Economic Bulletin*, which is a record of all government policy measures including finance and the economy, industries, labor, and trade.\(^4\) Capital control measures are divided into two categories: capital inflows (liabilities) and capital outflows (assets). Capital flows are further categorized into four different types: foreign direct investment (FDI), equities, bonds, and bank transactions. Foreign exchange transaction measures are included since these influence cross-border capital transactions.

The capital control indexes are measured by assigning +1 or −1 to each of the implemented measures. Any measure that liberalizes inflows and outflows is assigned +1, while any measure that restricts inflows as well as outflows is assigned −1. The assigned number is scaled by different weights based on the impact of the measure. The weight is set between 0 and 2, where any measure that affects capital inflows or outflows greater than $150 million is given a weight of 2. If the flow is less than $150 million, the weight is 0.5. Some measures that

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\(^3\)For most parts, we follow the method of Jongwanich, Gochoco-Bautista, and Lee (2011) used to construct capital control indexes for Malaysia and Thailand.

\(^4\)The website for the *Daily Economic Bulletin* can be found at <www.bok.or.kr>. Unfortunately, this is written in Korean only.
significantly influence overall capital flows are also assigned a weight of 2. The measures are constructed on a quarterly basis to match the frequency of major macroeconomic variables such as GDP and capital flows. Once the number and weight have been decided for each measure, the numbers are sequentially accumulated over time to arrive at the indexes for each asset class and foreign exchange transaction. The capital control indexes are constructed on a quarterly basis from 1990 to 2010.

The total capital account control/liberalization index for both inflows and outflows (ACC_CCI) is shown in Figure 1a. The index illustrates well the capital liberalization measures in the Republic of Korea on a general scale beginning 1990. First, the index increases over time, implying that the capital account has increasingly been liberalized. As discussed in the previous section, the country started comprehensive liberalization in 1992, a move driven by the intent to join the OECD as well as the increase in the external sector. Second, most big bang-type liberalization measures were introduced in 1998, as shown by the highest slope in the graph during that year. Third, there had been a small increase in the degree of restrictions on short-term capital inflows in recent years. While the graph does not show it clearly, there had been a small drop in the index.

The index on capital outflows (ACC_TOFC) is also shown in Figure 1a. As discussed in the previous section, the early stage of capital liberalization focused on capital outflows, which is why ACC_TOFC comprises a large portion of the total index in the early 1990s. This was true also of the 2000s (ACC_TOFC accounting for more than 50% of ACC_CCI), indicating that outflows have become more liberalized than inflows even in recent years. Increased capital inflows at the time spurred capital outflow liberalization to mitigate the negative impacts of excessive capital inflows. The index on capital inflows (indicated by ACC_TIFC), meanwhile, reflect the widespread lifting of capital restrictions on capital inflows after the currency crisis in 1998.
Figure 1a. **Capital Account Control/Liberalization Index**

ACC_CCI = capital account control/liberalization index on capital inflows and outflows, ACC_TIFC = capital account control/liberalization index on capital inflows, ACC_TOFC = capital account control/liberalization index on capital outflows.

Source: Author’s computations.

Figure 1b shows the decomposition of the index on capital inflows according to asset type. Before the Asian financial crisis, capital account liberalization on inflows had been mostly concentrated on FDI and stocks, as the government tried to attract foreign capital in the early 1990s, opening up the stock market beginning 1992. During the Asian financial crisis, an effort was made to liberalize all types of inflows. Bank and bond markets had been liberalized significantly along with equity and FDI investment. In the early and mid-2000s, further measures were introduced to ease up on inflows, especially on stocks and FDI. As the Republic of Korea experienced the rapid swing of capital flows between 2007 and 2008 that developed into the dollar liquidity crisis, the government began to reconsider the direction of liberalization on capital inflows, especially bank inflows. The indexes on foreign exchange transactions by nonresidents, on the other hand, show a somewhat different pattern from the indexes on other asset types. This indicates that foreign exchange transactions by nonresidents were still not fully liberalized.
Figure 1b. Indexes on Capital Inflows by Asset Class

ACC_bank = capital account control/liberalization index on bank loan inflows, ACC_bond = capital account control/liberalization index on bond inflows, ACC_FDI = capital account control/liberalization index on FDI inflows, ACC_stock = capital account control/liberalization index on stock inflows.

Source: Authors’ computations.

Figure 1c similarly shows the breakdown of the index on capital outflows. Liberalization measures were applied to all components except for bonds. Unlike for capital inflows, foreign exchange rate transactions had been liberalized early on to induce more outflows. The indexes show rapid liberalization of capital outflows for all types of assets in 1998. More interestingly, in the middle of the 2000s, capital outflows had been encouraged to mitigate the negative effects of increases in short-term capital inflows, particularly through liberalization of foreign exchange rate transactions and FDI outflows. However, in 2008, foreign exchange transactions by domestic residents had been more or less restricted by the strengthening of the liquidity ratio of dollar transactions.
III. CAPITAL FLOWS AND MAJOR MACROECONOMIC VARIABLES IN THE REPUBLIC OF KOREA

This section describes capital flows and other major macroeconomic variables in relation to capital account policy. In order to explain the relationships between capital flows and capital controls as well as other major macroeconomic variables, this section presents the trends of capital flows and shows the impacts of capital flows on the major macroeconomic variables in the Republic of Korea.

A. Trends of Capital Flows in the Republic of Korea

Cross-border capital flows in general grew steadily from the 1980s in the Republic of Korea as international institutional investors began to show a high tendency to diversify their portfolios in order to lower risks. In addition, the development of information and communication technology enabled global investment and broadened opportunities for investors to manage risks through investment in diversified financial assets across countries. In line with this, the changes in the form of capital flows in emerging market economies have been induced by both push effect and pull effects. With lower returns on domestic capital due to sluggish economic growth in the advanced economies, investors’ demand for investment in emerging market portfolio began to soar. At the same time, major emerging market economies had relaxed their regulatory measures on cross-border capital flows.
With the turn to the 1990s, capital inflows on a global scale started to take multiple forms, with investors from advanced economies diversifying their assets internationally. In the 2000s, the Republic of Korea, like other emerging market economies, experienced huge capital inflows because of the rise in global liquidity. However, it also experienced large capital outflows when domestic institutions started to invest abroad for their profit-seeking activities and for diversification of risks.

With the liberalization of the capital market through the last three decades, the total amount of capital inflows into the Republic of Korea increased almost 33 times, from $2.2 billion in 1980 to $68.8 billion in 2007, the highest level historically (Figure 2). During this period, the country experienced different types of capital flows. In the early 1980s, for instance, bank loans were the most important type of capital inflows along with transfer payments. Since most other types of capital inflows were prohibited, as mentioned in the previous section, the Korean government encouraged domestic banks to borrow from abroad in order to fill the current account deficit. At the time, foreign investors were only allowed to participate in the equity market through investment trust funds such as the Korea Fund, which had been listed on the NYSE since 1981. By 1990, foreign equity investment in the Korean stock market had been allowed albeit with limitations on the shares purchased by foreign investors. By 1998, these limitations on holdings had been removed. Following the liberalization measures, equity inflows steadily rose prior to the Asian financial crisis, dropped in 1997, but increased again since then.

Before the currency crisis of 1998, the government could control the type and size of capital flows with limited capital control measures because the capital market was not fully liberalized. Therefore, capital inflows in the Republic of Korea were quietly related to the measures that controlled the capital markets. This implied that pull factors were dominant in the Republic of Korea before the currency crisis.

However, with the liberalization of the capital market after the currency crisis, capital flows in the Republic of Korea took on different characteristics. There had been the big bang liberalization in capital markets, as indicated in Figure 1b, as well as push factors such as the global investment environment and the rise in liquidity. For example, as equity was seen as a candidate for resolving the currency crisis, the government removed most barriers to stock market investment in early 1998. Equity financing increased rapidly in 1999 as a result, but momentum was reversed in 2000 due to the global bursting of the information technology bubble. In 2003, foreign investment in the domestic stock market reached a record high of $14.4 billion but declined significantly since 2005 due to global deleveraging in response to the evolving US subprime mortgage crisis.

FDI flows meanwhile have shown a relatively steady increase. As foreign banks have been extremely cautious in their cross-border lending since the 1997
crisis, inflows of bank loans have shown a negative value except in 2006, implying that foreign banks have repatriated their loans since the crisis. By 2009 and 2010, capital inflows already returned to normal levels.

Capital outflows (investment by domestic residents) had traditionally been relatively small until the early 2000s (Figure 3). Even though there had been a series of liberalization measures since the early 1990s, they mostly focused on foreign exchange transactions. Levels impressively increased after the government encouraged outflows in response to the influx of short-term capital. Total capital outflows increased from $35.7 billion in 2006 to $78.7 billion in 2007. Increasing at a steady pace, FDI investment had traditionally been the major driver of outflows. However, since 2001, portfolio investments have made up more than 60% of capital outflows, reflecting the liberalization of residents’ investment abroad, which skyrocketed from $15.2 billion in 2006 to $52.4 billion in 2007. But in 2008, when the global financial crisis rocked the world financial markets, equity outflows significantly reversed.

Capital inflows to emerging market economies make macroeconomic management difficult since they can result in an increase in money supply, liquidity, and asset prices as well as an appreciation of nominal and real exchange rates. Moreover, the current account often runs a deficit with higher capital mobility. To avoid persistent current account deficits, money supply will have to be increased, precipitating a surge in domestic prices, or foreign exchange intervention activated, resulting in an accumulation of foreign reserves and accordingly domestic money supply. Foreign exchange intervention may be sterilized through sales of government securities in an open market operation. However, if the sterilization is only partial, liquidity and asset prices may increase.

**Figure 2. Pattern of Capital Inflows to the Republic of Korea**

![Pattern of Capital Inflows to the Republic of Korea](image)

*FDI = foreign direct investment.*

*Source: International Financial Statistics.*
To identify the effects of capital flows and capital controls on the Korean economy, we select several macroeconomic variables for scrutiny. Capital inflows dramatically increased since 1998 due to the big bang approach to capital market liberalization, with major macroeconomic variables showing different patterns.

Figure 4 shows the relationship between net capital inflows and current account balances in the Republic of Korea. As theory predicts, the current account is a mirror image of net capital inflows. However, the characteristics of the relationship between capital flows and current account balances are different depending on the degree of openness in capital markets. Before the currency crisis of 1998, current account balances were generally exactly matched with net capital inflows, with both series showing relative stability and persistence. There had been many reasons for that, but limited capital market openness seemed to be a major factor. However, net capital inflows and current account balances became more volatile and increased in volume after the currency crisis probably due to higher capital market openness. As a consequence of this, the Republic of Korea has faced more difficulties in achieving stable external balances.
Domestic liquidity and short-term interest rates have also been influenced by capital flows. Figure 5 indicates the trends of M2/GDP and call rates in the Republic of Korea. Before the 1998 currency crisis, there seemed to be less of a relationship between call rates and domestic money supply. This implied that domestic short-term interest rates were so repressed that monetary aggregates could not be as influential. However, since 1998, domestic money supply and call rates have displayed a negative relationship.
More interestingly, policy interest rates show different characteristics depending on the level of capital flows and foreign exchange rate regimes before and after the currency crisis. Through the 1980s, the Republic of Korea took a fixed exchange rate regime. Therefore, domestic short-term interest rates were closely correlated with the federal funds rate of the US. However, from the early 1990s to 1998, the country adopted a managed floating exchange rate regime generally with increasing flexibility of exchange rates, implying that domestic policy interest rates should be equal or close to policy rates of the US. By the same argument, domestic policy rates should be independent from that of the US after the currency crisis as the country adopted a free floating exchange rate regime. However, Figure 6 shows contradictory trends of short-term interest rates. Before 1998, the country’s policy rates did not respond much to US interest rates changes. This was possible only if the Republic of Korea could control capital inflows.

But since 1998, short-term policy rates have followed changes in US interest rates more closely. This indicates that the monetary autonomy supposedly guaranteed under a free float had not been achieved. One of the reasons for this could have been the excessive capital inflows which raised the risk of undue currency appreciation, liquidity expansion, asset price bubbles, and overheating of the domestic economy. To avoid this, domestic policy interest rates had to be closely aligned with US interest rates, weakening domestic monetary independence as capital controls were not an option for this period.

Figure 6. Short-Term Interest Rates of the Republic of Korea and the US

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**Figure 6. Short-Term Interest Rates of the Republic of Korea and the US**

*cr = call rates of the Republic of Korea, ffr = federal funds rate of the US, US = United States.*

Sources: Bank of Korea and IFS.
Finally, capital inflows tend to appreciate nominal and real exchange rates. When the Republic of Korea adopted a managed floating exchange rate regime with capital controls before the currency crisis, foreign exchange rates had been managed at stable levels (Figure 7). In the 1980s and the first half of the 1990s, the won/dollar exchange rate closely moved with the nominal effective exchange rate and the real effective exchange rate. In a floating exchange rate regime after the currency crisis, capital inflows directly affected the demand for domestic currency assets, leading to an appreciation in the nominal exchange rate as well as the real exchange rate given sticky prices. Two episodes of rapid capital outflows in 1998 and 2008 led to the huge depreciation of the won/dollar exchange rate as well as the nominal and real effective exchange rates.

Figure 7. Foreign Exchange Rates (1980Q1=100)

neer = nominal effective exchange rate, reer = real effective exchange rate.
Source: Bank of Korea and IFS.

The movement of foreign exchange rates of course depends on the choice of exchange rate regime. However, the capital inflow can also be an important factor. Figure 8 shows how volatility of the exchange rates had increased five times after the currency crisis in 1998. There were two abnormal periods: the currency crisis of 1998 and the liquidity crisis of 2008. Even if we exclude these two episodes, volatility still increased significantly after 1998. With the free floating exchange regime, the more volatile capital flows under a liberalized capital account probably led to more volatile foreign exchange rate movements during the period.
To mitigate the adverse effects of capital flows on the exchange rate, the Korean government has intervened in the foreign exchange market as evidenced by the rapid accumulation of foreign reserves since 1998 (Figure 9). Reserves rose quickly due to precautionary demand spurred by the crisis. Furthermore, while the country has been running sizeable surpluses on its current accounts, it has also accumulated large capital inflows as seen in the previous section. The bulk of the current account surpluses and capital inflows have been sterilized and added to reserves to stabilize either the nominal or real effective exchange rate with the objective of maintaining export competitiveness.
In sum, the Republic of Korea has faced difficulty in macroeconomic management since the period of greater capital market openness. Capital inflows without controls lead to an increase in liquidity as well as appreciation of the nominal and real exchange rates. To avoid deterioration of the current account balance, Korean authorities are pressed to undertake foreign exchange intervention which could result in excessive accumulation of foreign reserves and accordingly an increase in domestic money supply.

IV. EMPIRICAL ANALYSIS OF THE EFFECTS OF CAPITAL CONTROL MEASURES

This section analyzes the effects of capital account policy on capital flows by using the capital account control/liberalization indexes developed in Section II. By constructing a VAR model, we examine how exogenous changes in capital account policy affect capital flows.

A. Empirical Model

This section empirically examines the effectiveness of capital controls in the Republic of Korea using structural VAR models. We are particularly interested in the effects of capital controls on capital flows. We first analyze the issue using the baseline model. Afterwards, we consider various extensions of the baseline model to check the robustness of the results and examine the extended issues.

We consider a VAR model that includes nine endogenous variables: the index for capital account control/liberalization on capital inflows (TIFC), the index for capital account control/liberalization on capital outflows (TOFC), real GDP (RGDP), the real interest rate differential (DR), the real exchange rate against the US dollar (RE R), stock price (SP), the current account as a ratio to trend GDP (CUR, multiplied by 100), capital inflows as a ratio to trend GDP (TIF, multiplied by 100), and capital outflows as a ratio to trend GDP (TOF, multiplied by 100). To construct trend GDP, we use the fitted value of GDP obtained from a regression of nominal GDP to a linear trend.\(^5\) The real exchange rate is constructed using the nominal exchange rate against the US dollar and the consumer price indexes of the Republic of Korea and the US. The real interest rate differential is constructed by subtracting (ex post) US real interest rate (the federal funds rate minus CPI inflation) from (ex post) Korean real interest rate (call rate minus CPI inflation). RGDP, RER, and SP are in logarithm (multiplied by 100). The model also includes two measures of external variables: US real

\(^5\)We also experimented with the quadratic trend. The results are similar.
GDP (RGDPUS) and US stock price (SPUS). RGDPUS and SPUS are in logarithm (multiplied by 100).

Output, the interest rate differential, stock price, the current account, and the exchange rate are likely to affect capital inflows and outflows. By including these variables in the model, we try to control for all the variables that could influence capital flows to properly capture the effect of capital control measures.

We include the capital account control/liberalization indexes on inflows and outflows separately (and capital inflows and outflows separately), as the two measures are likely to have different effects on inflows and outflows. We include both indexes in the model as they can be interrelated. If capital controls can be imposed on both inflows and outflows, interpretations based on only one measure can be misleading.

The reduced form model is the following:

\[
\begin{pmatrix}
    \text{RGDP}_t \\
    \text{DR}_t \\
    \text{RER}_t \\
    \text{SP}_t \\
    \text{CUR}_t \\
    \text{TIF}_t \\
    \text{TOF}_t \\
    \text{TIFC}_t \\
    \text{TOFC}_t
\end{pmatrix} =
\begin{pmatrix}
    a_1 \\
    a_2 \\
    a_3 \\
    a_4 \\
    a_5 \\
    a_6 \\
    a_7 \\
    a_8 \\
    a_9
\end{pmatrix}
+ A_y(L)
\begin{pmatrix}
    \text{RGDP}_{t-1} \\
    \text{DR}_{t-1} \\
    \text{RER}_{t-1} \\
    \text{SP}_{t-1} \\
    \text{CUR}_{t-1} \\
    \text{TIF}_{t-1} \\
    \text{TOF}_{t-1} \\
    \text{TIFC}_{t-1} \\
    \text{TOFC}_{t-1}
\end{pmatrix}
+ B_y(L)
\begin{pmatrix}
    \text{RGDPUS}_t \\
    \text{SPUS}_t
\end{pmatrix}
+ \begin{pmatrix}
    \varepsilon_{1t} \\
    \varepsilon_{2t} \\
    \varepsilon_{3t} \\
    \varepsilon_{4t} \\
    \varepsilon_{5t} \\
    \varepsilon_{6t} \\
    \varepsilon_{7t} \\
    \varepsilon_{8t} \\
    \varepsilon_{9t}
\end{pmatrix},
\]

where \(A_y(L)\) and \(B_y(L)\) are 9×9 and 9×2 matrices of polynomials in lag operator \(L\), respectively.

The estimated reduced form model is converted to the structural form model by imposing zero restrictions on contemporaneous interactions among endogenous variables similar to Sims (1980). For the identifying restrictions, capital account control/liberalization measures are allowed to be contemporaneously affected by all endogenous variables, but not the other way around. Policy on capital control is likely to be endogenous to the state of the economy. Such identifying assumptions are used to identify the exogenous part of policy changes and to examine the effects of the policy changes on the economy.
The structure between TIFC and TOFC is not easy to determine. Since the primary way of controlling capital flows in the Republic of Korea has been to control capital inflows, the assumption that TIFC is contemporaneously exogenous to TOFC may be more reasonable. However, this assumption may not be fully justified, so we also experiment with the alternative assumption that TOFC is contemporaneously exogenous to TIFC.\(^6\)

Quarterly data is used. The estimation period covers January 1990–April 2010. A constant term and two lags are assumed. The Republic of Korea data is obtained from the Bank of Korea’s statistical data. US data is obtained from the Federal Reserve Bank of St. Louis web page.\(^7\)

**B. Empirical Results**

Figures 10 and 11 report the impulse responses of the endogenous variables to TIFC and TOFC shocks, respectively, over 16 quarters with 95% probability bands under the model where TIFC is assumed to be contemporaneously exogenous to TOFC. Figures 12 and 13 similarly report the impulse responses to TIFC and TOFC shocks, respectively, but where TOFC is assumed to be contemporaneously exogenous to TIFC. The responding variables are denoted at the top of each graph.

