Capital Controls and Exchange Rate Regime in India

by
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Abstract

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Until the early 1990s, India had a system of very strong capital controls. That allowed India's central bank to have the benefit of monetary policy autonomy while operating a fixed exchange rate regime. From the late 1990s, however, restrictions on the current and capital accounts were substantially eased. The resulting increases in capital inflows created difficult challenges for monetary policy. The main purposes of this study are to analyze the changes in capital controls in India, to classify the exchange rate regime and to investigate whether the changes in capital controls had an influence on the exchange rate regime.

The first part of the dissertation focuses on capital controls and introduces a new method of measuring a country's *de jure* restrictions on cross-border capital transactions. The distinctive feature of this new index is not only its level of disaggregation, but also coverage by month. That allows us to record changes in capital controls more precisely. The new index does an excellent job in picking up some of the important changes in capital controls and it shows us that even though India still maintains significant capital

controls, there has been substantial movement toward a more open capital account in recent years.

The second part of the dissertation focuses on India's exchange rate regime. According to the official classification, the exchange rate of the Indian rupee has been a "managed float" since the 1990s. However, recent research has implied that the rupee may have been loosely pegged to the U.S. dollar. This study presents a classification of India's exchange rate regime and also investigates whether changes in capital controls have had any influence on the exchange rate regime. The results reveal that the Indian rupee was *de facto* pegged to the U.S. dollar between 2001 and 2003 but it has been moving toward greater flexibility in recent years. My analysis shows that there is indeed a link between changes in capital controls and the exchange rate regime. The study also shows evidence that India's exchange rate policy led to distortions in monetary policy objectives of the central bank.

Dedication

To Baba, Ma and Janice.

Acknowledgement

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CHAPTER ONE
INTRODUCTION

Background of the Study

Sound macroeconomic policies and steady reforms since 1991 have allowed India to grow at a much faster rate in recent years. An average growth of about 8¾ percent between 2003-04 and 2007-08 made India one of the world's fastest growing economies (IMF, 2008). The poverty rate of 36 percent in 1993 had also dropped to under 28 percent in 2004. The combination of these factors along with India's increasing financial integration attracted huge capital inflows reaching a record of $45 billion from 2006 to 2007. Overseas investors bought a net $18.8 billion of stocks and bonds during the period of January to November 2007, doubling the previous record of $9.5 billion in the same period in 2006.

The Indian economy showed remarkable resilience to the global financial crisis in 2008. During the crisis year of 2008, the country managed to grow at 6.7 percent and the second and third quarter of 2009 reported a 7.9 percent growth over the corresponding quarter of the last financial year. Net capital inflows were also substantially higher at $23.6 billion (RBI, 2010) in the second quarter of 2009-10 compared with $7.1 billion in the second quarter of 2008-09. This is certainly good news but it has also created some problems for policy makers in India.

As large volumes of capital enter the country it creates excess liquidity and put pressure on the rupee (the Indian currency) to appreciate. This has complicated the task of conducting monetary policy. Policymakers have intervened by partially sterilizing the

inflows of capital. But this policy has helped to maintain a wide interest differential, which in turn has probably helped to intensify the inflows, thus putting further pressure on the exchange rate. According to official IMF classification and the Reserve Bank of India (RBI), the exchange rate of the Indian rupee is "managed float." However, recent research on the RBI's interventions has implied that the rupee may be effectively loosely pegged to the U.S. dollar (Zeileis *et al,* 2007). That link to the dollar, combined with the easing of restrictions on India's current account and capital account during the 1990s, suggests a potential conflict with the Reserve Bank's efforts to conduct an autonomous monetary policy directed toward stabilizing the domestic economy.