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\(^6\) Practically, we use a recursive VAR model as in Sims (1980). TIFC and TOFC are ordered first. In such a model, the effects of TIFC and TOFC shocks on the other seven variables are theoretically the same regardless of the ordering among the seven variables (for further discussion see Christiano, Eichenbaum, and Evans 1999).

\(^7\) Our statistical inference is not problematic in the presence of unit roots and cointegrating relations since we follow Bayesian inference. See Sims (1988) and Sims and Uhlig (1991) for a general discussion on Bayesian inference in the presence of unit roots and cointegrating relations.
Figure 10. Impulse Responses to TIFC shocks

CUR = current account as a ratio to trend GDP, DR = real interest rate differential, RER = real exchange rate against the US dollar, RGDP = real GDP, SP = stock price, TIF = capital inflows as a ratio to trend GDP, TIFC = capital account control/liberalization index on capital inflows, TOF = capital outflows as a ratio to trend GDP, TOFC = capital account control/liberalization index on capital outflows.

Source: Authors’ computations.
The results show that shocks to capital account control/liberalization measures do not have much effect on the economy. In particular, the responses of capital inflows and capital outflows are not very significant in most cases, suggesting that capital controls do not affect capital flows significantly. The only possible exception is the following. In Figure 12, in response to TIFC shocks, capital inflows do not change significantly. However, TOFC and TOF decrease significantly, in response to TIFC shocks. This may show a case in which changes in capital controls on inflows have a significant effect on capital outflows.\(^8\)

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\(^8\)The negative effect of TIFC shocks is marginally significant. This result is strange since capital account liberalization decreases capital inflows. The identified TIFC shocks might include an endogenous reaction to the state of the economy, e.g., during the Asian financial crisis, the Korean government had liberalized the capital account when capital inflows fell.
Figure 12. **Impulse Responses to TIFC shocks** (Alternative Ordering)

CUR = current account as a ratio to trend GDP, DR = real interest rate differential, RER = real exchange rate against the US dollar, RGDP = real GDP, SP = stock price, TIF = capital inflows as a ratio to trend GDP, TIFC = capital account control/liberalization index on capital inflows, TOF = capital outflows as a ratio to trend GDP, TOFC = capital account control/liberalization index on capital outflows.

Source: Authors’ computations.
Figure 13. Impulse Responses to TOFC shocks (Alternative Ordering)

CUR = current account as a ratio to trend GDP, DR = real interest rate differential, RER = real exchange rate against the US dollar, RGDP = real GDP, SP = stock price, TIF = capital inflows as a ratio to trend GDP, TIFC = capital account control/liberalization index on capital inflows, TOF = capital outflows as a ratio to trend GDP, TOFC = capital account control/liberalization index on capital outflows.

Source: Authors’ computations.

C. Effects of Each Measure

We further investigate the effects of components of the capital account control/liberalization measures. For such an analysis, we construct 10 individual capital account policy indexes, i.e., on inflows and outflows of FDI, stocks, bonds, bank loans, and foreign exchange transactions. To estimate the effect of each index, we extend the baseline model by adding the index and the corresponding capital flow series. For example, to investigate the effects of capital account control/liberalization measures on inflows of FDI, we include the capital account control/liberalization index on FDI inflows as well as FDI inflows (as a ratio to trend GDP). For the measures on foreign exchange transactions, we add the relevant index only because there is no corresponding capital flow measure. For identification, we keep the assumption that the policy measures are allowed to be contemporaneously affected by all other endogenous variables but not the other way around. Regarding the structure among policy measures, we
assume that the additional index is contemporaneously exogenous to the two indexes in the baseline model.\textsuperscript{9}

Figure 14 reports the responses of each component of capital flows to shocks to the corresponding capital account control/liberalization index for that type of flow. In the case of inflows and outflows of foreign exchange transactions, the responses of total capital inflows and outflows, respectively, are reported. There is no case in which a relaxation of capital controls increases capital flows significantly.

**Figure 14. Impulse Responses of Capital Flows to Shocks to Each Capital Control/Liberalization Measure**

\textsuperscript{9}For alternative assumption on the ordering among policy measures, the results are similar in that the effects are insignificant.
V. SUBPERIOD ESTIMATIONS FOR CAPITAL FLOWS

In Section IV, we investigated the effects of shocks to capital account control/liberalization measures over the full sample period. The results show that shocks to capital account policy do not affect capital flows significantly. The previous empirical experiment shows that typical measures adopted in a quarter do not have a significant effect. However, this does not necessarily imply that capital account control/liberalization will not affect capital flows and the economy. The economy may behave differently after a series of measures are imposed.

In this section, we compare the behavior of the Korean economy in two subperiods: the periods before and after serious capital account liberalization. In particular, we examine how US monetary policy shocks affect Korean macroeconomic variables such as the exchange rate, the interest rate, and capital flows. We draw various implications from the exercise, including on international monetary transmission and monetary independence under a restricted and liberalized current account. A substantial part of this section is drawn from Kim and Shin (2010).

A. Empirical Model

We use the following empirical model to analyze the effects of changes in US monetary policy on Korean economies. The Republic of Korea is a small open economy and, to reflect this structure in the model, we assume a block-exogenous VAR model in which US variables are treated as exogenous to Korean variables. This also weakens the small-degree-of-freedom problem (compared to a fully fledged, two-country model).

US monetary policy and the Korean economy endogenously respond to US or world structural shocks. As a result, simple analysis on the relationship between US monetary policy and the Republic of Korea can be misleading as any established could have originated from the US or world non-monetary structural shocks. Therefore, exogenous US monetary shocks are identified in the following model using the method of Christiano, Eichenbaum, and Evans (1999).

We assume that the economy is described by the following structural equation system

\[ G(L)y(t) = e(t) \]  \hspace{1cm} (2)

where \( G(L) \) is a matrix polynomial in lag operator \( L \), \( y(t) \) is an \( m \times 1 \) data vector, and \( m \) is the number of variables in the model. Also, \( \text{var}(e(t)) = \Lambda \) where \( \Lambda \) is a diagonal matrix and the diagonal elements are variances of structural shocks.
We assume that the equation system (1) can be expressed as

$$y(t) = \begin{bmatrix} y_1(t) \\ y_2(t) \end{bmatrix}, \quad G(L) = \begin{bmatrix} G_{11}(L) & 0 \\ G_{21}(L) & G_{22}(L) \end{bmatrix}, \quad e(t) = \begin{bmatrix} e_1(t) \\ e_2(t) \end{bmatrix}$$

where $y_1(t)$ and $e_1(t)$ are $m_1 \times 1$ vectors, $y_2(t)$ and $e_2(t)$ are $m_2 \times 1$ vectors, $G_{11}(L)$ is an $m_1 \times m_1$ matrix, $G_{21}(L)$ is an $m_2 \times m_1$ matrix, and $G_{22}(L)$ is an $m_2 \times m_2$ matrix.

We assume that $G_{21}(L)=0$. This assumption is the restriction of block-exogeneity, which implies that $y_1(t)$ is not affected by current as well as lagged $y_2(t)$. In the empirical model, $y_1(t)$ contains the US variables, and $y_2(t)$ the Korean variables. Therefore, the US variables are not affected by the variables of a small open Korean economy.

In the US block, the method of Christiano, Eichenbaum, and Evans (1999) is applied to identify US monetary policy shocks. The vector $y_1(t)$ includes $[\text{IP}_{\text{US}}, \text{CPI}_{\text{US}}, \text{CMP}, \text{FFR}, \text{NBR}, \text{M}]'$ where $\text{IP}_{\text{US}}$ is industrial production, $\text{CPI}_{\text{US}}$ is the consumer price index, CMP is commodity price, FFR is the federal funds rate, NBR is non-borrowed reserves, and M is a monetary aggregate. Following Christiano, Eichenbaum, and Evans (1999), we identify FFR shocks as monetary policy shocks by imposing restrictions on the contemporaneous structural parameter $G_{11}(0)$ such that $\text{IP}_{\text{US}}, \text{CPI}_{\text{US}},$ and CMP do not respond to FFR contemporaneously, while FFR does not respond to NBR and M contemporaneously.10

For the Korean variables, $y_2(t)$ includes the call rate (or interbank rate) (CR), the exchange rate against the US dollar (ERA), the consumer price index (CPI), and industrial production (IP). CPI and IP are important macro variables that show the aggregate price level and aggregate economic activity. CR and ERA are included as they show the monetary and foreign exchange policy stance of the country. Other variables of interest are included (one by one, additionally). They are foreign exchange reserves (RES), net capital inflows (CAP), and net portfolio inflows (PORT).

Because the variables on the right hand side differ in the reduced form block-exogenous VAR model, OLS provides inefficient estimates. We estimate the reduced form block-exogenous VAR model with seemingly unrelated regression (SUR) and then change to a structural VAR model.

As the estimation period is short, we use monthly data. The estimation periods are: 1982:10–1991:12 and 1999:1–2007:6. The first sample period

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10The US data is obtained from the database of the Federal Reserve Bank of St. Louis. Intermediate material prices are used as the commodity price index, while M1 is used as the monetary aggregate. We experiment with various measures of commodity prices and monetary aggregates. Abnormal responses such as the price puzzle are relatively weaker when we use intermediate material prices and M1. The natural logarithm is taken and multiplied by 100 for all variables, except for the interest rate.
corresponds to the period before serious capital account liberalization, while the second corresponds to the period after almost full capital account liberalization.

Studies like Strongin (1995) and Clarida, Gali, and Gertler (2000) suggest that by October 1982, the US monetary policy operating procedure had already changed to interest rate targeting. Therefore, the estimation period starts from October 1982 in the first sample. As reviewed in the previous section, capital account liberalization had accelerated beginning 1992. For example, the Korean stock market of the Republic of Korea was opened up to foreign investors starting January 1992. Therefore, we end the first subsample at December 1991. As mentioned earlier, the Korean capital account had been liberalized during the Asian financial crisis. In the second sample period, the Republic of Korea adopted inflation targeting with the interest rate as the monetary instrument. We end the sample on June 2007 in the period before the global financial crisis. We consider this period because the US had then chosen to implement an unusual monetary policy (i.e., quantitative easing). A constant term and two lags are assumed.

B. Empirical Results

Figure 15 shows the impulse responses of the federal funds rate and the Korean call rate to US monetary policy shocks over a span of 4 years. The dotted lines are 90% probability bands. The first and the second rows of the graphs show the impulse responses for the first and second sample periods, respectively.
Figure 15. **Impulse Responses of the Federal Funds Rate and the Korean Call Rate To US Monetary Policy Shocks**

**Before Liberalization**

<table>
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<tr>
<th>FFR</th>
<th>CR</th>
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<td><img src="image1.png" alt="Graph" /></td>
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**After Liberalization**

<table>
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<tr>
<th>FFR</th>
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<td><img src="image3.png" alt="Graph" /></td>
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CR = call rate of the Republic of Korea, FFR = federal funds rate of the US, US = United States.

In the sample period before serious capital account liberalization, the federal funds rate increases by 0.25–0.3% for the first three months after the shock and then decreases over time and goes back to the initial level in about 9 months. The Korean call rate also increases, rising up to 0.18% in about 2–3 months, and then falls back to the initial level in about 6 months. Therefore, as the federal funds rate increases, the Korean call rate also increases. For the sample period of a liberalized capital account, the federal Funds rate increases by 0.2% in about 3 months after the shock. The Korean call rate also increases by 0.05% in about 3–4 months.
Based on these results, we can conclude that Korean monetary policy was not independent of US monetary policy during both sample periods. As the Republic of Korea tightly managed the exchange rate during the first sample period, it is not surprising that Korean monetary policy depended much on US monetary policy. However, as the country adopted a floating exchange rate regime during the second sample period, it is interesting to note how Korean monetary policy was not independent of US monetary policy.

Figure 16. **Impulse Responses of the Won–Dollar Exchange Rate and the Republic of Korea’s Net Capital Inflows to US Monetary Policy Shocks**

**Before Liberalization**

![Graph showing impulse responses before liberalization](image)

**After Liberalization**

![Graph showing impulse responses after liberalization](image)


Source: Authors' computations.
To further infer why Korean monetary policy was not fully independent of US monetary policy during the second sample period, Figures 16 and 17 report the impulse responses of the exchange rate, net capital flows, net portfolio flows, and foreign exchange reserves. The exchange rate responses are not significant for the first sample period which can be expected as the Republic of Korea controlled the exchange rate very tightly during the time. Responses of foreign exchange reserves meanwhile reveal strong foreign exchange intervention. The exchange rate responses are not significant in the short run even for the second sample period. As shown in the responses of foreign exchange reserves, the Republic of Korea actually intervened in the foreign exchange market to stabilize the exchange rate, although the size of intervention was smaller than for the first sample period. In addition, the country also increased the interest rate in response to the US rate rise. All these possibly contribute to the weak short-run effects on the exchange rate.
Although net capital flows do not change significantly in both periods, net portfolio flows decrease significantly in both periods. In particular, net portfolio flows decrease sharply in the second sample period by up to 0.35%, which is about four times larger than the decrease of net portfolio flows in the first sample period. From these responses, we can infer the following. First, we find that net portfolio flows change more in the period of liberalized capital account than in the period of capital controls. This implies that the economy, not to mention capital flows itself, is likely to behave differently with and without capital controls. Second, we find that in the period of a more liberalized capital account, portfolio flows change a lot in response to US monetary policy shocks. If the Republic of Korea had not increased the interest rate and intervened in the foreign exchange market, portfolio flows would have changed even more. Volatile capital flows are likely to make the exchange rate, liquidity, and asset prices volatile (Kim and Yang 2009, 2011; Kim, Kim, and Wang 2004). This may be the reason why it was hard for the Republic of Korea to gain monetary independence from the US.

VI. EVENT STUDY

In Section IV, we examined the effects of shocks to the capital account control/liberalization indexes on capital flows. However, as discussed in Section II, most of the measures taken by the Republic of Korea over the last three decades had been toward capital account liberalization. A few capital control measures were implemented only beginning 2007. In this section, we analyze the effects of those recent measures by conducting an event study to examine their effects on capital inflows.

The major motivation for the introduction of capital controls in 2007 and 2008 had been to reduce large short-term capital inflows into the Republic of Korea. Since 2005, the country had experienced a surge in short-term borrowing by foreign banks due to the expectation of won appreciation in relation to global imbalances and mismatches in the forward market. Domestic exporters faced the full currency risk since most transactions in international trade were contracted in terms of the US dollar. They had to purchase forward contracts in order to fix their cash flows in terms of the Korean won, thus reducing forward swap rates. Banks which intermediate these contracts, were in the opposite position, selling forward contracts. Foreign banks’ advantage as regards dollar-denominated funding in the global market and the interest rate differential versus the US created the possibility of risk-free arbitrage profits (i.e., by borrowing from abroad and trading forward contracts in the domestic forward market). This further appreciated the Korean won and induced more short-term capital inflows into the country.
To reduce short-term capital inflows, the Korean government considered comprehensive measures including capital controls, liberalization of capital outflows, and enhancement of prudential measures in the banking sector. The policy measures were limited unless draconian capital controls were imposed, but the government did not want to generate political risks by imposing strong capital controls such as the introduction of unremunerated reserve requirements in Thailand. However, as discussed in the previous section, the government’s attitude to capital liberalization changed during this period. In August 2007, the Korean government announced a measure that restricted the use of foreign borrowings by allowing such funds only for real demand and investment in the manufacturing sector. By January 2008, foreign banks’ borrowings from headquarters had become more restricted.

More prudential measures in foreign exchange transactions were implemented as the country experienced a shortage of foreign reserves and dollar liquidity during the global financial crisis of 2008. The Korean government strengthened prudential measures concerning dollar liquidity by imposing high standards on foreign exchange risk management guidelines in November 2008 and increasing the dollar reserve ratio in banking sector in December 2008. As indicated in Figure 18, two capital control measures in 2007 succeeded in reducing total capital inflows as well as inflows of short-term bank loans. Even though the two capital control measures introduced in 2008 could not contribute to the decrease in the total capital inflows, short-term bank loans decreased after their implementation at least temporarily. This implies that the capital control measures in 2007 and 2008 had been more or less successful in throwing sand on inflows in the form of short-term banks loans as the government intended.

**Figure 18. Capital Control Measures and Capital Inflows ($ million)**

Note: Capital inflows are on the left axis, short-term bank loan inflows on the right.

Source: Bank of Korea.
Nevertheless, the event study in this section mainly focuses on capital controls in 2007. The reason we exclude capital control measures in 2008 is that these measures had been heavily influenced by the global financial crisis. After the second half of 2008, capital inflows dramatically reversed, while capital outflows increased, making it hard to infer the effects of capital account restrictions with a simple method of analysis. In contrast, measures in 2007 were implemented in a relatively neutral environment.

In order to check the effectiveness of the capital control measures, we calculate the difference between the amount of capital inflows after implementation of control measures and the 12-month average of capital inflows before implementation (Figure 19). Time 0 is the period when capital controls were implemented (e.g., August 2007), and consecutive time periods indicate the number of months beyond the time that controls were put into practice.

As indicated in Figure 19, total capital inflows decreased right after capital controls were introduced (compared to the 12-month average before they were implemented), and most types of capital inflows decreased in the period 0 to 1. However, total capital inflows increased after 2 months of capital control execution, implying that dollar liquidity affects overall capital flows in the short run. Stock inflows persistently fell after the measures were implemented. More interestingly, short-term bank loans from abroad persistently declined up to 4 months after the policy restriction even as other types of capital flows such as bonds already returned to positive values. Although the current event study is limited in that other economic events were not fully controlled, the results suggest that capital controls may have changed the composition of capital inflows, which is consistent with the empirical literature.

Figure 19. Impact of Capital Controls on Capital Inflows ($ million)

FDI = foreign direct investment.

Source: Authors’ computations.
VII. CONCLUSION

Most small open emerging economies have experienced major difficulties because of volatile capital flows. While sound macroeconomic policies have been recommended for managing these flows, it is difficult for small open economies to be consistent in simultaneously achieving both internal and external balances. One of the options available would be capital controls on cross-border capital transactions. But can these adequately deal with volatile capital inflows in emerging market economies? The previous empirical literature is inconclusive. Nevertheless, several countries in recent years have been interested in implementing them to mitigate the adverse effects of financial volatility. Therefore, whether or not capital controls work is an important research question for policymakers in emerging market economies.

Against this background, our paper aimed to shed light on the effectiveness of capital controls based on the experience of the Republic of Korea. We first reviewed the history of capital account control/liberalization, dividing it into five stages: (i) the gradual approach from the 1980s and the early 1990s; (ii) accelerated capital account liberalization in the early 1990s; (iii) the big bang approach during the Asian financial crisis; (iv) facilitation of capital market development from the late 1990s to the early 2000s; and (v) after the global financial crisis, the conservative approach to decrease the volatility of capital flows and prevent instability of domestic financial markets.

Previous empirical studies on capital controls have a major caveat in constructing capital control measures. Most of them rely on data from the IMF’s annual reports on exchange rate arrangements and restrictions. Even though the IMF data covers most countries, it is not comprehensive at all, and is constructed at a low frequency. To overcome this limitation, we constructed quarterly series of comprehensive capital control indexes based on the record of Korean government policies.

This paper discussed the effects of capital account control/liberalization in various ways. First, we reviewed the behavior of key macro variables from the 1980s. Second, we developed a VAR model to examine the effects of shocks to capital account policy on capital flows. Third, we constructed a VAR model to analyze the effects of US monetary policy shocks on the Republic of Korea’s capital flows and interest rate for the sample periods before and after serious capital account liberalization. Fourth, we performed a simple event study to analyze the effectiveness of capital control measures adopted in 2007.

The results from VAR analysis find that shocks to capital account policy do not have significant effects on capital flows in most cases. This evidence implies that it is not so easy to decrease the volatility of international capital flows by adopting a few policy measures on capital controls. However, this does not necessarily mean that economies under several capital controls and those with a
liberalized capital account have the same characteristics. We find differences in the behavior of macro variables in the sample periods before and after serious capital account liberalization. Capital flows, the current account, and the exchange rate are far more volatile in the period of a liberalized capital account than in the period of severe capital controls. In addition, the event study, although simple, tends to support the effectiveness of capital controls in terms of altering the composition of capital flows.

Empirical results also show that under a liberalized capital account, the Republic of Korea did not maintain monetary autonomy despite adopting a free float for the won. This may be related to financial globalization and volatile capital flows during the period. In addition, past studies such as Kim, Kim, and Wang (2004) and Kim and Yang (2009, 2011) found that capital flows significantly influenced key macroeconomic variables such as output, asset prices, and the exchange rate, and had adverse effects on the economy. It is hence imperative to develop a policy framework to decrease potential problems of volatile capital flows.
REFERENCES


Comments on Are Capital Controls Effective?
The Case of the Republic of Korea
Soyoung Kim and Doo Yong Yang

JOSEPH LIM

The paper gives an interesting account and analysis of capital controls and liberalization of the Korean macroeconomy, especially on the historical and descriptive parts of the paper.

However, the picture presented in the historical and descriptive part of the paper, which argues that capital account liberalization led to high volatilities in capital and current account flows, exchange rate movements, and other variables differ from that gleaned from the VAR analysis. The VAR analysis seems to show little impact of changes in the capital control regimes on these variables.

I am not an expert on VAR analysis but I think, as earlier pointed out by Prof. Athukorala on his criticism of the VAR model, the analysis should be focused on the crisis period, as well as the irrational exuberance period, where capital control and liberalization should matter.

I wonder whether the assumption of two-period lags (quarters) blurs the fact that the lags may be endogenous. It cannot predict when a crisis will happen and when capital account liberalization will have an effect. The lag period is variable and cannot be fixed. This is I think one of the drawbacks of VAR analysis. You have to know when the irrational exuberance period is, and when the panic and contagion periods are, wherein the capital regimes should really matter.

Also, unlike Thailand and Malaysia, the Republic of Korea did not experience strong capital controls as well as massive capital outflows in the two-lag period time. Perhaps this is why big effects of capital controls on variables were not obtained.

Another important point that the paper makes is the possible debunking of the Impossible Trinity case in the Republic of Korea. I agree that the Impossible Trinity may break with capital openness, but in a different way than the paper suggests. With capital openness, there is a tendency for the domestic interest rate to approximate the foreign interest rate. Hence, it cannot be said that monetary independence is lost with capital openness as the paper suggests. Nonetheless it is still possible that the Impossible Trinity is broken. That is, since these irrational exuberance periods are high outflow periods, interest rates should be used as a tool during these crises periods. But you don't have any choice with your interest.

Joseph Lim is professor at the Ateneo de Manila University.
rates. You have to sterilize when, for instance, there are big capital inflows or massive foreign exchange deterioration as in the Asian financial crisis.

I agree with the earlier discussion that capital account liberalization could lead to a Dutch Disease, especially with the appreciation of the currency and this leads to a lot of temptation to run capital account imbalances and high current account deficits. A surge of inflows could lead to other problems because of high liquidity, as well as currency and term mismatches, which if not properly sterilized and addressed with regulation would lead to asset bubbles and current account deterioration.

I also agree with the earlier comments that capital control is similar to financial regulation and prudential supervision on regulating risky assets such as hot money, to prevent asset bubbles. Unlike the bank sector, the equity and money markets are not regulated.

All the papers seem to show some irreversibility of capital account liberalization. As of now, both the People’s Republic of China and India have not yet liberalized, such that they have undue advantage over the other Asian countries in terms of financial stability.

What are the options then? Previous discussions present two sides. One side suggests the need for strong macroeconomic fundamentals, sound prudential supervision, and economic/financial surveillance. Meanwhile, others suggest some need for capital controls. I believe that individual countries' capital controls may not work because the financial markets can punish them, as in Thailand’s case. Therefore, we now have to consider the regional and international aspects of capital liberalization and control. For capital controls to work, the IMF should give full imprimatur and the financial markets should accept it as a common practice. We should have more international agreements acceptance of capital controls as a common practice.

On the curative aspect, crises happen due to too much financial integration, which is partly by capital account liberalization. Multilateralization efforts, such as the Chang Mai Initiative, however have not been very successful in the past global crisis.

In summary, Asian economies are leading global growth now but are not immune to the global trend of financial volatilities due to financial integration and capital account openness. It may be apt to lead the initiative towards a more stable and sound global financial system with regional and international initiatives.
Fine-Tuning an Open Capital Account in a Developing Country: The Indonesian Experience
SISIRA JAYASURIYA AND SHAWN CHEN-YU LEU

Indonesia has operated a liberal capital account permitting relatively free flow of international non-FDI flows since the early 1970s. In this paper, we review the Indonesian experience and the effectiveness of capital restrictions during 1990–2010 using a SVAR model of the Indonesian economy. Because of severe data problems in the pre-1997 period and because the Indonesian monetary policy and broader macroeconomic regime underwent fundamental changes since the 1997 crisis, we also estimated a model separately for the 2000–2010 period. Both sets of results suggest that inflow and outflow restrictions have been effective for FDI but largely ineffective for portfolio capital. However, the 2000–2010 model results indicate not only that restrictions on inflows have a short-term impact on restricting portfolio flows, but also suggest that controls on inward portfolio investments have some ability to shift funds from short-term to longer-term markets, though the impact is short-lived.

*JEL classification:* F30; F41

I. INTRODUCTION

Indonesia offers an interesting contrast in many ways to most Asian economies in terms of its experience with capital controls. It is often described as one of the few developing countries to have had a liberalized capital account since the early 1970s and as a country that went against conventional wisdom about the optimal sequencing of trade and capital account liberalization, opening the capital account well before serious liberalization of the trade regime which started only in the 1980s. It abolished most direct exchange controls in 1970, unified the exchange rate, and permitted Indonesian firms to borrow directly from foreign banks. In the subsequent four decades, it resisted imposing direct exchange controls despite experiencing major macroeconomic turbulence and political convulsions, including episodes of massive capital flight as had occurred during the 1997 Asian financial crisis and, more recently, surges in capital inflows.

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1See Hill (2000).
The Indonesian capital account was not “fully open” in the early 1970s as there remained many regulatory restrictions on overseas bank borrowings and foreign direct investment (FDI) despite removal of direct exchange controls.\footnote{From time to time, regulatory measures were taken to constrain cross-border flows. See Arndt (1974) and Grenville (1976) for more details.} Controls on FDI were progressively removed from the late 1980s onwards, but there had been measures taken from time to time to restrict short-term capital movements. Overall, it seems appropriate to describe the specific regulatory measures Indonesia implemented to influence cross-border capital flows as attempts to fine-tune an open capital account, as it clearly had a much more open capital account since the early 1970s compared with most of its neighbors in developing Asia.

In this paper, we describe and evaluate the effectiveness of measures to control cross-border capital movements in Indonesia during 1990–2010. The paper is structured as follows. In Section II, we present a brief review of the macroeconomic history and context, highlighting the major changes in economic circumstances and macroeconomic policy framework before and after the 1997 crisis, and a qualitative analysis of the most important capital control measures adopted in 2003–2004. In Section III, we describe the construction of a capital restriction index based on the methodology outlined in Schindler (2009) and elaborated in Jongwanich, Gochoco-Bautista, and Lee (2011). Section IV describes the specification of a structural vector autoregression (SVAR) model, while Section V discusses some major data issues and limitations, the empirical estimation and diagnostics of the reduced-form VAR model, and impulse response functions to a number of macroeconomic shocks. In Section VI, we discuss dynamic responses to various capital flow restrictions, including some robustness checks to explore the effectiveness of capital control measures. Section VII concludes with a summary of the main findings.

II. BACKGROUND ON CAPITAL CONTROLS

From the mid-1970s to the 1997 crisis, Indonesia’s balance of payments (BOP) and overall macroeconomic developments were dominated by the oil discoveries that made Indonesia an important oil exporter. Oil revenues provided the government with a huge revenue base, eased BOP pressures that had been a persistent feature in previous times, and enabled the government to undertake large-scale expenditure on infrastructure investments as well as support expansion of import-competing manufacturing industries, which were often dominated by politically favored private interests. Trade liberalization was discouraged as Dutch Disease effects from the oil boom generated political pressure for protection of these import-competing industries as well as the more traditional
export sectors, resulting in an escalation of trade barriers. The availability of oil funds also meant there was less need for reliance on foreign investments. Restrictions on FDI increased beginning the mid-1970s and further tightened in 1982–1986 (Fane 1999, Hill 1988). Though exchange controls were removed in the early 1970s, the highly regulated domestic financial system limited integration with the global capital market.

A. Trade, Investment, and Financial Sector Reforms

An important shift in Indonesian trade and investment policies occurred around the mid-1980s. In early 1985, some major trade reforms reduced average tariffs by around a third and set in motion a process that continued over the following years. This opened up the trade regime substantially, though such liberalization had been quite discriminatory as “business ventures connected with the President’s family or associates received some spectacular privileges” (Fane 1999, 660). The reform process broadened with the sharp fall of oil prices in 1986 when the government recognized the need for foreign investment to maintain growth momentum and started to open up most sectors of the economy to FDI (except for traditional handicrafts). There were also important financial sector deregulation measures in 1988 that eased domestic and international market integration.

In the context of a stable exchange rate, a conservative fiscal stance, and what appeared to be a very stable authoritarian pro-western government, these reforms facilitated a continuation of rapid economic growth from the late 1980s until 1997, when it was interrupted dramatically by the Asian financial crisis (Figure 1). Between 1989 and 1996, Indonesia was one of the region’s fastest growing economies, with average annual growth of 7.2%, relatively low inflation (below 10%), and unemployment below 5%. Per-capita GDP had risen from $596 in 1990 to $1,155 in 1996 (Goeltom 2008). Figure 1. Indonesia Annual GDP Growth, 1981–2009

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3See Warr (1986) for an analysis of Indonesia’s Dutch Disease.
4See Fane (1999) for a discussion of the reform process.
Indonesian authorities were generally able to exercise a significant degree of monetary policy independence despite having a fixed exchange rate and virtually open capital account in the 1970s and 1980s. This was only possible in practice because the domestic financial market was only weakly integrated to global markets. Domestic market regulations and imperfections meant that capital movements were dominated by government borrowings and FDI. This started to change from the late 1980s however when private capital flows, often unrecorded and nontransparent, started to increase. Such inflows, which included large-scale foreign borrowings by the Indonesian corporate sector, began to play a larger role by the 1990s (Grenville 2004).

Indonesia shifted from a positive list to a negative list for FDI in 1989. This list was shortened during the early 1990s further expanding the sectors open to foreign investment. Private capital movements sensitive to interest differentials tended to increase beginning the late 1980s. As domestic interest rates were typically much higher than foreign interest rates—though part of this reflected inefficiencies in the domestic financial sector—there were inducements for foreign borrowing and capital inflows, though these were tempered by expected rupiah depreciation and country risk considerations. Indonesian authorities acted to impede capital inflows and offshore commercial borrowing induced by such interest rate differentials following rapid growth of money supply in 1989 and 1990, which fueled inflation and led to the so-called shock treatment and “tight money policy” adopted beginning March 1991. Measures put in place to curb the level of short-term capital account transactions included tighter restrictions on foreign borrowings, e.g., re-imposing limits on short-term and medium-term borrowings by banks and requiring approval for foreign borrowings of investors for any project connected with state enterprises.

There were several major crises in the banking system involving bank insolvency and bank collapses between 1990 and 1992 and also problems of mismanagement, manipulation, and fraud in the Jakarta Stock Exchange. In 1993 and early 1994, Bank Indonesia (BI) vigorously attempted to sterilize large...
disturbances to base money caused by volatile capital flows that were influenced by a rapidly changing differential between domestic and foreign interest rates, shifting expectations about the future value of the rupiah (given volatility in oil prices), growing concerns over the soundness of the banking system, and a rapidly expanding stock market. BI’s net foreign assets increased by Rp5.2 trillion from October 1993 to February 1994, then fell sharply over the next three months by Rp7.3 trillion (Pangestu 1994).

BI regulations were at best poorly enforced in practice. This was certainly the case for politically favored institutions. A thriving offshore market in rupiah in Singapore enabled spot and swap transactions with international currencies such as the US dollar, affecting domestic interest rates. Such markets had been widely utilized by politically powerful corporations and individuals, and BI would have been able to exercise little or no control over them even if it wanted to. BI itself had no political independence, as the governor was appointed directly by the President. Pangestu (1994, 30) drew the following conclusion from a comparison of various data sources and the different “adjustments” made to the valuation of foreign reserves by BI: “These comparisons would appear to confirm that international capital mobility has a much stronger impact on Indonesia’s international reserves than is apparent from official figures.” At the same time, as McLeod (1993, 25) observed, measures to control short-term private capital movements and transactions were “not totally effective.”

Indonesia enjoyed a boom in FDI in 1995–1996, with a doubling of such flows over the previous year. Portfolio inflows also started to increase rapidly with foreign inflows accounting for about 70% of the trading volume of the Jakarta Stock Exchange in 1995–1996. Recognizing the limitations of monetary policy in the context of a fixed exchange rate regime and an open capital account, BI moved to widen the exchange rate band to gain some policy flexibility.

Large short-term private capital flows in the context of a weak and crisis-ridden banking system and an open capital account held the potential for a crisis in the event of a major shock. This seemed to be on the horizon as concerns about political instability emerged in the mid-1990s with rising speculation that the Suharto presidency would soon come to an end. In August 1996, Manning and Jayasuriya (1996, 11) observed that: “With a very open capital account, Indonesia can be vulnerable to destabilizing capital movements caused by changes in investor confidence, the result of actual or potential (even imaginary!) political crises.”

The crisis came in mid-1997, though the trigger was not a domestic political crisis but a financial crisis in Thailand. By July 1997, Indonesia was

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5 For a detailed discussion, see Fane (2005).
6 Almost no one envisaged at the time that a popular uprising would throw out President Suharto. The post-Suharto scenarios were generally predicated on a Suharto “retirement” at a time of his choosing.
caught up in a contagion with devastating consequences for the economy, effects of which are still being felt.

B. 1997–1998 Crisis and the Aftermath

The 1997 crisis marked a watershed in Indonesian economic and political development. Indonesia was the worst affected country among its neighbors and took the longest time to recover, but it has by and large retained a basic commitment to a liberal economic policy regime and maintained a commitment to open trade policy and a liberalized capital account. The one major change in its external economic policy brought about by the 1997 crisis had been a shift to a floating exchange rate regime (albeit with substantial interventions) from the previous fixed exchange rate regime where the currency was effectively pegged to the US dollar.

In the immediate aftermath, Indonesia had to battle persistent political and economic instability, as it attempted to restore battered financial and banking systems, recover investor confidence, and regain growth momentum. Until 2004, Indonesian macroeconomic policies were tightly constrained by agreements with the IMF. Until the second half of the decade, it experienced persistent capital outflows, inflationary pressures, downward pressure on the exchange rate, and high exchange rate volatility. The situation started to change from the second half of the decade, as Indonesia began to reap the rewards of the transition to a functioning democracy that re-established financial and banking institutions and began a slow but steady economic recovery. The economy proved to be surprisingly resilient when confronted by the global financial crisis of 2008. It has been growing strongly since 2009 and even grappling with surging capital inflows. Although managing such flows poses complex problems, this represents a welcome change from the many years of persistent capital outflow pressures that characterized the post-1997 crisis period.

The 1997 crisis had been triggered by massive capital flight and led to the floating of the rupiah in August that year, in turn leading to further capital flight and rapid currency depreciation. High interest rates failed to arrest capital flight but contributed to a banking crisis and liquidity squeeze. We will not discuss the causes and consequences of the 1997–1998 crisis in any detail, as there is a huge and well known literature on this topic with continuing debates about the factors that contributed to the financial crisis becoming transformed into a catastrophic economic collapse.

We note several crisis-related developments of direct relevance to subsequent macroeconomic policy developments, all relating to a series of agreements contained in IMF Letters of Intent (LOIs). First, Indonesia did not follow its neighbor Malaysia in imposing capital controls to stem capital flight but instead maintained an open capital account. However, it did issue a regulation to
restrict indirect lending by onshore banks to nonresidents through the swap market. Second, Indonesia shifted from a dollar-pegged fixed rate and undertook the “orthodox” IMF policy prescription of floating the exchange rate, allowing authorities to use market-based monetary policy instruments (i.e., interest rate policies). (In practice, the shift to a floating exchange rate regime did not imply a free float as the exchange rate, particularly the US dollar–rupiah rate, became a very politically sensitive indicator of the underlying health of the economy and investor confidence). Third, as part of a comprehensive institutional restructuring, Indonesia enacted legislation to establish the independence of BI, thus creating some unexpected problems in the early post-Suharto years. Fourth, Indonesian macroeconomic policies were quietly and tightly constrained by the IMF LOIs until the end of 2003. These included targeting base money as a key plank of BI monetary policy with the objective of controlling inflation.

The debate over the IMF-supported policy responses to the Indonesia crisis, including the opposition to any form of capital controls, continues to this day. Reportedly, Indonesian authorities seriously considered some form of capital control in early 1998 as the rupiah continued to slide. The government, however, backed off under intense pressure from the IMF. In June 2000, the Indonesian officials again considered controls to stabilize the rupiah but were compelled to reject such a measure under direct pressure from the IMF.7

On the other hand, as can be seen in Appendix A, the desire to attract FDI (not only to traditional economic sectors such as plantations but also to the banking sector which was in dire need of recapitalization) led to a series of measures in 1998 and 1999 that further relaxed or removed regulations hindering the inward flow of FDI. By 2000, Indonesia was much more open to FDI than prior to the crisis, though this did not succeed in inducing significant inflows. Instead, net private investment flows of all types continued to be negative.

C. Early Post-Crisis Period: Persistent Capital Outflow Pressures

The early post-crisis years were characterized by continuing political instability, persistent net private capital outflows (both portfolio and FDI), inflationary pressures, and exchange rate volatility. The importance of the level of the nominal ($/Rps) exchange rate as a confidence factor meant that frequent BI interventions were necessary to maintain the level within “acceptable” bounds. As

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7The following was reported in The New York Times (06 June 2000): “The IMF’s chief, Horst Kohler, emerged from a breakfast meeting with President Abdurrahman Wahid and briskly dispelled speculation that the IMF would agree to an Indonesian effort to defend its faltering currency, the rupiah, by placing controls on the currency. ‘The president and I fully agreed that the introduction of capital controls would be counterproductive,’ said Mr. Kohler, who was making his first visit to Jakarta as IMF director. ‘He feels that it would be the wrong decision, and I agree, because such a decision would deter foreign investors.’ Later in the day, a senior economic adviser to President Wahid, Sofyan Wanandi, said: ‘It’s over. It’s not going to happen.’” (http://www.nytimes.com/2000/06/06/business/international-business-imf-warns-indonesia-against-capital-controls.html).
mentioned in the previous section, capital controls were effectively ruled out under IMF pressure.

Figure 2. Capital Flows in Indonesia: 1994–2010 (Bank Indonesia)

In early January 2001, BI announced one of the few capital control measures enacted since the crisis. “On 15 January 2001, Bank Indonesia surprised the business community in Indonesia and Singapore by announcing a complex regulation to curb the supply of rupiah to foreigners and offshore accounts. Rupiah transactions with foreigners or Indians permanently residing overseas were prohibited, and allowable forward currency transactions and bank positions were reduced from $5 million to $3 million, except for investment hedging. Parties were allowed until 7 February to settle outstanding positions. The rationale was to restrict speculation against the rupiah. Some speculation had been occurring because the very low foreign currency spreads in Singapore enabled anyone with substantial rupiah deposits to make money by forward swaps against small day-to-day movements in the rupiah” (Dick 2001, 14). However, while this created initial consternation among the investors, there was no evidence that the measure was strictly enforced or that it had any major impact. It had been announced during the last period of the outgoing government in the midst of considerable political instability and uncertainty.