Until the early 1990s, India had a system of strong capital controls. In the spirit of the theory of impossible trinity[1], these controls made it possible for India's central bank to operate a fixed exchange rate regime and also have monetary policy autonomy. During the 1990s, however, restrictions on the current account and the capital account were substantially, though not completely, eased. The resulting increases in capital inflows created difficult challenges for monetary policy. In particular, they generated pressures for nominal exchange rate appreciation of the rupee against the dollar thus hurting India's external competitiveness. In order to counteract this pressure, the RBI intervened by

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[1] The theory of "impossible trinity" states, in the long term no country can simultaneously have an open capital account, a fixed exchange rate, and a monetary policy targeted on the domestic economy. Specifically, once the capital account is open and the exchange rate is fixed, monetary policy is driven solely by the need to uphold the fixed exchange rate. For example, when there is a pressure on the currency to appreciate, the central bank must buy foreign currency to prevent an actual currency appreciation. Financing the purchases requires an increase in the monetary base, which will be a problem if the need of the hour is to tighten monetary policy. As an alternative, the bank might seek to finance the purchase of foreign currency by offsetting sales of other domestic assets, such as its holding of government debt (a process known as sterilization); but those actions will exacerbate the rise in interest rates, attracting further inflows.

buying foreign exchange. But too much intervention could lead to excess domestic liquidity, and consequent inflationary pressures. The challenge is to balance these two considerations - external competitiveness versus domestic inflation. This became an increasingly complex problem.

Statement of Purpose

The major purpose of my dissertation is to analyze the degree of capital controls in India and classify the exchange rate regime. Another goal is to investigate whether changes in capital controls had any impact on the exchange rate regime. In the first part of the dissertation I utilize the available information on capital transactions provided by the IMF and the Reserve Bank of India to document in detail how capital restrictions in India have been changing over the years. Additionally, I explore the advantages and disadvantages of the current measures of capital controls and combine the strengths of these measures to construct a more effective new measure of capital controls. In the second part of the dissertation I present an analysis of India's exchange rate regime and implications for India's policy makers.

Overview of the Methodology

Most of the current indices on capital controls are constructed very simplistically. So a new method of constructing capital control index is absolutely necessary so that the level of capital controls can be accurately measured. I introduced a new measure of

capital controls in this study. The measure is based mainly on the information available on IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). Additionally, I used information provided by the Reserve Bank of India. The new index is a de jure measure i.e. it captures only what the country announces in its law and regulation of capital flows.

On India's exchange rate regime classification I rely mainly on the methodology used by Frankel and Wei (2008). This method uses a synthesis specification that allows estimation of weights given to different foreign currencies at the same time as estimation of the tendency of monetary authorities to allow exchange market pressure to show up in the exchange rate, versus official intervention. I also critique their conclusions about the dates of changes in exchange rate regimes.

Research Questions

From the available information in yearly issues of AREAER it is clear that many recent changes have occurred to India's policy on capital controls even though many controls still remain. These changes have not been adequately reflected in many of the major indices of capital controls. On the issue of exchange rate classification, recent studies such as Zeileis *et al* (2007) and Cavoli and Rajan (2008) have concluded that India's currency is effectively loosely pegged to the U.S. dollar even though the official and IMF *de facto* classifications are 'managed float' in recent periods. Given the above, the primary questions for this study are:

1. What is the degree of capital controls in India and how have they changed in recent years?

2. What is the de facto exchange rate regime in India? Have there been any changes in recent years?

Scope and Limitations

This study focuses on India's capital controls and exchange rate regime since the beginning of economic reforms in 1991. As mentioned above, the new index of capital controls presented in this study is a de jure measure because it is based only on official information provided by the country authorities. However, one limitation of this approach is that official information does not always reflect the true story behind capital control policies. For example, a country can have very strict rules on capital controls but enforcement may be relatively soft. This study does not present any de facto measure of capital controls even though such measures can also provide useful information.

Summary of the Remaining Chapters

The rest of the dissertation is organized as follows. There are two parts. The first part focuses on India's capital controls and it covers chapters two through four. The second part focuses on India's exchange rate regime and it covers chapters five and six. Chapter two provides detailed analysis of the currently available measures of capital controls including the advantages and limitations of those measures. The third chapter

presents a detailed documentation of the history of capital account liberalization in India and provides detailed information on India's capital controls since 1991. Chapter four introduces a new method of measuring capital controls. Most of the current measures do not distinguish between capital inflows and outflows with two notable exceptions being Rossi (1999), Potchamanawong (2007) and Schindler (2009). Measuring inflows and outflows separately is important because imposing controls on one side may have different implications for exchange rate policy, for instance, than controls on the other side. This chapter also presents an estimation of the degree of capital controls in India based on the new and existing measures of capital controls. Chapter five presents a literature review of the important studies on classification of exchange rate regimes. Chapter six provides an analysis of India's exchange rate regime and implications for policy makers. Lastly, chapter seven provides the summary of the dissertation and concluding remarks.