Writing in mid-2001, after the election of a new government, Pangestu and Goeltom (2001, 15) emphasized the continuing pressure on the rupiah in this context of fragile confidence, high inflation, and open capital account: “Moreover, holding rupiah is currently unattractive, since the covered interest rate differential is negative, that is, the swap premium is so high as to more than offset the differential between rupiah and foreign currency interest rates. On the supply side this is evident also in a reluctance on the part of exporters to convert their revenues to rupiah.” Though political pressures against raising domestic interest rates reduced room for maneuverability and capital control measures would have appeared attractive, such instruments were not considered as the IMF grip on domestic policymaking remained very strong (though the government repeatedly
failed to meet many targets) while the new Megawati government had been keen to regain IMF trust.

D. Regulations on Commercial Banks’ Net Open Positions as a Capital Control Measure

Though Indonesia signed another LOI with the IMF in March 2003, a nationalist reaction was developing against perceived over-reliance on IMF policies which had served the country poorly (MacIntyre and Resosudarmo 2003). Inflationary pressures had been contained while the rate of private capital outflows had decelerated, but investor sentiment remained volatile, banking sector problems persisted, and the currency continued to be under pressure. In July 2003, BI issued a regulation on net open positions of commercial banks that obliged the latter to maintain a net foreign currency position on an overall basis (i.e., on-balance and off-balance sheet) up to a maximum of 20% of bank capital. However, the impact of this measure on commercial banks’ ability to engage in foreign currency transactions was limited as they were able to use swap markets to get around the intent of the regulation.8

These conditions continued through 2004 when the currency again started to slide rapidly, prompting BI to attempt to restrain “currency speculation.”9 In May 2004, it was reported that the BI governor had written to four foreign banks warning them to refrain from speculating against the rupiah (Jakarta Times 14 May 2004). These were followed later in the year by the rupiah stabilization policy package of June 2004. The new prudential regulations on net open foreign exchange positions of commercial banks substantially hindered their ability to trade in the swap market (Fane 2005). In its Economic Report on Indonesia 2004, BI presented data on volume of swap transactions and rupiah volatility following this measure to demonstrate that these measures achieved some success in increasing the depth (liquidity) of the spot market and reducing its volatility and also boosted domestic interbank swap transactions helping to deepen the foreign currency market.

When the global financial crisis erupted in the second half of 2008, deteriorating export prospects and changing risk perceptions placed renewed pressure on the rupiah and the currency traded down to Rp12,000 per US dollar. As part of its policy response, after initial steps taken to increase access to foreign currency, BI implemented restrictions on “speculative transactions,” apprehensive of further destabilizing capital outflows. By 2009, however, it was facing a very different problem.

8See Fane (2005) for a detailed discussion of this issue. 9According to BI’s Economic Report on Indonesia 2004, “depreciation pressures on the rupiah reached a peak in early May 2004, as short-term foreign capital outflows surged and expectations of further weakening prompted foreign currency purchases by domestic players (a bandwagon effect).”
E. Coping with Short-Term Capital Inflows: 2009–2011

After the initial shock, the Indonesian economy rebounded and proved surprisingly resilient, registering solid economic growth throughout 2009. As with other parts of Asia, Indonesia now became an attractive destination for global investors looking for profitable investment opportunities. In 2009, large inflows of portfolio capital drove the Indonesian stock market up 87%. After battling downward pressures on the currency for many years after the 1997–1998 crisis, Indonesia now found itself having to cope with surging capital inflows and real exchange rate appreciation. The issue of capital controls resurfaced but this time because of concerns about excessive short-term inflows. Some new control measures, primarily prudential regulations directed at impeding short-term interest arbitrage transactions (mainly swap transactions) and shifting inflows into longer maturity assets were put in place. An interesting new development is that private international investors moved into purchases of government bonds and BI securities, adding a volatile new element and complicating attempts at stabilizing short-term capital flows. The policy response included offer of longer maturity securities, minimum holding periods, and nontradable deposits. As capital flows have been subject to frequent external shocks, it is difficult at this stage to isolate and assess the impact of these policy measures.

III. CAPITAL CONTROL INDICES

We used information on changes to capital account restrictions from published material from the Bank of Indonesia as well as the IMF’s Annual Report on Exchange Arrangements and Exchange Restrictions and constructed capital restriction indexes following the methodology outlined in Schindler (2009) as elaborated in Jongwanich, Gochoco-Bautista, and Lee (2011). In this procedure, capital restriction measures are first divided into two categories, those affecting net capital inflows (liabilities) and those affecting net capital outflows (assets). Within these two categories, the flows are further disaggregated into four types: FDI, equity securities, debt securities, and other investment flows.

The capital control indices 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, whether 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 at between 0 and 2—the higher the weight, the more severe the measure, especially from policymakers’ point of view. For example, a measure designed to directly relax or block capital flows greater than $50 million is given a weight of 2; if the flow is less than $5 million, the weight assigned is
0.5. In addition, a weight of 0.25–0.5 is given when the central bank changes the regulation slightly, seeks the cooperation of, or provides a particular option for investors, including financial institutions. The weight is increased to 1 when the central bank requests and/or requires investors or financial institutions to undertake certain measures. A weight of 2 is assigned when the central bank imposes a tax, unremunerated reserve requirements (URR), a two-tier market, or lifts certain policy measures.

Once a number (+1 or −1) and weight have been assigned to each measure, the numbers are sequentially accumulated over time to arrive at the indexes for each asset class. The indexes are rescaled to lie between 0 and 100 to be able to compare them with Schindler (2009) so that 100 represents capital restrictions and 0 represents capital liberalization. The capital restriction indexes are constructed based on monthly information and the simple average over 3 months is calculated to generate quarterly indexes.

A chronology and description of capital restriction and liberalization measures adopted in Indonesia during 1990–2010 is given in Appendix A. Due to data limitations, we constructed three capital restriction indexes: total flows, FDI, and “other flows” drawing on both published material and on the judgments of several Indonesian analysts familiar with BI activities in assigning weights to particular measures. The last category consists of private short-term capital flows dominated by portfolio type flows. The indexes are presented in Figure 3.

Figure 3. Capital Restriction Indexes
(An increase in the index number indicates tighter capital controls)
IV. AN SVAR MODEL OF CAPITAL CONTROL

To assess the effectiveness of capital control measures in Indonesia, we set up the following SVAR model and organize the contemporaneous structural macroeconomic relationships in a recursive fashion:

$$\Gamma_0 X_t = \mu + \Phi D_t + \sum_{i=1}^{p} \Gamma_i X_{t-i} + \sum_{j=0}^{q} \Lambda_j Z_{t-j} + \varepsilon_t$$

where $$X_t = (y_t, r_{rt}, q_t, c_f, c_i)$$ is the endogenous variable vector, where $$y_t$$ represents real output, $$r_{rt}$$ denotes the differential between domestic and foreign real interest rates, $$q_t$$ represents the real exchange rate defined as the foreign goods cost of one unit of domestic goods (i.e., a rise in the value of $$q_t$$ represents real appreciation), $$c_f$$ denotes capital flows (we consider measures of net aggregate inflows and outflows), and $$c_i$$ denotes the capital restriction index (which is constructed separately for inflow restrictions and outflow restrictions). The contemporaneous recursive structure is summarized in the matrix $$\Gamma_0$$ as follows (with zeros above the diagonal suppressed):

$$\Gamma_0 X_t = \begin{bmatrix} 1 \\ * & 1 \\ * & * & 1 \\ * & * & * & 1 \end{bmatrix} \begin{bmatrix} y_t \\ r_{rt} \\ q_t \\ c_f \\ c_i \end{bmatrix}$$

where an asterisk indicates that the variable is present in the equation. We assume that real output reacts to the fluctuations of other macroeconomic variables in the system with a lag due to the time required to adjust for production cost and schedule in the goods market. Hence, $$y_t$$ is placed first in the recursive ordering. The real interest rate differential ($$r_{rt}$$) is taken to approximate the monetary policy stance in the domestic economy and is assumed to respond to contemporaneous movements in output. The real exchange rate ($$q_t$$) and capital flows ($$c_f$$) are treated as financial variables in the system. Capital flows are ordered after the real exchange rate on the basis that movements of international capital are sensitive to real exchange rate fluctuations, directions and changes in the real interest rate differential, and the level of economic activity.

Though Indonesia did not resort to capital controls during the period of massive capital flight in the 1997–1998 crisis due to IMF pressure, our discussion of the historical evolution of capital controls in Indonesia supports Edwards (1999a), who argued that in most emerging market economies the extent and coverage of capital control measures have been adjusted in response to changes in
the magnitude of capital flows. Hence we place the capital restriction index variable \( (ci) \) last in the recursive system to reflect this endogeneity.\(^{12}\)

A constant \( (\mu) \) is included in each endogenous variable equation. In the deterministic variable vector, three seasonal dummies and a dummy variable that covers the period of the Asian financial crisis (Q3 1997 to Q4 1998) are included in \( D_t \).\(^{13}\) Given that Indonesia is a small open economy, we include two foreign variables to capture the interaction between the domestic and world economies. These enter into the SVAR system as exogenous variables, \( Z_t = \left( y^*_t, sp^*_t \right) \), where \( y^*_t \) represents foreign real output and \( sp^*_t \) the foreign real share price index.

To complete the description of the SVAR model, the structural disturbances, \( \varepsilon_t = \left( \varepsilon^v_t, \varepsilon^s_t, \varepsilon^g_t, \varepsilon^{df}_t, \varepsilon^{ci}_t \right) \), are assumed to be white noise processes.

**V. DATA AND EMPIRICAL RESULTS**

In estimating and using the model to study the impact of capital restriction measures in Indonesia, we were conscious of the severe data problems relating to capital flows in Indonesia, particularly for the pre-2000 period. As Mcleod (1993), Pangestu (1994), Hill (2000), and many others have pointed out, the capital flow statistics provided by BI, particularly short-term capital flows and private foreign debt, are extremely unreliable and inaccurate. Many “hot money” flows were not reported at all in the official statistics, and there are huge discrepancies between the rupiah values of foreign reserves reported in BI’s balance sheet and the dollar values reported in *Indonesian Financial Statistics*. It is widely believed that BI deliberately misrepresented the true value of reserves because of concerns about the possibility of large scale capital flight.\(^{14}\) Further, BI had poor administrative capacity for effective monitoring and supervision of the banking sector and political considerations precluded closer monitoring of the activities of politically well-connected financial institutions and banks.\(^{15}\) Some of these limitations also apply to IMF data, particularly to data on capital flows.

The data we use are quarterly and range from Q1 1991 to Q3 2010. The financial data are obtained primarily from the International Financial Statistics (IFS) database to ensure consistency except for the capital restriction index which

\(^{12}\)We also considered the placement of the capital restriction index variable first in the recursive ordering as in Edwards (1999a) for the purpose of generating a contemporaneously exogenous policy shock on the rest of the macroeconomic variables in the system. This alternative decomposition scheme is not reported as the results did not generate sensible impulse response functions.

\(^{13}\)The inclusion of the seasonal dummies intends to deal with potential seasonal effects as we use seasonally unadjusted data (e.g., Indonesian manufacturing output).

\(^{14}\)Mari Pangestu (1994, 31), currently Indonesia’s minister for trade, noted that “the figure for ‘errors and omissions’ in the 1993–1994 BOP was of a similar size to that of the recorded current account deficit!”

\(^{15}\)Hill (2000, 91), for example, points to the “implausibility” of BI data that indicates no significant increase in Indonesia’s short-term debt during 1991–1995.
we constructed and the real effective exchange rate which we extracted from the World Bank database. For real output, we estimate the SVAR model using real manufacturing output (from IFS data) and real GDP data (obtained from BI sources) for comparison. The differential between domestic and foreign real interest rates is computed in two ways: the first is the difference between the Indonesian central bank policy rate and the US federal funds rate (labeled as the real policy rate differential in the impulse response analysis) and the other is the difference between the Indonesian money market rate and the US Treasury bond rate (labeled as the real interest rate differential). The real interest rate is the nominal rate less the inflation rate, i.e., $r_t = \hat{I}_t - \pi_{t+1}$, where inflation is calculated as the annual change in the log of the CPI.16

Since the capital control measures implemented by BI aimed at either influencing capital inflows or outflows (see Appendix A for the description of the capital control measures implemented during the sample period), we consider the effectiveness of capital restrictions on the two types of flows. That is, we examine the impact of tighter capital inflow restriction on the aggregate level of net inflows and the impact of tighter capital outflow restriction on the aggregate level of net outflows. We further examine the effectiveness of capital controls on the three types of flows, i.e., FDI, portfolio investment, and “other investment”.17 All of the capital flow measures are expressed as percentages of GDP for estimation. For foreign variables that proxy the global influences on the Indonesian economy, we use US real GDP and the US real share price index (Figure 4).

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16 We also tried current inflation and inflation lagged one period but found that this specification gives the most sensible impulse response functions, suggesting that inflationary dynamics in Indonesia may be forward-looking.

17 We could not compute the dynamic response of portfolio investment outflow with respect to tighter outflow restriction because there are only 28 observations available for this outflow category (from Q1 2004 to Q3 2010).
Figure 4. Other Primary Macroeconomic Variables

A. Diagnostics of the Reduced-Form VAR

The examination of the SVAR model through impulse response functions is preceded by performing a battery of diagnostic tests to check the statistical adequacy of the reduced form (Spanos 1990).

The benchmark specification uses manufacturing output for $y_t$, total net capital inflow (as a ratio to GDP) for $cf_t$, and the capital inflow restriction index for $ci_t$. For $rr_t$, we use both the real policy rate differential and the real interest rate differential for comparison purposes. We use the benchmark specification and its impulse response analysis with manufacturing output in the model estimated for
the entire period because when we used the real GDP data to estimate the SVAR model we obtained explosive dynamic responses of real output to various macroeconomic shocks in the system.\textsuperscript{18} We note here that quarterly GDP data come from constructed series and are subject to the limitations inherent in such series. As will be seen later, we do not encounter this problem when the model is estimated for the post-2000 period.

The lag orders of the endogenous and exogenous variables are allowed to differ.\textsuperscript{19} The dynamic structure used for estimation is three lags of the endogenous variables and one lag of the exogenous variables.\textsuperscript{20} The results of the diagnostic tests on the reduced-form benchmark VAR(3,1) are reported in Table 1a. These residual diagnostic tests cannot reject the null hypotheses of no serial correlation and the absence of ARCH effects at the 5\% significance level except for the presence of ARCH effects in the capital flow equation. Apart from the output equation, non-normality is detected in the remaining equations (but not for the real exchange rate equation when real interest rate differential is used). When the results are assessed together, there is general support for the statistical adequacy of the model.\textsuperscript{21}

Table 1a. \textbf{Reduced-form Diagnostics on the Aggregate Inflow VAR} \\
(\textit{rr} = \textit{real policy rate differential})

<table>
<thead>
<tr>
<th></th>
<th>(y_t)</th>
<th>(rr_t)</th>
<th>(qt)</th>
<th>(cf_t)</th>
<th>(ci_t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q(1)</td>
<td>0.42</td>
<td>1.23</td>
<td>0.82</td>
<td>2.97</td>
<td>2.38</td>
</tr>
<tr>
<td>(0.52)</td>
<td>(0.27)</td>
<td>(0.37)</td>
<td>(0.09)</td>
<td>(0.12)</td>
<td></td>
</tr>
<tr>
<td>Q(3)</td>
<td>4.79</td>
<td>6.43</td>
<td>1.60</td>
<td>4.08</td>
<td>6.38</td>
</tr>
<tr>
<td>(0.19)</td>
<td>(0.09)</td>
<td>(0.66)</td>
<td>(0.25)</td>
<td>(0.09)</td>
<td></td>
</tr>
<tr>
<td>ARCH(3)</td>
<td>3.57</td>
<td>0.96</td>
<td>8.00</td>
<td>27.1</td>
<td>0.56</td>
</tr>
<tr>
<td>(0.31)</td>
<td>(0.81)</td>
<td>(0.05)</td>
<td>(0.00)</td>
<td>(0.90)</td>
<td></td>
</tr>
<tr>
<td>J-B</td>
<td>0.34</td>
<td>11.3</td>
<td>76.7</td>
<td>154</td>
<td>1568</td>
</tr>
<tr>
<td>(0.84)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ calculations.

\textsuperscript{18} Hence when we refer to “output” in the following discussions, we mean “manufacturing output.”

\textsuperscript{19} Keating (2000) termed this approach ‘asymmetric VAR’ which permits greater flexibility in specifying the dynamics.

\textsuperscript{20} Given the quarterly data and its relatively small sample size, the upper bound was initially set at 4 lags for both the endogenous and exogenous variables. The Akaike information criterion selected VAR(1,1). However, we tested further to seek a specification that better captures the dynamics of the multivariate system. Using the likelihood ratio test where the null is VAR(1,1) against the alternative of VAR(3,1), the test statistic is \(\chi^2(50) = 100.8\) with p-value = 0.00, hence the test rejects the null in support of the alternative hypothesis.

\textsuperscript{21} Based on Bayesian inference, our estimation procedure without differencing is valid given our computation method for confidence intervals, though it is generally the case that the order of integration of the variables in the VAR system should be checked and variables transformed as appropriate to explore potential long-run cointegrating relationships that may emerge from I(1) variables. We thank Professor Soyoung Kim for clarifying this point.
Table 1b. Reduced-form Diagnostics on the Aggregate Inflow VAR

\( (rr_t = \text{real interest rate differential}) \)

<table>
<thead>
<tr>
<th></th>
<th>( y_t )</th>
<th>( rr_t )</th>
<th>( q_t )</th>
<th>( cf_t )</th>
<th>( ci_t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q(1)</td>
<td>0.06</td>
<td>0.19</td>
<td>0.14</td>
<td>0.02</td>
<td>3.27</td>
</tr>
<tr>
<td></td>
<td>(0.80)</td>
<td>(0.66)</td>
<td>(0.71)</td>
<td>(0.89)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>Q(3)</td>
<td>3.76</td>
<td>1.42</td>
<td>0.55</td>
<td>0.39</td>
<td>5.93</td>
</tr>
<tr>
<td></td>
<td>(0.29)</td>
<td>(0.70)</td>
<td>(0.91)</td>
<td>(0.94)</td>
<td>(0.12)</td>
</tr>
<tr>
<td>ARCH(3)</td>
<td>1.23</td>
<td>0.46</td>
<td>5.55</td>
<td>12.3</td>
<td>3.09</td>
</tr>
<tr>
<td></td>
<td>(0.75)</td>
<td>(0.93)</td>
<td>(0.14)</td>
<td>(0.00)</td>
<td>(0.38)</td>
</tr>
<tr>
<td>J-B</td>
<td>0.15</td>
<td>94.1</td>
<td>2.96</td>
<td>1.83</td>
<td>1600</td>
</tr>
<tr>
<td></td>
<td>(0.93)</td>
<td>(0.00)</td>
<td>(0.23)</td>
<td>(0.40)</td>
<td>(0.00)</td>
</tr>
</tbody>
</table>

Note: P-values are reported in parentheses for the diagnostic tests. The univariate tests are the JB test statistic that conducts the Jarque-Bera test for non-normality, ARCH(3) gives the F-test statistic for heteroscedasticity with 3 lags, and Q(1) and Q(3) are the Ljung-Box tests based on serial correlation with 1 and 3 lags, respectively.

Source: Authors’ calculation.

B. Impulse Response Functions

Given the recursive identifying assumptions (2) imposed on the SVAR model, we examine the dynamic responses of the macroeconomic variables subject to five structural shocks, i.e., real output, real rate differential (policy rate and market rate differentials), real exchange rate, capital flow (the nature of the shock depends on the definition), and capital restriction shocks (either restrictions on inflows or restrictions on outflows). The impulse response functions are reported in Figures 5–9 with 90% confidence intervals.

All responses show mean-reversion which reflects the stationary properties of the SVAR model. The estimated dynamic responses based on the real market rate differential exhibit greater cyclical variations. The impulse response functions of the first four structural shocks allow us to analyze the macroeconomic dynamic behavior of the estimated SVAR model. The impulse response functions associated with the capital restriction shocks (shown in the next section), which can be regarded as the monetary authority imposing tighter controls on inward or outward capital movements, meanwhile allow us to assess policy effectiveness of capital control measures.

Figure 5 presents the impulse responses after a one-standard-deviation real output shock. The increase in the level of real economic activity leads to a rise in the real interest rate differential in favor of the domestic interest rate, the real exchange rate appreciates, and there is a surge in the capital inflow upon impact. After two quarters, the upward pressure from the domestic interest rate eases and the real exchange rate depreciates. As a result, the initial capital inflow is reversed before experiencing a few quarters of a small rebound, while the positive effect on output gradually dissipates.
Dynamic Responses to One S.D. Manufacturing Output Shock

Figure 5a. Real Policy Rate Differential = Indonesian Policy Rate – Federal Funds Rate

Source: Authors’ calculation.
Figure 5b. **Real Interest Rate Differential = Indonesian Money Market Rate – US Treasury Bond Rate**

Figure 6 presents the impulse responses to a positive shock to the real interest rate differential, which can be thought of as (approximating) monetary tightening in the domestic economy that initially contributes to an appreciation in the real exchange rate. We observe an impact real depreciation when using real market rate differential (though this is not significant given that the confidence interval contains the value zero) and a surge in capital inflows. Real output rises with a lag due to the increase in capital inflows. The boost in output lasts for two quarters before the effects from the monetary tightening (and also the real appreciation) lead to output contraction.
Dynamic Responses to One S.D. Real Interest Rate Differential Shock

Figure 6a. Real Policy Rate Differential = Indonesian Policy Rate – Federal Funds Rate

Source: Authors’ calculation.
In Figure 7, a positive shock to the real exchange rate (a real appreciation shock) leads to higher capital flow into the domestic economy. As a result, the level of real output picks up with a lag. The real interest rate differential rises as domestic monetary conditions become tighter. After two quarters, the domestic real interest rate declines. The real exchange rate depreciates and returns to the equilibrium level. Capital inflows fall quickly in the short run after the initial rise and stabilize around equilibrium in quarter 10. Real output reaches its maximum in quarter 3 and takes a long time to return to equilibrium.

The effects of a positive capital inflow shock are shown in Figure 8. The dynamic responses are similar to those discussed for the real exchange rate shock. Over time, all cyclical fluctuations gradually disappear as the effect of the inflow
shock peters out. We also observe that the real economy requires more time to return to equilibrium than the financial markets.

**Dynamic Responses to One S.D. Real Exchange Rate Shock**

Figure 7a. **Real Policy Rate Differential = Indonesian Policy Rate – Federal Funds Rate**

Source: Authors’ calculation.
Figure 7b. **Real Interest Rate Differential** = Indonesian Money Market Rate – US Treasury Bond Rate

Source: Authors’ calculation.
Dynamic Responses to One S.D. Aggregate Inflow Shock

Figure 8a. Real Policy Rate Differential = Indonesian Policy Rate – Federal Funds Rate

Source: Authors’ calculation.
VI. DYNAMIC RESPONSES TO CAPITAL RESTRICTION SHOCKS

We now use the model to explore the main issue of interest in this study and examine the dynamic responses of capital flows to shocks to capital restriction indexes.

A. Capital Inflow Restriction Shocks

Figure 9 summarizes the dynamic responses to a one-standard-deviation shock to the capital inflow restriction index (i.e., more stringent controls on capital inflows into the domestic economy). We observe that tighter controls are
able to reduce the level of net inflows with the maximum effect at quarter 2. The negative impact on the inflows remains for some time before settling back to equilibrium at quarter 10. In the short run, there is output contraction although output expands again after two quarters of decline (in contrast the real market rate differential result suggests a slight pickup). The real interest rate differential rises as the lower net capital inflows lead to tighter domestic monetary conditions. There is persistent real depreciation in the short run which helps real output move towards a quick recovery from the initial slump in the goods market.

**Dynamic Responses to One S.D. Inflow Restriction Shock**

Figure 9a. Real Policy Rate Differential = Indonesian Policy Rate – Federal Funds Rate

Source: Authors’ calculation.
In examining the effectiveness of higher capital restrictions on the disaggregated measures of the inflows (Figure 10), tighter capital controls are shown to reduce inflows of FDI, portfolio investment, and other investment in the short run. Comparing the dynamic effects of the capital inflow restriction shocks on the three measures, FDI shows the largest reduction in level, while other investment inflows take the longest to return to equilibrium. In contrast, the impulse response function of portfolio inflows suggests that harsh capital control regulation is ineffective, as we observe a (small) rise in portfolio inflows straight after the implementation of the policy. However, this is followed by a series of interchanging rises and falls in the level of portfolio inflows with the maximum decline taking place immediately after the initial rise. Reflecting the speculative
nature of the portfolio movements, this capital flow experiences the smallest fall in the short run compared to the other two inflow categories and requires the least amount of time to complete the cyclical adjustment following the restriction shock.

**Dynamic Responses to One S.D. Inflow Restriction Shock**
(capital inflow = FDI, portfolio, and other investment)

Figure 10a. **Real Policy Rate Differential = Indonesian Policy Rate – Federal Funds Rate**

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- Manufacturing Output
- Real Exchange Rate
- Real Policy Rate Differential
- Capital Inflows

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B. Capital Outflow Restriction Shocks

Would we observe similar impacts if the central bank imposed restrictive measures on capital outflows? A SVAR model is estimated where we use the total net capital outflow (as a ratio to GDP) for $c_f$, and the capital outflow restriction index for $c_i$. Because of limited data observations for the three outflow measures that we use in estimation, i.e., the aggregate, FDI, and other investment outflows, the lag order for the outflow SVAR model is unity for the endogenous variables and the exogenous variables as chosen by the Akaike information criterion. The reduced-form diagnostics are presented in Table 2.
Table 2a. Reduced-form Diagnostics on the Aggregate Outflow VAR
\((rr_t = \text{real policy rate differential})\)

<table>
<thead>
<tr>
<th></th>
<th>(y_t)</th>
<th>(rr_t)</th>
<th>(q_t)</th>
<th>(cf_t)</th>
<th>(ci_t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Q(1))</td>
<td>2.07</td>
<td>0.04</td>
<td>0.05</td>
<td>0.30</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(0.84)</td>
<td>(0.82)</td>
<td>(0.60)</td>
<td>(0.32)</td>
</tr>
<tr>
<td>(ARCH(1))</td>
<td>0.10</td>
<td>1.01</td>
<td>0.05</td>
<td>0.17</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>(0.76)</td>
<td>(0.31)</td>
<td>(0.82)</td>
<td>(0.68)</td>
<td>(0.63)</td>
</tr>
<tr>
<td>(JB)</td>
<td>0.81</td>
<td>6.75</td>
<td>71.1</td>
<td>146</td>
<td>15.3</td>
</tr>
<tr>
<td></td>
<td>(0.67)</td>
<td>(0.03)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
</tbody>
</table>

Table 2b. Reduced-form Diagnostics on the Aggregate Outflow VAR
\((rr_t = \text{real interest rate differential})\)

<table>
<thead>
<tr>
<th></th>
<th>(y_t)</th>
<th>(rr_t)</th>
<th>(q_t)</th>
<th>(cf_t)</th>
<th>(ci_t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Q(1))</td>
<td>1.95</td>
<td>0.79</td>
<td>0.26</td>
<td>0.00</td>
<td>1.38</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.37)</td>
<td>(0.61)</td>
<td>(0.98)</td>
<td>(0.24)</td>
</tr>
<tr>
<td>(ARCH(1))</td>
<td>0.15</td>
<td>0.05</td>
<td>0.00</td>
<td>0.32</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>(0.70)</td>
<td>(0.82)</td>
<td>(0.97)</td>
<td>(0.57)</td>
<td>(0.60)</td>
</tr>
<tr>
<td>(JB)</td>
<td>0.92</td>
<td>59.1</td>
<td>63.8</td>
<td>173</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td>(0.63)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
</tbody>
</table>

Note: P-values are reported in parentheses for the diagnostic tests. The univariate tests are the JB test statistic that conducts the Jarque-Bera test for non-normality, ARCH(1) gives the F-test statistic for heteroscedasticity with 1 lag, and Q(1) is the Ljung-Box test based on serial correlation with 1 lag. Source: Authors’ calculation.

The dynamic responses of the three outflow categories to an outflow restriction are presented in Figure 11. A more stringent control is effective in reducing the level of the aggregate and FDI outflows where the negative impact lasts for three quarters. However, the same policy measure is not effective in dampening other investments as we observe a short-run rise in the level of flows. For the other macroeconomic variables, following the outflow restriction shock, real output rises responding to the negative net outflows. As a result, the domestic monetary stance becomes tighter which leads to a real exchange rate appreciation.
Dynamic Responses to One S.D. Outflow Restriction Shock
(capital outflow = total, FDI, and other investment)

Figure 11a. Real policy rate differential = Indonesian policy rate – Federal funds rate

Source: Authors’ calculation.
C. Robustness Checks of Capital Control Effectiveness: 2000-2010 Period

To check for robustness of our results on capital control effectiveness, we estimated the SVAR model from Q1 2000 to Q3 2010. Our earlier discussion indicates that the Indonesian economy experienced some structural and regime changes in the 1990s that culminated in the Asian financial crisis. This in turn led to a sharp change in the macroeconomic policy regime, the quality of data, and the objectives of capital control measures. Focusing on the post-crisis period does not only entail the use of more reliable data but can also provide policy insights likely to be more useful.

We use the estimation results from this period to examine if: (i) tighter controls on portfolio investments reduce the level of portfolio inflows and outflows, and (ii) more stringent restriction measures are effective against aggregate inflows and outflows (including FDI and other investments). For each set of dynamic responses shown in Figures 12–15, we compare two variations of the dynamic responses where the real output variable is either real manufacturing output or real GDP.

As shown in Figure 12, tighter controls on inflows significantly reduce the level of inward portfolio investments upon impact. However, the policy effectiveness is short-lived and lasts for only one quarter. This compares with the full-sample result where a higher capital restriction standard is ineffective in reversing the surge of portfolio inflows.

We know that the monetary authority focused more intensely on regulating portfolio flows during the 2000s. But how effective are the same capital control measures on non-portfolio investments? Figure 13 shows that subject to an inflow restriction shock, the aggregate inflow (which includes FDI and other investments) increases significantly for one quarter. This is the opposite of the full-sample result where the aggregate inflow, FDI, and other investments all decline in response to more stringent capital control measures. While a sudden surge in capital inflows may worry policymakers, closer attention is usually paid to inward portfolio movements owing to its speculative nature. Our results are consistent with the view that capital controls on portfolio investments are successful in shifting funds from short-term to longer-term markets thus reducing the level of volatility in the economy. However, the policy effects are temporary as portfolio inflows bounce right back after one quarter.

\[22\] The results are not qualitatively different when real policy rates are used to compute the differential.
Dynamic Responses to One S.D. Inflow Restriction Shock (2000Q1–2010Q3) (capital flow = portfolio inflow)

Figure 12a. Real Output = Manufacturing Output

Figure 12b. Real Output = Real GDP

Source: Authors’ calculation.
Dynamic Responses to One S.D. Inflow Restriction Shock (2000Q1–2010Q3) (capital flow = total inflow)

Figure 13a. Real Output = Manufacturing Output

Figure 13b. Real Output = Real GDP

Source: Authors’ calculation.
Turning our attention to outflow restrictions, Figures 14 and 15 show that tighter controls on outflows are able to reduce the outgoing level of portfolio and aggregate investments. Although the impulse response function for portfolio outflows when real GDP is used for output indicates that there is negative portfolio outflow, these results should be treated with caution given the small number of observations available for estimating the capital outflow SVAR. Wide confidence intervals around the point estimates of aggregate and portfolio outflow dynamic responses suggest weak policy effectiveness of capital outflow restrictions in the 2000s.

**Dynamic Responses to One S.D. Outflow Restriction Shock** (Q1 2000–Q3 2010)  
(capital flow = portfolio outflow)

Figure 14a. Real Output = Manufacturing Output

![Graphs showing dynamic responses](image-url)

- Manufacturing Output
- Real Exchange Rate
- Real Interest Rate Differential
- Portfolio Outflow

---

*90% Confidence Intervals*  
*Impulse Response Function*
Figure 14b. Real Output = Real GDP

Real GDP

Real Exchange Rate

Real Interest Rate Differential

Portfolio Outflow

--- 90% Confidence Intervals | Impulse Response Function

Source: Authors’ calculation.

Dynamic Responses to One S.D. Outflow Restriction Shock (Q1 2000–Q3 2010) (capital flow = total outflow)

Figure 15a. Real Output = Manufacturing Output

Manufacturing Output

Real Exchange Rate

Real Interest Rate Differential

Aggregate Outflow

--- 90% Confidence Intervals | Impulse Response Function

Source: Authors’ calculation.
VII. CONCLUSIONS

Indonesia has operated a liberal capital account permitting relatively free flow of international non-FDI flows since the early 1970s. Indonesian authorities have not relied on capital control measures as a principal instrument to maintain macroeconomic stability and eschewed capital controls even during the 1997 crisis despite massive capital flight. Restrictions on FDI, quite significant till the mid-1980s, have been progressively eased over time and they are no longer seen as an important policy issue. However, authorities have taken measures from time to time to discourage or restrain “destabilizing” short-term capital flows. These control measures, generally quite limited in scope (such as during the 2004–2005 period), were primarily aimed at restricting the activities of commercial banks which were the main conduits for international funds transfers and for the “internationalization of the currency.” More recently, measures directed at impeding short-term interest arbitrage transactions (mainly swap transactions) were implemented to cope with a surge in private capital inflows, part of the large private international capital inflows that started to come into emerging markets after the 2008 global financial crisis and recession. This new development where private investors are purchasing government paper and BI securities on a large scale has posed new policy issues and dilemmas.
In this paper, we have reviewed the Indonesian experience and the effectiveness of capital restrictions during 1990–2010. We estimated an SVAR model of the Indonesian economy and constructed a capital restriction index to explore the impact of policy restrictions on various types of capital flows. In doing so, we have highlighted data limitations, particularly relating to the highly unreliable official data on private capital flows prior to the 1997 crisis. Further, the Indonesian monetary policy and broader macroeconomic regime has undergone fundamental changes since the 1997 crisis. Hence, we also estimated a model separately for the 2000–2010 period, and we feel that the results based on this model are probably more reliable and policy-relevant despite the shorter time period and hence fewer data points.

There has been a general consensus in Indonesia that pre-1997 capital restriction measures targeted at commercial bank operations to limit short-term capital movements were quite ineffective for a variety of reasons. Our 1990–2010 SVAR model results are consistent with that view, suggesting that inflow and outflow restrictions are effective for FDI but largely ineffective for portfolio capital. Results from the 2000–2010 SVAR model support this basic conclusion. However, the results not only indicate that restrictions on inflows do have a short-term impact on restricting portfolio flows, they also suggest that controls on inward portfolio investments can have some success in shifting funds from short-term to longer-term markets, though the impact is again short-lived.

While we treat these findings as preliminary, they are broadly consistent with other findings in the literature and suggest a possible short-term role for capital restrictions. These results need to be further validated through a more comprehensive examination of measures impacting on capital flows, including a deeper analysis of the most recent episode of control measures.
# APPENDIX A

## Indonesian Capital Control Measures on Aggregate Inflows and Outflows 1988–2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Events</th>
<th>Assigned Weight</th>
<th>Aggregate Inward</th>
<th>Aggregate Outward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 1988</td>
<td>The legal reserve requirement for foreign currency liabilities of foreign banks was reduced from 15% to 2%. (commercial banks and other credit institutions)</td>
<td>–0.25</td>
<td>–0.25</td>
<td></td>
</tr>
<tr>
<td>Q1 1990</td>
<td>Joint-venture banks and foreign banks were permitted to open branch offices in Batan Island (export processing zone). (commercial banks and other credit institutions)</td>
<td>–0.25</td>
<td>–0.25</td>
<td></td>
</tr>
<tr>
<td>Q2 1991</td>
<td>Investment licensing requirements were liberalized. The number of activities on the negative list was reduced from 70 to 60. Domestic and foreign investors were allowed to grant licenses under pre-specified conditions (partially deregulating 31 other activities). (direct investment)</td>
<td>–0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3 1991</td>
<td>Quantitative limits were placed on offshore borrowing by banks and the government sector, including state-owned enterprises.</td>
<td>+0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 1992</td>
<td>Full foreign ownership of foreign direct investments (FDI) by nonresidents was permitted. (direct investment)</td>
<td>–1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foreign direct investments with a minimum capital of $250,000 were permitted in certain cases. (direct investment)</td>
<td>–0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foreign investors were allowed to reinvest profits in the shares of other foreign firms. (capital and money market instruments)</td>
<td>–0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 1993</td>
<td>The restriction on FDI was relaxed by reducing the number of sectors closed to foreign investment and reclassifying sectors to fall under less stringent bars. (direct investment)</td>
<td>–0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4 1993</td>
<td>Requirements on FDI, in particular on land-use rights and environmental standards, were liberalized. Divestiture requirements relaxed. (direct investment)</td>
<td>–0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3 1997</td>
<td>Forward sales of foreign currency contracts offered by domestic banks to nonresidents were limited to $5 million a bank and a customer. Such restriction not applicable to trade/investment related transactions. (derivatives and other instruments)</td>
<td>+0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foreign investors were allowed to purchase unlimited domestic (nonbanking) shares. (capital and money market instruments)</td>
<td>–0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 1998</td>
<td>All barriers to foreign investments in palm oil plantations were removed. (direct investment)</td>
<td>–0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Controls on branching by foreign banks lifted. (commercial banks and other credit institutions)</td>
<td>–0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Controls on foreign investment in retail banks were lifted. (direct investment)</td>
<td>–1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 1998</td>
<td>Controls on foreign investment in wholesale trade were lifted. (direct investment)</td>
<td>–0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period</td>
<td>Description</td>
<td>Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3 1998</td>
<td>Revised and shortened list of activities closed to foreign investors were issued. Some seasonal restrictions were removed. (direct investment)</td>
<td>-0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4 1998</td>
<td>Controls on nonresident investment in domestic banks were lifted. (direct investment)</td>
<td>-0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 1999</td>
<td>Income tax holdings for up to 8 years to newly established corporations in 22 industrial sectors were granted. (direct investment)</td>
<td>-0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The ceiling on the amount of stock foreigners may acquire in nonstrategic corporations without the approval of the company’s board of directors was raised. (capital and money market instruments)</td>
<td>-0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A takeover of nonstrategic operations by foreign investors without government approval was permitted. (direct investment)</td>
<td>-0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Equity participation of foreign banks in a joint bank was raised from 85% to 99%. (commercial banks and other credit institutions)</td>
<td>-0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 2000</td>
<td>The final phase of the transition to 20% maximum net open position went into effect. (commercial banks and other credit institutions)</td>
<td>+0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 2001</td>
<td>Resident banks were permitted from conducting the following transactions with nonresidents: lending or provision of overdrafts in rupiah or foreign currency, placing funds with nonresidents, purchase of rupiah-denominated securities issued by nonresidents, interoffice transactions in rupiah, equity participation in rupiah with nonresidents. (capital and money market institutions)</td>
<td>+0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 2003</td>
<td>Banks were obliged to maintain overall net open position (on- and off-balance sheet) maximum of 20% of capital. (capital and money market institutions)</td>
<td>+0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 2004</td>
<td>Deposit accounts in rupiah were made subject to a reserve requirement in the range of 5% to 8%, depending on the total amount of deposits; those in foreign currencies of third party funds were subject to a 3% reserve requirement. (commercial banks and other credit institutions)</td>
<td>+0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3 2004</td>
<td>Banks were obliged to maintain overall net open position (on- and off-balance sheet) maximum of 20% of capital and net open position for on balance-sheet maximum of 20% of capital in the middle and of working day. (commercial banks and other credit institutions)</td>
<td>+1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 2005</td>
<td>Short-term borrowings by banks were limited to 20% of bank capital. Long-term borrowings (maturity of over one year) by banks required approval by BI. (commercial banks and other credit institutions)</td>
<td>+0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Banks were required to observe a daily limit on short term offshore loan (STOL) balances of 30% of capital, excluding loan balances arising from STOLs from controlling shareholders for liquidity support, operating funds of a foreign bank branch in Indonesia of up to 100% of declared operating funds, current and saving accounts and time deposits held by foreign country</td>
<td>+0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
<td>Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 2005</td>
<td>The limit on forward and swap transactions of banks with nonresidents without an underlying investment-related transaction was reduced from $3 million to $1 million. (commercial banks and other credit institutions)</td>
<td>+0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4 2008</td>
<td>Restrictions on buying of foreign exchange against rupiah above $100,000 for nonspeculative activities and some related restrictive measures on purchase of particular “structured products.”</td>
<td>+0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4 2010</td>
<td>One month holding period for Bank Indonesia certificates (SBI). (portfolio investments)</td>
<td>+0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reimposition of restrictions on the net short-term foreign borrowing by banks with a 30% of capital limit on banks’ short-term overseas borrowing and higher reserve requirements on foreign currency deposits. (commercial banks and other credit institutions)</td>
<td>+0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 2011</td>
<td>Replaced the one-month holding period for Bank SBIs with a six-month holding period, effective beginning 13 May 2011. (portfolio investments)</td>
<td>+0.75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### APPENDIX B