PART I – CAPITAL FLOWS AND CONTROLS

CHAPTER TWO
LITERATURE REVIEW ON MEASURES OF CAPITAL CONTROL

Introduction

The most common approach to measuring a country's level of capital controls is to use official information on legal restrictions on cross-border capital flows. The conventional binary indicator of capital account openness is based on information contained in the International Monetary Fund's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER) for each of the IMF's member countries. This approach is used to generate de jure measures of capital controls i.e. measures that are based only on officially provided information, not necessarily reflecting the reality on capital controls in countries.

Quinn's (1997) methodology provides one of the best capital restriction measurements due to the disaggregation of data and length of the period covered. However, it has some drawbacks. Some information, such as exchange tax information, is stated unclearly and inconsistently by many countries, especially developing countries. It is a major drawback of this measurement since exchange tax is one of the important criteria in determining degree of capital mobility. In addition, Quinn's measurement suits best with the earlier format of AREAER. Others such as Miniane (2004), Edwards (2005), Chinn and Ito (2006) and Potchamanawong (2007) have developed finer measures of capital account openness using disaggregated information from the AREAER.

Another approach is to use a de facto measure that tries to take into account how much a country is integrated into international capital markets in practice. A measure of gross flows as a ratio to GDP captures two-way flows, which one would expect to see if economies were in fact sharing risk efficiently in a world with multiple financial instruments and agents with different risk profiles. Using the sum of gross inflows and outflows as a ratio to national GDP also yields a nice symmetry with the widely-used measure of trade openness, which is the sum of imports and exports as a ratio to GDP. But as Prasad (2009) points out, such flows tend to be quite volatile and are prone to measurement error.

Some studies have estimated deviations from CIP as an indication of international financial market integration. Examples of such studies include Frankel and Levich (1975), Taylor (1989), and Frankel (1991). Some recent studies, such as Hutchison *et al* (2009) have examined the de facto effects of capital account liberalization in India by measuring deviations from covered interest parity (CIP) over time. They measure a no-arbitrage band for small deviations from CIP where the upper and lower threshold points are determined by the intensity of capital controls and transaction costs. Ma *et al* (2004) and Misra and Behera (2006) have examined variations in deviations from CIP arbitrage conditions in India over time using simple summary statistics and qualitative methods. They find that smaller deviations from covered interest parity are an indication of greater capital account openness since the advent of India's capital control liberalization. Pasricha (2008), investigating interest rate differentials, also finds that India is de facto more open than de jure measures such as the Chinn-Ito index suggest.

Both de jure and de facto measures provide valuable information. De jure measures are relevant for analysis of the effects of capital account liberalization policies. But, as pointed out earlier, the existence of capital controls often does not accurately capture an economy's actual level of integration into international financial markets. These measures do not capture the degree of enforcement of capital controls (or the effectiveness of that enforcement), which can change over time even if the legal restrictions themselves remain the same. For example, many countries with extensive capital controls have still experienced massive outflows of private capital, while some economies with open capital accounts have recorded few capital inflows or outflows. For instance, despite its extensive regime of capital controls, China has not been able to fully block inflows of speculative capital in recent years (Prasad and Wei, 2007). A further complication is that, despite the extensive coverage of the IMF's annual AREAER publication, there could be other regulations that effectively act as capital controls but are not counted as controls. For instance, prudential regulations that limit the foreign exchange exposure of domestic banks could, under certain circumstances, have the same effect as capital controls.