Table 3. Reduced Form Estimation of the Capital Inflow Equation

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>FDI</th>
<th>Portfolio</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{t-1}$</td>
<td>0.171 (0.32)</td>
<td>0.045 (0.32)</td>
<td>0.127 (0.25)</td>
<td>0.048 (0.44)</td>
</tr>
<tr>
<td>$y_{t-2}$</td>
<td>−0.049 (0.75)</td>
<td>−0.014 (0.76)</td>
<td>−0.059 (0.56)</td>
<td>0.029 (0.63)</td>
</tr>
<tr>
<td>$y_{t-3}$</td>
<td>0.025 (0.85)</td>
<td>0.052 (0.18)</td>
<td>0.015 (0.86)</td>
<td>−0.081 (0.14)</td>
</tr>
<tr>
<td>$rr_{t-1}$</td>
<td>−0.204 (0.24)</td>
<td>−0.043 (0.31)</td>
<td>−0.160 (0.12)</td>
<td>−0.012 (0.87)</td>
</tr>
<tr>
<td>$rr_{t-2}$</td>
<td>−0.233 (0.25)</td>
<td>0.024 (0.63)</td>
<td>−0.186 (0.12)</td>
<td>0.011 (0.89)</td>
</tr>
<tr>
<td>$rr_{t-3}$</td>
<td>0.211 (0.16)</td>
<td>−0.008 (0.85)</td>
<td>0.139 (0.14)</td>
<td>0.085 (0.13)</td>
</tr>
<tr>
<td>$q_{t-1}$</td>
<td>0.041 (0.62)</td>
<td>−0.007 (0.71)</td>
<td>−0.082 (0.14)</td>
<td>0.130 (0.00)</td>
</tr>
<tr>
<td>$q_{t-2}$</td>
<td>0.017 (0.85)</td>
<td>−0.010 (0.68)</td>
<td>0.185 (0.01)</td>
<td>−0.050 (0.16)</td>
</tr>
<tr>
<td>$q_{t-3}$</td>
<td>−0.070 (0.35)</td>
<td>−0.011 (0.56)</td>
<td>−0.102 (0.07)</td>
<td>−0.036 (0.22)</td>
</tr>
<tr>
<td>$cf_{t-1}$</td>
<td>0.004 (0.98)</td>
<td>0.198 (0.18)</td>
<td>0.088 (0.62)</td>
<td>−0.307 (0.02)</td>
</tr>
<tr>
<td>$cf_{t-2}$</td>
<td>−0.034 (0.85)</td>
<td>0.117 (0.44)</td>
<td>−0.356 (0.04)</td>
<td>−0.192 (0.15)</td>
</tr>
<tr>
<td>$cf_{t-3}$</td>
<td>−0.099 (0.55)</td>
<td>0.058 (0.67)</td>
<td>−0.335 (0.02)</td>
<td>−0.229 (0.07)</td>
</tr>
<tr>
<td>$ci_{t-1}$</td>
<td>−0.018 (0.67)</td>
<td>−0.015 (0.18)</td>
<td>0.003 (0.90)</td>
<td>−0.003 (0.86)</td>
</tr>
<tr>
<td>$ci_{t-2}$</td>
<td>−0.047 (0.35)</td>
<td>−0.009 (0.53)</td>
<td>−0.027 (0.39)</td>
<td>−0.019 (0.33)</td>
</tr>
<tr>
<td>$ci_{t-3}$</td>
<td>0.000 (0.99)</td>
<td>0.001 (0.90)</td>
<td>0.015 (0.57)</td>
<td>−0.015 (0.36)</td>
</tr>
<tr>
<td>$const$</td>
<td>−153.9 (0.06)</td>
<td>−45.28 (0.03)</td>
<td>−65.84 (0.16)</td>
<td>−44.20 (0.13)</td>
</tr>
<tr>
<td>$sdum1_t$</td>
<td>−0.702 (0.73)</td>
<td>0.004 (0.99)</td>
<td>0.424 (0.74)</td>
<td>−0.374 (0.63)</td>
</tr>
<tr>
<td>$sdum2_t$</td>
<td>0.650 (0.82)</td>
<td>0.190 (0.80)</td>
<td>1.026 (0.57)</td>
<td>0.420 (0.70)</td>
</tr>
<tr>
<td>$sdum3_t$</td>
<td>0.740 (0.73)</td>
<td>0.049 (0.93)</td>
<td>0.676 (0.62)</td>
<td>0.445 (0.60)</td>
</tr>
<tr>
<td>$acrisis_t$</td>
<td>−15.53 (0.00)</td>
<td>−1.779 (0.04)</td>
<td>−10.31 (0.00)</td>
<td>−4.838 (0.00)</td>
</tr>
<tr>
<td>$y^*_t$</td>
<td>0.953 (0.43)</td>
<td>0.102 (0.74)</td>
<td>1.420 (0.07)</td>
<td>−0.608 (0.16)</td>
</tr>
<tr>
<td>$y^*_t$</td>
<td>−0.797 (0.50)</td>
<td>−0.058 (0.85)</td>
<td>−1.374 (0.07)</td>
<td>0.654 (0.13)</td>
</tr>
<tr>
<td>$sp_t^i$</td>
<td>0.126 (0.21)</td>
<td>−0.001 (0.98)</td>
<td>0.052 (0.40)</td>
<td>0.042 (0.27)</td>
</tr>
<tr>
<td>$sp_t^i$</td>
<td>−0.180 (0.07)</td>
<td>−0.021 (0.42)</td>
<td>−0.076 (0.22)</td>
<td>−0.049 (0.19)</td>
</tr>
</tbody>
</table>

Adj. $R^2$            0.521 0.616 0.389 0.714
Mean of Dep Variable  0.912 0.815 0.748 −0.650
S.E. of Dep Variable  5.694 1.714 3.189 2.861
S.E. of Equation      3.942 1.062 2.493 1.530
S.S.R.                823.7 59.78 329.5 124.1
Regression F(23,53)   4.590 6.299 3.102 9.243
Sig Level of F test   0.000 0.000 0.000 0.000
Log Likelihood        −200.5 −99.51 −165.2 −127.6

Note: P-values are reported in parentheses.
Table 4. Reduced Form Estimation of the Capital Outflow Equation

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>FDI</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{t-1}$</td>
<td>0.003 (0.35)</td>
<td>0.003 (0.25)</td>
<td>-0.001 (0.21)</td>
</tr>
<tr>
<td>$rr_{t-1}$</td>
<td>-0.006 (0.10)</td>
<td>-0.005 (0.19)</td>
<td>-0.001 (0.21)</td>
</tr>
<tr>
<td>$q_{t-1}$</td>
<td>0.001 (0.58)</td>
<td>0.001 (0.69)</td>
<td>0.000 (0.82)</td>
</tr>
<tr>
<td>$c_{t-1}$</td>
<td>0.487 (0.01)</td>
<td>0.482 (0.01)</td>
<td>-0.093 (0.76)</td>
</tr>
<tr>
<td>$ct_{t-1}$</td>
<td>-0.001 (0.10)</td>
<td>-0.001 (0.09)</td>
<td>0.000 (0.17)</td>
</tr>
<tr>
<td>const</td>
<td>-10.58 (0.35)</td>
<td>-11.27 (0.30)</td>
<td>-1.446 (0.48)</td>
</tr>
<tr>
<td>$sdum1_t$</td>
<td>-0.041 (0.34)</td>
<td>-0.029 (0.48)</td>
<td>-0.013 (0.08)</td>
</tr>
<tr>
<td>$sdum2_t$</td>
<td>0.010 (0.83)</td>
<td>0.016 (0.73)</td>
<td>-0.017 (0.09)</td>
</tr>
<tr>
<td>$sdum3_t$</td>
<td>0.068 (0.09)</td>
<td>0.070 (0.07)</td>
<td>-0.007 (0.33)</td>
</tr>
<tr>
<td>acrisist</td>
<td>-0.169 (0.04)</td>
<td>-0.157 (0.05)</td>
<td>-0.010 (0.39)</td>
</tr>
<tr>
<td>$y^*_t$</td>
<td>0.018 (0.61)</td>
<td>0.020 (0.57)</td>
<td>-0.004 (0.45)</td>
</tr>
<tr>
<td>$y^*_{t-1}$</td>
<td>-0.006 (0.85)</td>
<td>-0.007 (0.82)</td>
<td>0.006 (0.30)</td>
</tr>
<tr>
<td>$sp^*_t$</td>
<td>-0.003 (0.43)</td>
<td>-0.003 (0.41)</td>
<td>-0.001 (0.27)</td>
</tr>
<tr>
<td>$sp^*_{t-1}$</td>
<td>-0.001 (0.77)</td>
<td>-0.002 (0.66)</td>
<td>0.001 (0.13)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>FDI</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adj. $R^2$</td>
<td>0.718</td>
<td>0.768</td>
<td>0.845</td>
</tr>
<tr>
<td>Mean of Dep Variable</td>
<td>0.140</td>
<td>0.120</td>
<td>0.020</td>
</tr>
<tr>
<td>S.E. of Dep Variable</td>
<td>0.145</td>
<td>0.157</td>
<td>0.033</td>
</tr>
<tr>
<td>S.E. of Equation</td>
<td>0.077</td>
<td>0.076</td>
<td>0.013</td>
</tr>
<tr>
<td>S.S.R.</td>
<td>0.153</td>
<td>0.149</td>
<td>0.005</td>
</tr>
<tr>
<td>Regression F(23,53)</td>
<td>8.623</td>
<td>10.91</td>
<td>17.39</td>
</tr>
<tr>
<td>Sig Level of F test</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>54.52</td>
<td>55.05</td>
<td>125.0</td>
</tr>
</tbody>
</table>

Note: P-values are reported in parentheses.
REFERENCES

The paper basically has two components: (1) a descriptive portion which presents the history of capital account liberalization and the use of capital controls in Indonesia, and (2) the construction of an index of capital controls and subsequent use in a structural VAR model for assessing the effectiveness of controls.

The first portion is very useful as it presents an account of Indonesia’s relatively open capital account before the 1997 Asian financial crisis, its continued compliance with IMF recommendations of keeping the capital account open during and in the aftermath of the 1997 crisis, and its use of capital controls beginning in 2004.

The second portion of the paper discusses the construction of a capital controls index using the IMF’s *Annual Report on Exchange Arrangement and Exchange Restriction* (AREAER), unlike the other papers in the seminar which used respective central bank data. Although this is justified on the grounds that it is difficult to gather historical data and information from local resources, it must also be pointed out the AREAER database also has some gaps which is filled through consultations with the concerned countries. Furthermore, the methodology of index construction must be explained some more, especially the weights accorded to specific de jure capital controls.¹

In response to this paper and the other papers which were presented, note that in most papers a typical finding is that capital controls only have temporary effects on volumes but would have permanent effects on the composition of the flow. While there are minor differences in findings, there seems to be an emerging pattern that effects on capital flows are temporary. With respect to attempts at assessing the effectiveness of recently imposed controls, it might be too early to see the effects.²

With respect to data treatment, the modeling was done on level variables without the requisite regularity tests, especially for stationarity and cointegration.³ As regards the use of structural VARs in the assessment of

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¹This was subsequently done in the revised version of the paper
³The regularity tests are discussed in the revised version of the paper.

Ravi Balakrishnan is International Monetary Fund’s (IMF) Regional Representative and is based in Singapore.
effectiveness of capital controls, the methodology has its merits, but it could also have disadvantages. For one, it is often difficult to find significant results when employing VARs in this type of analysis since capital restrictions tend to occur in discrete jumps. Structural VARs are also sensitive to the ordering of endogenous variables such that it would probably be useful to augment the study with another methodology like event analysis to ensure robustness of results.

Lastly, capital controls are already in the toolkit, but it should be noted that the use of capital controls could also have unintended effects, and the impact depends on the instrument that is used and the entity that is being targeted. There is a need for more resolution on the framework and approaches.
Growth with Resilience in East Asia and the 2008–2009 Global Recession

LINO BRIGUGLIO AND STEPHEN PICCININO

This paper assesses why the 2008–2009 global economic recession impacted East Asia less than it did the United States (US) and the European Union (EU). The paper utilizes a “growth-with-resilience” (GWR) index aimed at measuring the extent to which a country can absorb or counteract external shocks and at the same time promote economic growth. The main findings show higher GWR index scores for East Asia compared to those for the EU and the US, which may explain why the global recession had a milder impact on the region. The study also shows East Asia as being very heterogeneous, with major differences in the countries’ economic, political, and social realities, more so than in the US and EU. Therefore, the overall picture for the region may not apply to individual economies.

JEL classification: O10, O11, O12, O23, O53, O57

1. INTRODUCTION

This paper assesses why the 2008–2009 global economic recession impacted East Asia less than it did the United States (US) and the European Union (EU). The paper utilizes a “growth-with-resilience” (GWR) index aimed at measuring the extent to which a country can absorb or counteract external shocks and at the same time promote economic growth.¹

Although economic vulnerability is often associated with small states (Briguglio 1995), the recent global recession has shown that no country is really sheltered from external economic shocks. This has brought the challenge of building economic resilience to the forefront of economic policy.

The two major economic centers of the world are currently the US and the EU, but many studies have predicted a move towards East Asia (e.g., Quad 2011, Grether and Mathys 2008). A study comparing the three major economic centers of the world in terms of growth and resilience is therefore of interest.

The main findings of this paper are the higher GWR index scores for East Asia compared to those for the EU and the US, which may explain why the impact of the recent global recession had been milder on the region. The paper

¹Growth with resilience is sixth among the nine pillars of work pursued by the G20 Development Working Group. This pillar was identified at the G20 Seoul Summit in 2009. Available on-line: http://www.economicsummits.info/2010/11/seoul-summit-annex-2-g20-action-plan-on-development

Lino Briguglio is Professor of Economics at the University of Malta. Stephen Piccinino was a research assistant in the writing of this paper.
also reveals East Asia to be a very heterogeneous region, with major differences in economic, political, and social realities of the various countries, again more so than in the US and the EU. Therefore, the overall picture for East Asia may not apply to individual economies.

This paper is organized as follows. Section II, which follows this introduction, outlines the main characteristics of East Asian economies and assesses the impact of the global recession on these economies. Section III describes the methodology for computing the GWR index, while Section IV presents the results of the index for the selected East Asian economies, comparing these with results for the US and the EU. Section V provides the conclusions of the study and discusses implications of results.

II. THE EAST ASIAN ECONOMIES

A. The Economies of East Asia

In this paper, East Asia refers to ten economies, six of which are members of the Association of Southeast Asian Nations (ASEAN) and the remaining four comprising the People’s Republic of China (PRC); Hong Kong, China; the Republic of Korea; and Taipei, China. The population of East Asia as defined in this paper is about 2 billion, of which about 65% live in the PRC alone (see Table 1).²

There have been major developments in East Asian economies in the past 20 years or so, including a rapid process of foreign trade liberalization and, as a result, a high rate of foreign direct investment (FDI). Although there is extensive cooperation between East Asian countries, notably between the members of the ASEAN, economic integration is not very deep. The ASEAN Free Trade Agreement (AFTA) came into force in 1992. AFTA does not apply a common external tariff on imports, and each member is free to impose tariffs on goods entering from outside the area.³ Economic relations between ASEAN and the other Asian economies covered by this study, however, have been increasing and there are now various preferential trade agreements in the region, with different rules of origin and tariff arrangements.

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² Members of ASEAN are Brunei Darussalam, Cambodia, Indonesia, the Lao People’s Democratic Republic (Lao PDR), Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam. Brunei Darussalam, Cambodia, the Lao PDR, and Myanmar were not included in the analysis because of missing data needed for the construction of the GWR index. The PRC and the Republic of Korea are both part of ASEAN+3.

³ However, for goods originating within ASEAN, in line with specified rules of origin, there is a Common Effective Preferential Tariff (CEPT) among member states, with the exception of Cambodia, the Lao PDR, Myanmar, and Viet Nam, where the application of CEPT has been delayed.
B. Major Divergences

The economies under consideration diverge markedly, differing in terms of population, stages of development, religious belief, political governance, and social development. One can see from Table 1 that Singapore and Hong Kong, China—two of the smallest members of the group in terms of population—have relatively high gross domestic product (GDP) per capita and human development index (HDI) scores, while the larger countries (the PRC, Indonesia, and the Philippines) have relatively low GDP per capita and HDI scores. Governance arrangements also vary considerably, with some having negative scores on a political governance index (based on Kaufman, Kraay, and Mastruzzi 2010).

Table 1. Characteristics of East Asian Countries

<table>
<thead>
<tr>
<th>Population, 2010 (million)</th>
<th>GDP, 2010 ($ billion)</th>
<th>GDP per Capita, 2010 ($)</th>
<th>GDP Growth, 2004–2010 (%)</th>
<th>HDI Score</th>
<th>Political Governance Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASEAN Countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>234.4</td>
<td>706.7</td>
<td>3,015</td>
<td>5.6</td>
<td>0.600</td>
</tr>
<tr>
<td>Malaysia</td>
<td>28.3</td>
<td>238.0</td>
<td>8,423</td>
<td>4.9</td>
<td>0.744</td>
</tr>
<tr>
<td>Philippines</td>
<td>94.0</td>
<td>188.7</td>
<td>2,007</td>
<td>5.1</td>
<td>0.638</td>
</tr>
<tr>
<td>Singapore</td>
<td>5.3</td>
<td>222.7</td>
<td>43,117</td>
<td>7.0</td>
<td>0.846</td>
</tr>
<tr>
<td>Thailand</td>
<td>63.9</td>
<td>318.9</td>
<td>4,992</td>
<td>4.1</td>
<td>0.654</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>88.3</td>
<td>103.6</td>
<td>1,174</td>
<td>7.3</td>
<td>0.572</td>
</tr>
<tr>
<td>Other East Asian Economies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC</td>
<td>1,341.4</td>
<td>5,878.3</td>
<td>4,382</td>
<td>11.1</td>
<td>0.663</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>7.1</td>
<td>225.0</td>
<td>31,591</td>
<td>5.1</td>
<td>0.862</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>48.9</td>
<td>1,007.2</td>
<td>20,591</td>
<td>3.9</td>
<td>0.877</td>
</tr>
<tr>
<td>Taipei, China</td>
<td>23.3</td>
<td>430.6</td>
<td>18,458</td>
<td>4.6</td>
<td>0.868</td>
</tr>
</tbody>
</table>

ASEAN = Association of Southeast Asian Nations, HDI = human development index, PRC = People’s Republic of China.

Note: HDI scores range from 0 to 1, with higher values corresponding to higher degrees of human development. Political governance scores range from –2.5 to 2.5, with higher values corresponding to better governance outcomes.


The structures of these economies are also very divergent as can be seen from Table 2. Lower-income countries such as Viet Nam, Indonesia, and the Philippines depend highly on agriculture and fishing, while higher-income economies (e.g., Singapore; Hong Kong, China; and Taipei, China) have very small agricultural sectors and relatively large services sectors. The smaller economies, as expected, tend to be more trade-oriented, with Singapore and Hong Kong, China leading in the openness score.

The structures of these economies are also very divergent as can be seen from Table 2.
Table 2. Structure of the East Asian Economies

<table>
<thead>
<tr>
<th>ASEAN Countries</th>
<th>Agriculture</th>
<th>Industry</th>
<th>Services</th>
<th>Exports (% of GDP)</th>
<th>Imports (% of GDP)</th>
<th>Average (% of GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>14.5</td>
<td>47.6</td>
<td>37.9</td>
<td>27.6</td>
<td>25.0</td>
<td>26.3</td>
</tr>
<tr>
<td>Malaysia</td>
<td>9.8</td>
<td>46.0</td>
<td>44.1</td>
<td>103.6</td>
<td>81.9</td>
<td>92.7</td>
</tr>
<tr>
<td>Philippines</td>
<td>14.6</td>
<td>31.1</td>
<td>54.2</td>
<td>36.8</td>
<td>37.1</td>
<td>37.0</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.0</td>
<td>26.4</td>
<td>73.5</td>
<td>220.2</td>
<td>196.5</td>
<td>208.3</td>
</tr>
<tr>
<td>Thailand</td>
<td>11.3</td>
<td>44.0</td>
<td>44.6</td>
<td>72.8</td>
<td>65.7</td>
<td>69.2</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>21.1</td>
<td>40.4</td>
<td>38.5</td>
<td>77.1</td>
<td>91.9</td>
<td>84.5</td>
</tr>
<tr>
<td>Other East Asian Economies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC</td>
<td>10.9</td>
<td>48.0</td>
<td>41.1</td>
<td>43.3</td>
<td>33.7</td>
<td>38.5</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>0.1</td>
<td>8.0</td>
<td>92.0</td>
<td>204.8</td>
<td>195.2</td>
<td>200.0</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>2.7</td>
<td>37.7</td>
<td>59.6</td>
<td>48.0</td>
<td>46.6</td>
<td>47.3</td>
</tr>
<tr>
<td>Taipei, China</td>
<td>1.6</td>
<td>31.0</td>
<td>67.4</td>
<td>69.2</td>
<td>61.9</td>
<td>65.5</td>
</tr>
</tbody>
</table>

PRC = People’s Republic of China.

Note: Agriculture includes agriculture, hunting, forestry, and fishing (corresponds to ISIC Rev. 3 divisions 01–05). Industry includes mining and quarrying, manufacturing, electricity, gas and water supply, and construction (corresponds to ISIC Rev. 3 divisions 10–45). Services include all other economic activities (corresponds to ISIC Rev. 3 divisions 50–99).


Source: UNCTADStat (On-line).

C. The Impact of the Global Recession on East Asia

The global economic downturn had an impact on the growth process in East Asia with almost all countries in the region facing a reduction in demand in 2009. As shown in Table 3, this resulted in slower growth rates compared to previous years. Economies that rely heavily on exports such as Hong Kong, China; the Republic of Korea; Malaysia; Singapore; Taipei, China; and Thailand experienced a downturn. In contrast, countries such as the PRC, Indonesia, and the Philippines, which rely to a lesser extent on exports and imports, did not experience negative growth, though they still went through a slowdown during the period.

With regard to the eurozone, the EU, and the US, changes in real GDP during 2009 were negative, and declines were higher on average than those of the 10 East Asian economies taken together.
Table 3. GDP Growth Rates in East Asia, the EU, and the US

<table>
<thead>
<tr>
<th>Region</th>
<th>2004–2007</th>
<th>2009</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>5.6</td>
<td>4.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>6.1</td>
<td>–1.7</td>
<td>7.8</td>
</tr>
<tr>
<td>Philippines</td>
<td>6.0</td>
<td>1.1</td>
<td>4.9</td>
</tr>
<tr>
<td>Singapore</td>
<td>8.5</td>
<td>–0.8</td>
<td>9.3</td>
</tr>
<tr>
<td>Thailand</td>
<td>5.3</td>
<td>–2.3</td>
<td>7.6</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>8.2</td>
<td>5.3</td>
<td>2.9</td>
</tr>
<tr>
<td>PRC</td>
<td>12.1</td>
<td>9.2</td>
<td>2.9</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>7.3</td>
<td>–2.7</td>
<td>10.0</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>4.7</td>
<td>0.2</td>
<td>4.5</td>
</tr>
<tr>
<td>Taipei, China</td>
<td>5.6</td>
<td>–1.9</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>Region:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASEAN 6</td>
<td>6.2</td>
<td>1.1</td>
<td>5.1</td>
</tr>
<tr>
<td>East Asia 4</td>
<td>10.3</td>
<td>6.5</td>
<td>3.8</td>
</tr>
<tr>
<td>East Asia 10</td>
<td>9.5</td>
<td>5.5</td>
<td>4.0</td>
</tr>
<tr>
<td>USA</td>
<td>2.8</td>
<td>–2.6</td>
<td>5.4</td>
</tr>
<tr>
<td>Eurozone</td>
<td>2.5</td>
<td>–4.1</td>
<td>6.6</td>
</tr>
<tr>
<td>EU</td>
<td>2.8</td>
<td>–4.2</td>
<td>7.0</td>
</tr>
</tbody>
</table>

**Note:** Growth rates for the different economies are weighted averages, where the weights refer to the GDP of each country or economy.

**Source:** IMF. Various editions. *World Economic Outlook*. Washington, DC

In order to assess the recovery following the global recession, we compared GDP and GDP per capita in 2007, the year before the impact, with figures in 2010, the year after the impact. This indicator is shown in Table 4, which suggests that East Asian economies recovered better than the US and the EU in 2010.

This paper argues that one reason for the sharp fall in real GDP of the EU and the US in 2009 and their slower recovery in 2010 compared to East Asia can be explained in terms of the lower degree of GWR ingredients in the US and the EU.
Table 4: Rate of Recovery—GDP Growth Rates in East Asia, the EU, and the US
(\% difference from 2007 to 2010)

<table>
<thead>
<tr>
<th>Economy:</th>
<th>GDP Per Capita</th>
<th>GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>13.2</td>
<td>17.6</td>
</tr>
<tr>
<td>Malaysia</td>
<td>6.1</td>
<td>10.3</td>
</tr>
<tr>
<td>Philippines</td>
<td>6.1</td>
<td>12.5</td>
</tr>
<tr>
<td>Singapore</td>
<td>8.0</td>
<td>15.3</td>
</tr>
<tr>
<td>Thailand</td>
<td>6.5</td>
<td>7.9</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>15.4</td>
<td>19.6</td>
</tr>
<tr>
<td>PRC</td>
<td>30.0</td>
<td>32.0</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>3.8</td>
<td>6.40</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>7.8</td>
<td>8.80</td>
</tr>
<tr>
<td>Taipei, China</td>
<td>7.7</td>
<td>9.50</td>
</tr>
<tr>
<td>Region:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASEAN 6</td>
<td>9.6</td>
<td>13.9</td>
</tr>
<tr>
<td>East Asia 4</td>
<td>24.0</td>
<td>25.8</td>
</tr>
<tr>
<td>East Asia 10</td>
<td>21.2</td>
<td>23.6</td>
</tr>
<tr>
<td>United States</td>
<td>–2.5</td>
<td>0.13</td>
</tr>
<tr>
<td>Eurozone</td>
<td>–3.3</td>
<td>–2.10</td>
</tr>
<tr>
<td>Europe</td>
<td>–3.1</td>
<td>–2.10</td>
</tr>
</tbody>
</table>

PRC = People’s Republic of China.
ASEAN 6 = Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam; East Asia 4 = the PRC; Hong Kong, China; the Republic of Korea, and Taipei, China; East Asia 10 = comprises ASEAN 6 and East Asia 4 economies.

Source: IMF World Economic Outlook. Note the growth rates for the ASEAN, East Asia, the EU and the EZ are weighted averages, where the weights are the GDP of each country.

III. CONSTRUCTING A GROWTH-WITH-RESILIENCE INDEX

To construct the GWR index, this paper mostly draws on two studies, one authored by Briguglio et al. (2006 and 2009) and the other by the Commission on Growth and Development (2008).4

A. The Economic Resilience Index

Briguglio et al. (2006) argue that the term economic resilience can be used in two senses relating to the ability of an economy to: (i) recover quickly from harmful external economic shocks, and (ii) withstand the effect of such shocks.

The ability of an economy to recover from the effects of adverse shocks will be severely limited if, for example, there is a chronic tendency for large fiscal deficits. On the other hand, this ability will be enhanced when policy tools can be utilized to counteract the effects of negative shocks—for instance, when the fiscal position is strong, allowing policymakers to use discretionary expenditure or implement tax cuts to contrast the effects of negative shocks. This type of resilience is therefore associated with “shock–counteraction.”

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4The Commission on Growth and Development was chaired by Michael Spence and consisted of 22 leaders and policymakers mostly from developing countries, academics, and influential business persons.
An economy is able to withstand shocks when these are neutered or rendered negligible. This type of resilience, which can be referred to as “shock absorption,” is possible when mechanisms are in place to reduce the effects of shocks. For example, flexible markets could act as instruments of shock absorption, since negative external demand shocks affecting a particular sector could be met relatively easily by shifting resources to another sector enjoying stronger demand.

The authors hypothesize that the variables enabling a country to build economic resilience comprise the following: (i) economic factors measured by macroeconomic stability and market efficiency, and (ii) sociopolitical factors measured by good political governance and social development.

**B. Macroeconomic Stability**

According to Briguglio et al. (2006), macroeconomic stability is conducive to economic resilience as it relates to the interaction between an economy’s aggregate demand and aggregate supply. If aggregate expenditure in an economy moves in equilibrium with aggregate supply, the economy would be characterized by internal balance (manifested in a sustainable fiscal position, low price inflation, and unemployment rate close to the natural rate) as well as by external balance (reflected by the level of government debt). These can be considered as variables highly influenced by economic policy. Briguglio et al. (2006) propose that the macroeconomic stability component of resilience be measured by three variables: (i) the fiscal deficit-to-GDP ratio, (ii) the sum of unemployment and inflation rates, and (iii) the debt-to-GDP ratio.

**C. Market Efficiency**

Briguglio et al. (2006) further argue that if markets adjust rapidly to achieve equilibrium following an external shock, the risk of being negatively affected by such a shock would be lower than if market disequilibria persisted. Indeed, with very slow or non-existent market adjustment, resources will not be efficiently allocated in the economy, resulting in welfare costs—for instance, in the form of unemployed resources and waste or shortage in the goods markets. These considerations have important implications for shock-absorbing resilience.

Following a search for suitable indicators, Briguglio et al. (2006) decided to use a component of the Freedom of the World Index (Gwartney and Lawson 2005) that focuses on the regulation of credit, labor, and business. The index is aimed at measuring the extent to which markets operate freely, competitively, and efficiently across countries. It is designed to identify the effect of regulatory restraints and bureaucratic procedures on competition and the operation of markets.
Bureaucratic control of business activity tends to inhibit market efficiency as it limits competition and hinders the operation of markets. This occurs, for example, when regulation retards entry into business or when prices are determined by dictate hence discouraging private sector involvement. Such actions impede the adjustment of markets and hence their ability to absorb shocks.

Similar considerations apply in the case of the labor market. Here, interference relates to unduly high unemployment benefits, which could undermine the incentive to accept employment; excessive restrictions on dismissal; minimum wage impositions; centralized wage setting; and conscription. All these could preclude work effort, limiting the ability of an economy to recover from adverse shocks.

D. Socio-political Factors

Briguglio et al. (2006) believe that good political governance is essential for an economic system to function properly and hence to be resilient. Good governance is associated with issues such as rule of law and property rights. Without mechanisms of this kind in place, it may be relatively easy for adverse shocks to result in economic and social chaos and unrest, and the effects of vulnerability to external shocks would be exacerbated. There are various indicators of political governance including that produced by the World Bank (Kaufmann, Kraay, and Mastruzzi 2010). An analysis of these indices would indicate that the highest rankings in terms of good governance tend to be associated with economic success in terms of GNI per capita (Curmi 2009).

Briguglio et al. (2006) also argue that social development indicates the extent to which relations within a society are properly developed, enabling effective functioning of the economic apparatus without hindrance of civil unrest. Social development can also indicate the extent to which effective social dialogue may take place in an economy which, in turn, would enable collaborative approaches towards the undertaking of corrective measures in the face of adverse shocks. Briguglio et al. (2006) propose that the social development component of economic resilience be measured by the education and health indicators used in constructing the UNDP Human Development Index (HDI).

E. Factors Conducive to Economic Growth

In identifying countries that attained high growth rates and establishing the reasons for their success, the Commission on Growth and Development (2008) listed 13 countries with an average growth rate of 7% or higher for 25 years in the

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5It should be noted that the GWR index constructed in this paper does not have separate “good governance” and “social” components. However the “institutions” and the “soundness of banks” indicator which are used for the GWR index, is likely to capture these factors.
post-war period. These were Botswana; Brazil; the PRC; Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; Malta; Oman; Singapore; Taipei, China; and Thailand. The findings of the Growth Commission present useful insights on the issue of economic growth.

Five key Ingredients

In describing its findings, the Growth Commission considered five key ingredients that helped sustain high levels of growth. These are enumerated below.

(i) Economic openness. This enabled successful countries to import ideas, technology, and know-how from the rest of the world and at the same time exploit global demand. It also spurred inward FDI and investment by multinational companies in turn leading to technological advance and the creation of export markets.

(ii) Economic stability. A steady environment was found to encourage investment and leave room for maneuver when the economy fell under pressure. Conversely, volatility and unpredictability were found to discourage private sector development and discourage savings.

(iii) High rates of saving and investment, including public investment in infrastructure. Had a high degree of inflation prevailed in these countries, wealth could have been redistributed from savers to debtors, possibly discouraging people from holding financial assets. In some cases, direct measures to encourage or even enforce thrift were employed as in the case of Singapore and Malaysia.

(iv) Reliance on a market system. Markets were free to allocate resources, provide price signals, and encourage competitive private sector participation. The Growth Commission argued that even in the PRC and Singapore, where the political role of the government was very prominent, the administration had been essentially laissez-faire in the economic (though not the political) sphere. There were government interventions such as the provision of tax breaks, subsidized credit, direct lending, and similar government-led initiatives, but generally speaking, these measures were not restrictive — on the contrary, they often enhanced mobility in the factors of production, particularly labor, leading to the destruction of jobs with low productivity while creating more productive ones.
(v) Sound institutions. These played a major role in terms of defining property rights, enforcing contracts, and encouraging fair trading. The Growth Commission argued that the immaturity of institutions may well be synonymous with underdevelopment. In addition, growth requires credibility and commitment in governance.

F. Juxtaposing Growth with Resilience

Combining the resilience index proposed by Briguglio et al. (2006) and the findings of the Growth Commission (2008), it is possible to identify a number of economic traits that are likely to lead to growth with resilience, all of which can be associated with good economic governance. These elements shall be used in this study to construct the GWR index in order to compare the impact of the global recession on East Asia with that on the US and the EU.

The GWR index proposed in this paper has three components: (i) the market flexibility indicator, (ii) the macroeconomic stability indicator, and (iii) the sources-of-growth indicator.

The market flexibility component was introduced on the assumption that markets that operate well allow a country to better absorb external shocks and therefore be more resilient, as explained above, with reference to Briguglio et al. (2006).

The macroeconomic stability component indicates whether an economy has room to maneuver if it is hit by an external shock. The raison d’etre for including the stability component has been explained in Briguglio et al. (2006), as indicated earlier.

The sources-of-growth indicator has two subcomponents: investment (and by implication savings) as a percentage of GDP and sound institutions, both of which were given major importance by the Growth Commission (2008). Investment may be considered as an indicator of the extent to which resources are assigned for economic growth. The institutions component was introduced recognizing that economic growth required sound and credible economic management as explained above with regard to the Growth Commission report. Flexibility, stability, and sources-of-growth indicators are summarized in Figure 1, which shows the basic arguments underpinning each indicator. These

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6 The openness indicator identified by the Growth Commission (2008) as an ingredient of economic growth is not used in the GWR index developed in this paper. In the opinion of the present authors, a high degree of openness is not a policy-induced variable but an inherent characteristic of small states. It is essentially an indicator of economic vulnerability rather than resilience. However, the possible policy-induced factors associated with openness identified by the Growth Commission are probably captured by the institutions indicator introduced in the GWR index.

7 Results do not change significantly when the savings-to-GDP ratio is replaced by the investment-to-GDP ratio.
components are used in this paper to assess the degree of growth with resilience of 10 East Asian countries in comparison to the US and the EU.

Figure 1. The Growth with Resilience Pyramid

These flexibility, stability, and sources of growth indicators will be used to assess the degree of “growth with resilience” of 10 East Asian countries and compare them with the US and the EU.

IV. GROWTH WITH RESILIENCE IN EAST ASIA, THE EU, AND THE US

The GWR index proposed in this study is computed from data derived from three main sources: (i) the IMF World Economic Outlook (IMF 2011), (ii) the Freedom of the World Index (Gwartney, Hall, and Lawson 2010), and (iii) the World Competitiveness Report (World Economic Forum 2008, 2009, and 2010).

A. The Growth-with-Resilience Index

The GWR index developed in this paper draws on the index proposed in Briguglio et al. (2006) but adds a component related to sources of growth based on the arguments of the Growth Commission (2008). The components of the index are shown in Table 5. Appendix 1 presents the data and gives more information about the sources.
Table 5: Components of the Growth-with-Resilience Index\textsuperscript{a}

<table>
<thead>
<tr>
<th>Flexibility</th>
<th>Stability</th>
<th>Sources of Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit market regulations</td>
<td>Inflation</td>
<td>Investment/GDP</td>
</tr>
<tr>
<td>Labor market regulations</td>
<td>Unemployment rate</td>
<td>Institutions</td>
</tr>
<tr>
<td>Product market regulations</td>
<td>Government deficit/GDP</td>
<td></td>
</tr>
<tr>
<td>Soundness of Banks</td>
<td>Gross government debt/GDP</td>
<td></td>
</tr>
</tbody>
</table>


B. Rescaling the Data

The data are standardized or rescaled using the following formula to enable summation and averaging of the three components,

\[ XS_i = (X_i - X_{\min})/(X_{\max} - X_{\min}), \]

where \( XS_i \) is the standardized observation in an array of observations of a given variable, \( X_i \) is the actual observation in an array of observations of a given variable, \( X_{\max} \) is the maximum-valued observation in an array of observations of a given variable, and \( X_{\min} \) is the minimum-valued observation in an array of observations of a given variable. It can be shown that \( XS \) takes a value of between 0 and 1.

C. Weighting

Equal weights (0.333) are assigned to each of the three main components.\textsuperscript{8} The issue of weights is very contentious and has been discussed at length in various studies (see Farrugia 2008). In practice, authors of composite indices use either use equal weights, as in this study, or else put forward ad hoc arguments to justify unequal weights. It should therefore be stated here that alternative weightings will likely produce results different from those in this study.

Following is a summary of the results.

D. Market Flexibility Component

The market flexibility component has two subcomponents, one that measures the extent to which markets operate efficiently and another relating to soundness of the banking system. Explaining why the second subcomponent was included is warranted at this point.