Evolution of the AREAER

The initial method of measuring capital restrictions is based on the information of line E.2, which is "Restrictions on payments for capital transactions", from the IMF's AREAER published between 1967 (which refers to information in 1966) and 1996 (which refers to information in 1995). It generally described the existence of rules and

restrictions of the overall capital payment transaction. Since 1996 AREAER divides capital transaction restrictions into thirteen separated categories. In each category there is information about capital restrictions on inflows and outflows. It describes whether residents and nonresidents have the ability to make transactions freely, whether it is required to acquire prior permission from the government, or whether it is totally forbidden to conduct this particular type of transaction. The new format provides insight into the intensity of capital transactions, creating wider coverage of information instead of the generic narrative descriptions of capital transaction restrictions in the earlier format of AREAER. This allows scholars constructing indices better reflect the level of restrictions. The pioneers who have exploited the usefulness of the new format are Johnston and Tamirisa (1998) and Miniane (2004). The formers take every item into account, while the latter only considers the twelve main categories and dual exchange rate arrangements to create capital control measures. Unfortunately, the new format of AREAER also introduces a structural break in the measure since the two classification methodologies (one entry versus 13 entries) cannot easily be mapped onto each other (Edison *et al.*, 2004). In the following few paragraphs I present a description of recent measures of capital control.

Quinn (1997)

Quinn is the first scholar to apply the level of intensity to capital control measure. As mentioned earlier, it is widely accepted that Quinn's methodology is one of the best measures due to disaggregation of data and length of the covered period. But the study is focused on OECD countries with information on only selected years for other countries.

The openness index is available from 1950-1997 for 21 OECD countries. For 43 non-OECD countries, the index is available only for years 1958, 1973, 1982, and 1988.

Quinn's openness index is the combination of international agreements (0-2), current account transactions (0-8), and capital account transactions (0-4). The score ranges from 0 (fully restricted) to 14 (fully liberalized).

Quinn applies a similar set of rules to determine the level of openness of current and capital accounts. The criteria are based on the government's approval and taxation on the transactions. The method relies on tax information to distinguish between value of 1 (heavily taxed) and 1.5 (taxed). However, taxes on capital transactions normally are not reported by countries. Thus a coder has to use subjective judgment or find another source of information to replace the tax information when coding. The criteria, especially taxation, work well for the current account category but not very well on the capital account side due to the lack of information on the taxation on capital transaction. Thus Quinn's coding rule might not fit very well on the capital transactions side.

Details of Quinn's capital restriction measurement are as follows:

X = 0 if approval is required and rarely given and surrender of receipts required.

X = 0.5 if approval is required and sometimes given.

X = 1 if approval is required and frequently given; if approval isn't required and heavily taxed.

X = 1.5 if approval isn't required and taxed.

X = 2 if not restricted.

The construction of Quinn's measure is based on the earlier version of AREAER, which consists of two main sections: Capital Receipts and Capital Payments. Quinn's coding rules are based on the overall (aggregated) information of the capital transactions (including both capital receipts and capital payments). This aggregation method is difficult to apply to the new disaggregated format, since each subcategory of capital transaction does not have the same policy, i.e. a country might put more controls on money market transactions than portfolio investment transactions or on any other transactions. As a result, it is difficult for an individual coder to decide what level of restrictions should be assigned. Therefore, personal judgment is needed to decide in what degree of capital controls a particular country would fall into. This can lead to inconsistency in the data set. This problem can be reduced by assigning two coders and cross check with each other as Quinn did.

Johnston and Tamirisa (1998)

This measure is the most disaggregated measure of capital controls since it combines all the classifications (including all the subcategories) of the IMF's AREAER. It also distinguishes capital inflows from capital outflows and between different types of transactions by assigning binary values to each subsection (i.e. purchases and sales locally by nonresidents, purchases and sales abroad by residents, to residents from nonresidents, and so on) of the 13 main capital transaction categories. The data is available for only 1996 with a sample of 45 developing and transition countries. The

authors assume that unavailable data corresponds to unregulated transactions. However, according to the manual of the AREAER, the omitted information implies lack of information; not necessarily unregulated transaction. Unfortunately, in some cases, the AREAER shows lack of consistency for its reports on the restrictions of capital transactions. The omitted information is likely due to the liberalization of such transactions that encouraged IMF to not state such transaction; and therefore the omissions are not due to lack of information. Johnston and Tamirisa's method seems to be a bold action to assume missing data as liberalized transaction, which is not always the case.