\textsuperscript{8}Appendix 4 presents more information about the weightings of the subcomponents.
The market efficiency index emphasizes the importance of freely and properly operating markets for allocative efficiency. It relates, in particular, to the ability of an economy to reallocate resources quickly and effectively following an economic shock. However, Briguglio et al. (2009) argue that this fundamentally neoliberal approach should be balanced by an emphasis on the soundness of the banking system.

Thus, the GWR index proposed here views free markets and a framework of financial bank prudence as two essential aspects of a properly working market.

The results shown in Table 6 indicate that in East Asia, Hong Kong, China has the most efficient market, followed by Singapore, Malaysia, and Thailand, in that order. The US is also characterized by a highly efficient market but this is being weighed down by the weakness of banks. The EU suffers from various market inefficiencies, and the eurozone even more so. A closer look at the index suggests that market inefficiencies in Europe stem mostly from labor market regulations, particularly those relating to hiring and firing and bureaucracy costs.

The PRC has the lowest score in terms of market efficiency, ranking last among all countries. The main reason for this relates to the ownership of banks, the presence of regulations, and price controls. At the same time, confidence in banks is not as low as it is in the US and the EU.

Table 6. Standardized Scores of the Market Flexibility Component

<table>
<thead>
<tr>
<th>Region</th>
<th>Market Regulations</th>
<th>Soundness of Banks</th>
<th>Average</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>0.387</td>
<td>0.150</td>
<td>0.269</td>
<td>9</td>
</tr>
<tr>
<td>Malaysia</td>
<td>0.722</td>
<td>0.650</td>
<td>0.686</td>
<td>3</td>
</tr>
<tr>
<td>Philippines</td>
<td>0.526</td>
<td>0.600</td>
<td>0.563</td>
<td>5</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.936</td>
<td>0.950</td>
<td>0.943</td>
<td>2</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.688</td>
<td>0.650</td>
<td>0.669</td>
<td>4</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>0.447</td>
<td>0.150</td>
<td>0.298</td>
<td>8</td>
</tr>
<tr>
<td>PRC</td>
<td>0.000</td>
<td>0.450</td>
<td>0.225</td>
<td>10</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>0.470</td>
<td>0.150</td>
<td>0.310</td>
<td>7</td>
</tr>
<tr>
<td>Taipei, China</td>
<td>0.489</td>
<td>0.450</td>
<td>0.470</td>
<td>6</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>0.528</strong></td>
<td><strong>0.283</strong></td>
<td><strong>0.330</strong></td>
<td></td>
</tr>
</tbody>
</table>

PRC = People’s Republic of China.
ASEAN 6 = Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam; East Asia 4 = the PRC; Hong Kong, China; the Republic of Korea, and Taipei, China; East Asia 10 = comprises ASEAN 6 and East Asia 4 economies; EU = European Union; Eurozone = comprises the 17 EU members that have adopted the euro.

The raw data are presented in Appendix 1, Table A1.1. Note: Higher scores represent a higher degree of flexibility.

Source: Authors’ calculations.
E. The Macroeconomic Stability Component

The macroeconomic stability component has four subcomponents—inflation, unemployment, the government deficit, and gross public debt. These basically indicate if an economy has room to maneuver when hit by an external shock. It should be noted that data for the macroeconomic component had been averaged over an eight-year period (2001–2008) to eliminate changes relating to the business cycle.

The macroeconomic stability scores of the GWR Index are shown in Table 7. Each subcomponent had been assigned equal weights. The results indicate that Hong Kong, China; the Republic of Korea; the PRC; and Taipei, China were the most stable economies, with Indonesia, the Philippines, and Viet Nam being relatively more unstable. The eurozone exhibited more instability than East Asia, considered collectively.

Table 7: Standardized Scores of the Macroeconomic Stability Component

<table>
<thead>
<tr>
<th>Country</th>
<th>Inflation</th>
<th>Government Deficit/GDP</th>
<th>Government Debt/GDP</th>
<th>Unemployment Rate</th>
<th>Average</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>0.000</td>
<td>0.597</td>
<td>0.446</td>
<td>0.067</td>
<td>0.277</td>
<td>10</td>
</tr>
<tr>
<td>Malaysia</td>
<td>0.754</td>
<td>0.302</td>
<td>0.545</td>
<td>0.821</td>
<td>0.606</td>
<td>7</td>
</tr>
<tr>
<td>Philippines</td>
<td>0.410</td>
<td>0.576</td>
<td>0.359</td>
<td>0.000</td>
<td>0.336</td>
<td>9</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.847</td>
<td>1.000</td>
<td>0.000</td>
<td>0.882</td>
<td>0.682</td>
<td>6</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.700</td>
<td>0.628</td>
<td>0.505</td>
<td>1.000</td>
<td>0.708</td>
<td>5</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>0.178</td>
<td>0.000</td>
<td>0.597</td>
<td>0.576</td>
<td>0.338</td>
<td>8</td>
</tr>
<tr>
<td>PRC</td>
<td>0.765</td>
<td>0.526</td>
<td>0.822</td>
<td>0.742</td>
<td>0.714</td>
<td>3</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>1.000</td>
<td>0.492</td>
<td>1.000</td>
<td>0.546</td>
<td>0.760</td>
<td>1</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>0.668</td>
<td>0.786</td>
<td>0.753</td>
<td>0.811</td>
<td>0.754</td>
<td>2</td>
</tr>
<tr>
<td>Taipei, China</td>
<td>0.895</td>
<td>0.602</td>
<td>0.658</td>
<td>0.700</td>
<td>0.714</td>
<td>4</td>
</tr>
<tr>
<td>Region:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASEAN 6</td>
<td>0.410</td>
<td>0.410</td>
<td>0.413</td>
<td>0.483</td>
<td>0.429</td>
<td>5</td>
</tr>
<tr>
<td>East Asia 4</td>
<td>0.767</td>
<td>0.572</td>
<td>0.806</td>
<td>0.743</td>
<td>0.722</td>
<td>1</td>
</tr>
<tr>
<td>East Asia 10</td>
<td>0.699</td>
<td>0.572</td>
<td>0.731</td>
<td>0.693</td>
<td>0.674</td>
<td>2</td>
</tr>
<tr>
<td>USA</td>
<td>0.716</td>
<td>0.539</td>
<td>0.353</td>
<td>0.591</td>
<td>0.550</td>
<td>3</td>
</tr>
<tr>
<td>Eurozone</td>
<td>0.765</td>
<td>0.424</td>
<td>0.276</td>
<td>0.227</td>
<td>0.423</td>
<td>6</td>
</tr>
<tr>
<td>EU</td>
<td>0.754</td>
<td>0.427</td>
<td>0.349</td>
<td>0.277</td>
<td>0.452</td>
<td>4</td>
</tr>
</tbody>
</table>

PRC = People's Republic of China.
ASEAN 6 = Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam; East Asia 4 = the PRC; Hong Kong, China; the Republic of Korea, and Taipei, China; East Asia 10 = comprises ASEAN 6 and East Asia 4 economies; EU = European Union; Eurozone = comprises the 17 EU members that have adopted the euro.

*The raw data are presented in Appendix 1, Table A1.2. Note: Higher scores represent a higher degree of stability. Source: Authors' calculations.

9Net debt may also be considered as an indicator of indebtedness. However, the concept of net debt ushers in a number of problems. First, data on net debt across countries is often not available. Second, there are conceptual problems associated with the choice of assets to consider when differentiating between gross and net debt. Also, governments need to refinance their gross debt and therefore gross debt may really matter when one considers government insolvency.

10The current account balance could be added as this may indicate the extent to which domestic demand outpaces supply—another cause of instability. We decided to leave out the current deficit, which is related to the difference between savings and investment, so as not to assign excessive weight to the growth resources component. However, the results would not have changed markedly if the current account deficit had been introduced with equal weighting as the other instability components.
F. Sources-of-Growth Component

Table 8 shows the results for the sources-of-growth component. It has two subcomponents—the investment to GDP ratio and an institutions indicator. In East Asia, the PRC; Singapore; Hong Kong, China; and Viet Nam have relatively high scores, while the Philippines and Indonesia have relatively low scores. The EU and the US have generally lower scores than East Asia, with the US exhibiting the lowest scores.

Table 8. Standardized Scores of the Sources-of-Growth Component

<table>
<thead>
<tr>
<th>Country</th>
<th>Investment/GDP</th>
<th>Institutions</th>
<th>Average</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>0.318</td>
<td>0.281</td>
<td>0.299</td>
<td>9</td>
</tr>
<tr>
<td>Malaysia</td>
<td>0.243</td>
<td>0.495</td>
<td>0.369</td>
<td>7</td>
</tr>
<tr>
<td>Philippines</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>10</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.294</td>
<td>1.000</td>
<td>0.647</td>
<td>2</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>0.792</td>
<td>0.221</td>
<td>0.506</td>
<td>4</td>
</tr>
<tr>
<td>PRC</td>
<td>1.000</td>
<td>0.411</td>
<td>0.706</td>
<td>1</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>0.243</td>
<td>0.866</td>
<td>0.555</td>
<td>3</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>0.551</td>
<td>0.281</td>
<td>0.416</td>
<td>5</td>
</tr>
<tr>
<td>Taipei,China</td>
<td>0.221</td>
<td>0.562</td>
<td>0.391</td>
<td>6</td>
</tr>
</tbody>
</table>

Region:

- ASEAN 6: 0.413, 0.368, 0.390, 3
- East Asia 4: 0.848, 0.417, 0.632, 1
- East Asia 10: 0.746, 0.408, 0.577, 2
- USA: 0.115, 0.512, 0.313, 6
- Eurozone: 0.190, 0.564, 0.377, 5
- EU: 0.168, 0.585, 0.377, 4

Source: Authors’ calculations.

G. Growth-with-Resilience Scores

Table 9 presents the average of the three components of the GWR index. Economies with the highest scores are Hong Kong, China; Singapore; Thailand; and Malaysia. With the lowest scores are Indonesia and the Philippines.

The four high-GWR countries were highly impacted by the global recession and registered relatively high declines in real GDP in 2009 (see Table 3). In contrast, the two low-GWR countries, though affected by the global downturn, did not even register a fall in GDP during the period.

The question arises therefore as to why Hong Kong, China; Singapore; Thailand; and Malaysia have relatively high GWR scores. The answer to this

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11It can be argued that the index should include either savings or investment because theoretically these should tend to be equal. In practice, however they are not.
seeming contradiction is that while these economies are highly export-oriented and therefore very open, Indonesia and the Philippines are more domestically oriented.12

Looking at the regional scores of the GWR index, East Asia as a region registered higher scores than the US and the EU. This may explain why it had not been as deeply affected as the US and the EU by the global financial crises and the consequent recession.

Table 9. The Growth-with-Resilience Index

<table>
<thead>
<tr>
<th></th>
<th>Total Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>0.282</td>
<td>10</td>
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<tr>
<td>Malaysia</td>
<td>0.553</td>
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<td>Philippines</td>
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<td>Singapore</td>
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<tr>
<td>Thailand</td>
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<td>Viet Nam</td>
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<tr>
<td>PRC</td>
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<tr>
<td>Hong Kong, China</td>
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<td>Republic of Korea</td>
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<tr>
<td>Taipei, China</td>
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<td><strong>Region:</strong></td>
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<tr>
<td>ASEAN 6</td>
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<td>East Asia 4</td>
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<tr>
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<tr>
<td>EU</td>
<td>0.410</td>
<td>5</td>
</tr>
</tbody>
</table>

PRC = People’s Republic of China.
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Source: Authors’ calculations.

V. CONCLUSION

This paper constructed a growth-with-resilience index based on three components—market flexibility, macroeconomic stability, and sources of growth—and used this to compare East Asia with the EU and the US. The main findings are the higher GWR scores for East Asia, which may explain why the impact of the 2008–2009 global recession on the region was milder.

The study also revealed East Asia to be a very heterogeneous area, with major differences in the countries’ economic, political and social realities, being seemingly larger than those in the US and the EU. Therefore the East Asia average should be interpreted with some caution. Indeed, the Philippines and

12As a matter of fact, there is a highly correlated and statistically significant relationship between the recession impact on East Asian economies as calculated in Table 3 and export dependence as calculated in Table 2.
Indonesia in East Asia actually registered lower GWR scores than the EU or the US.

The main policy implication of this study is that the pursuit of macroeconomic stability and market flexibility would enable countries to better withstand external shocks. This ability could be reinforced by high rates of saving and investment and the development of appropriate institutions conducive to growth.
## APPENDIX 1: THE DATA

Table A1.1. Data for the Market Flexibility Component

<table>
<thead>
<tr>
<th>Asian Economies:</th>
<th>Market Regulation(^a)</th>
<th>Soundness of Banks(^b)</th>
</tr>
</thead>
<tbody>
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<tr>
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<td>Philippines</td>
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<td>Thailand</td>
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<td>Viet Nam</td>
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<td>PRC</td>
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<td>Hong Kong, China</td>
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<td>Republic of Korea</td>
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<td>7</td>
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<td>Taipei, China</td>
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<td>6</td>
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<tr>
<td>Regions:</td>
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<tr>
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<tr>
<td>USA</td>
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<td>Eurozone</td>
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</tr>
<tr>
<td>EU</td>
<td>6.97</td>
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</tr>
</tbody>
</table>

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\(^a\)This index ranges from 0 to 10, with higher scores indicating greater economic freedom. Data, sourced from Gwartney et al. (2010), pertains to 2008.

\(^b\)This index ranges from 1 to 7, with higher scores indicating greater soundness. Data sourced from World Economic Forum (2010).

<table>
<thead>
<tr>
<th>Asian Economies:</th>
<th>Consumer Price Changes (%)</th>
<th>Government Debt/GDP (%)</th>
<th>Government Debt/GDP (%)</th>
<th>Unemployment Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Singapore</td>
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<td>5.41</td>
<td>93.61</td>
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<td>Thailand</td>
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**Regions:**

<table>
<thead>
<tr>
<th>Regions</th>
<th>Consumer Price Changes (%)</th>
<th>Government Debt/GDP (%)</th>
<th>Government Debt/GDP (%)</th>
<th>Unemployment Rate (%)</th>
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</thead>
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<tr>
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<td>EU</td>
<td>2.48</td>
<td>-2.65</td>
<td>61.53</td>
<td>7.78</td>
</tr>
</tbody>
</table>

**Note:** Data shown are the averages for 2001–2008. The figures for ASEAN, East Asia 4, East Asia 10, the EU, and the eurozone are weighted averages, where the weights are the GDP of the respective economies forming part of these groupings.

Table A1.3. *Data for the Sources-of-Growth Component*

<table>
<thead>
<tr>
<th>Asian Economies:</th>
<th>Investment (% of GDP)</th>
<th>Institutions$^a$</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Rank</td>
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<td><strong>Regions:</strong></td>
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<tr>
<td>EU</td>
<td>20.79</td>
<td>5</td>
</tr>
</tbody>
</table>

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$^a$This index ranges from 1 to 7. Data sourced from World Economic Forum (2010).

APPENDIX 2: SUBCOMPONENTS OF MARKET FLEXIBILITY

Market Regulations

The market regulations index produced by Gwartney et al. (2010) as part of the Freedom of the World Index has three main headings: (i) credit market regulations, (ii) labor market regulations, and (iii) product market regulations.

Each heading has the following components:

(i) Credit market regulations
   a. ownership of banks
   b. foreign bank competition
   c. private sector credit
   d. interest rate controls

(ii) Labor market regulations
   a. hiring regulations and minimum wage
   b. hiring and firing regulations
   c. centralized collective bargaining
   d. regulations on hours
   e. mandated cost of worker dismissal
   f. conscription

(iii) Product market regulations
   a. price controls
   b. administrative requirements
   c. bureaucracy costs
   d. costs of starting a business
   e. extra payments or bribes
   f. licensing restrictions
   g. cost of tax compliance.

Data used in the GWR index refer to 2008. Results do not change significantly though if a chain-linked index over 9 years (since 2000) is used. The chain-linked index produced by Gwartney et al. (2010) does not cover all the countries, thus 2008 scores were used in this paper.

Soundness of Banks

The soundness of banks index was developed by the World Economic Forum as part of the eighth pillar, financial market development, of its global competitiveness index (World Economic Forum 2010). It is formulated from experts’ responses to the following question: “How would you assess the soundness of banks in your country?” Scores range from 1 (insolvent and may require a government bailout) to 7 (generally healthy with sound balance sheets).
APPENDIX 3: SUBCOMPONENTS OF INSTITUTIONS

The institutions index developed by the World Economic Forum as the first pillar of its global competitiveness index (with a weight of 15% of the GCI) is very wide-ranging in its coverage and relates to public and private institutions (the former being weight 3 times as much as the latter) (World Economic Forum 2010). The elements of the institutions index are summarized below.

(i) Public institutions
   a. property rights
      i. property rights
      ii. intellectual property protection
   b. Ethics and corruption
      i. diversion of public funds
      ii. public trust of politicians
      iii. irregular payments and bribes
   c. Undue influence
      i. judicial independence
      ii. favoritism in decisions of government officials
   d. Government inefficiency
      i. wastefulness of government spending
      ii. burden of government regulation
      iii. efficiency of legal framework in settling disputes
      iv. efficiency of legal framework in challenging regulations
      v. transparency of government policymaking
   e. Security
      i. business costs of terrorism
      ii. business costs of crime and violence
      iii. organized crime
      iv. reliability of police services

(ii) Private institutions
   a. Corporate ethics
      i. ethical behavior of firms
   b. Accountability
      i. strength of auditing and reporting standards
      ii. efficacy of corporate boards
      iii. protection of minority shareholders’ interests
      iv. strength of investor protection
### Table A4.1. Weights of GWR Index Subcomponents

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight (%)</th>
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<td>Credit market regulations</td>
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</tr>
<tr>
<td>Labor market regulations</td>
<td>5.55</td>
</tr>
<tr>
<td>Product market regulations</td>
<td>5.55</td>
</tr>
<tr>
<td>Soundness of Banks</td>
<td>16.65</td>
</tr>
<tr>
<td>Stability (Room for Maneuver)</td>
<td>33.30</td>
</tr>
<tr>
<td>Inflation</td>
<td>6.66</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>6.66</td>
</tr>
<tr>
<td>Government deficit/GDP</td>
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<tr>
<td>Government gross debt/GDP</td>
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</tr>
<tr>
<td>Current account balance/GDP</td>
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<tr>
<td>Sources of Growth</td>
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</tr>
<tr>
<td>Investment/GDP</td>
<td>16.65</td>
</tr>
<tr>
<td>Institutions</td>
<td>16.65</td>
</tr>
</tbody>
</table>

Source: Authors’ representation.
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   1. **Third Level: Caps and Lower Case, Bold, Indented**

      a. **Fourth Level: Caps and Lower Case, Bold, Double Indented**

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Use italics for scalar variables, use boldface to specify vectors and matrices, and use script for sets. All other letter symbols will appear as italics in print (except \text{log}, \text{cov}, \text{max}, \text{exp}, \text{lim}, \text{In}, \text{var}, etc.). Equations should be numbered consecutively, and the equation numbers should be in parentheses flush right at the end of the line. Numbers between –1 and +1 should have 0 before decimal point.

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Citations in the text or footnotes should give only the name of the author(s), year of publication, and possibly a page number or chapter number, as follows: Hayek (1960, 200), (Cornwall 1965a, 1965b; Watts 1999). References to authors in the text must exactly match those in the reference section. Citations should take the place of footnotes whenever possible.

The section for references, which should follow the main text and begin on a new page, should have complete, verified information including the first names (not just the initials) and surnames of the authors and journal names in full (no abbreviations). No item should appear in the references if it has not been cited in the text. For titles of articles, books, and theses, use the “up” style of capitalization and do not use quotation marks. Journal articles must include the volume, issue number (or month), and page numbers. The reference list should be organized alphabetically by author's last name and then by year, in ascending order. References should conform to the following examples:

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