Rossi (1999)

This study focuses on 15 developing countries over the period 1990-97. Countries included in the sample are Argentina, Brazil, Chile, Columbia, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Philippines, South Africa, Thailand, and Venezuela.

Rossi uses Johnston and Tamirisa's capital control measure as a starting point for both inflow and outflow capital transactions. Two indices of capital controls (KINF and KOUT) are calculated. After being slightly modified to account for an alternative classification of some of the items in the capital account, the 1997 indices are then back casted to 1990 using an algorithm which mimics the main episodes in the process of capital account liberalization with the information from AREAER.

There can be various types of restriction policies. For example, the liberalization can be extensive and abrupt ("big bang"), gradual over time, or temporarily or permanently reversed. In the first case, i.e. "big bang" liberalization, if the liberalization starts on or before the first year of the sample period with no reversal, the index does not vary over the remaining period; thus, the 1997 value can be used. In the second case of a gradual policy starting before or on the first year of the sample period, the value of the 1997 index can be back casted to 1990 by calculating the number of years the gradual policy is implemented for, and, assuming an initial value for the index at the time the gradual policy is initiated, by increasing the 1997 value proportionally. The third case of reversals is difficult to deal with and require calculating how much of the previous liberalization is reversed. One possibility is to assume that gradual reversals move at the same pace as gradual liberalization; in this case, the reversals can be taken care of by inverting the path of the simulation. The same principle, however, does not apply to cases in which either there is a reversal after "big bang" liberalization, since it cannot be assumed that the new temporary controls (reversals) represent a total closure of the capital account, or that the reversal proceeds faster than the previous liberalization.

Glick and Hutchison (2000a; 2000b)

This study focuses on a panel data set of 69 developing countries over the period of 1975-1997. The main source of the capital controls information is the IMF's AREAER; the authors assign a value of 1 if the country's capital transaction is liberalized, 0 otherwise, reversing the sign of the previous literatures' measure. However,

after 1996 the IMF adopted a new format for AREAER. This prompted the authors to adopt another method by giving a value of 0 if more than 5 out of the 13 capital transactions were controlled, otherwise 1 (controls in four or less capital transactions). The control index thus still takes a binary form, but the pre-1996 and post-1996 values have different meanings: the former index is based on the imposition of any capital controls while the latter is based on the number of types of capital controls. Counting how many capital transactions are restricted does not really provide an accurate picture of capital controls since some countries might have the same number of restrictions but on different capital transactions. The control variables used in the regression analysis are export growth, the ratio of broad money to foreign reserves, credit growth, current account to GDP ratio, and dummy variables for banking crises and fixed exchange rate regimes.

Miniane (2004)

This capital control index was created by extending the 13 disaggregated capital transaction categories reported in the AREAER back to 1983 from 2000, covering 34 developed and developing countries. Each category is coded as a one if at least one restriction exists for that item, zero otherwise. However, Miniane omitted the control on personal capital movement category due to the lack of consistent information in past editions of the AREAER. He then adds dual/multiple exchange market and takes average of the 13 categories (12 capital transactions plus dual/multiple exchange market) to create the capital restriction index, which doesn't distinguish between inflows and outflows.

However, there are some drawbacks of this method. The binary method can capture only extreme cases of either total capital controls or fully liberalized. It cannot distinguish the intensity of control on each category. It cannot capture the change from relatively strong level of controls to weak levels. It only captures the changes from full controls to having no controls. However, the disaggregation of capital account restriction could solve this problem.

The details of regulation on capital market securities, money market instruments, collective investment securities, and derivatives and other instruments, are not stated for the previous format, forcing Miniane to use a backward-inductive method. He argues that after the "Big-Bang" (capital liberalization era), the capital controls have not fluctuated much. By using this method, however, the data might not reflect the actual movement of restrictions since they would vary according to the tightening and easing of controls over the sample period.

Edwards (2005)

Edwards (2005) created a capital mobility index by combining information of Quinn (2003) and Mody and Murshid (2005), based on data from 1970 to 2000 covering 163 countries. The index has a scale ranging from 0 to 100, where higher values indicate a higher degree of capital mobility. A score of 100 denotes absolutely free capital mobility. Stata's "impute" command[2] is used to predict missing values of Edwards' index

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[2] The "impute" command fills in missing values for the dependent variable (depvar) based on a set of independent variables (indepvars), creating a new dependent variable (newvar1).
Stata syntax: impute depvar indepvars, generate(newvar1)

based on the following factors: the two original indices (Quinn; Mody and Murshid), their lagged values, openness as measured by import tariffs collections over imports, the extent of trade openness measured as imports plus exports over GDP, and GDP per capita. Finally, country specific data is used to revise and refine the control measure created by the impute procedure. This measure has the largest country sample coverage and longest range of year coverage.

Chinn and Ito (2006)

Chinn and Ito (2006) measure a country's degree of capital account openness by using principal component analysis of four major categories of external account restrictions. The categories include multiple exchange rates, restrictions on current account transaction, equally weighted average of a five-year window of restriction on capital account transaction, and surrender of export proceeds. Chinn-Ito's index is based on AREAER. It uses the first standardized principal component of four external account categories to construct the index. A higher value implies a higher degree of openness. One major drawback of the index is that it fails to provide any information on disaggregated types of capital account openness. In addition, the authors fail to offer a rationale for using principal components. The index covers 163 countries from 1970 to 2004.

Potchamanawong (2007)

Potchamanawong (2007) constructed a new measurement of capital control also based on data from IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). The measure nicely combines intensity and breadth. Potchamanawong constructed his capital control index by using equally weighted average of 13 different types of capital restrictions and on exchange rate arrangement. Each category ranges between 0 and 1 with 0.25 intervals. A higher value implies a higher degree of controls. In addition to nicely capture the degree of intensity of capital control like most indices, the Potchamanawong index also does a great job of distinguishing between controls on inflows and controls on outflows. This helps to provide a clearer picture of the effect of capital controls on macroeconomic issues such as likelihood of crises. The Potchamanawong index includes 26 developing and emerging market countries over the period from 1995 to 2004.

Omori (2007)

Omori (2007) updated a financial liberalization index that was originally developed by the International Monetary Fund (IMF). The index covers forty-two countries from 1973 to 2002. It looks at seven different types of financial liberalization which reflect the removal or relaxation of legal restriction on capital movement and financial sectors. Seven types of financial liberalization are a) Elimination of controls over credit allocation and reserve requirements, b) Elimination of interest rate controls, c) Elimination of entry barriers in the banking sector, d) Privatization of state-owned banks,

e) Capital account liberalization, f) Security market liberalization, and f) Enhancement of prudential regulations and supervision of the banking sector. Each financial liberalization policy ranges between zero and three. A higher value indicates a greater degree of the financial liberalization. The index is based on several sources including IMF's Recent Economic Development and Annual Report on Exchange Rate Arrangement and Exchange Rate.

Kaminsky and Schmukler (2008)

Kaminsky and Schmukler (2008) classify their financial liberalization index into the following three categories; deregulation of domestic financial sector, capital account liberalization and stock market liberalization. The deregulation of domestic financial sector include the deregulation of interest rate controls on both deposit and lending, credit controls as well as reserve requirement. In the category of capital account liberalization the index allows one to check whether there are regulations on off-shore borrowing by domestic financial institutions, multiple foreign exchange markets and capital inflows and outflows. The liberalization of the stock market is identified as the deregulation of restrictions on acquisition of domestic stock market shares by foreigners and the repatriation of interests and dividends. This index focuses on 28 countries, both developed and developing countries, from 1972 to 2005. The index uses data sources from both international institutions such as the IMF, BIS, the World Bank, and domestic institutions such as central banks, finance ministries, and stock exchanges of the selected

countries. The index also captures the intensity of financial liberalization which range from one to three. In this case, a higher value indicates lower levels of liberalization.

Schindler (2009)

The capital control index presented in Schindler (2009) is similar to the one used in Potchamanawong (2007). However, it looks only at breadth. It measures de jure restrictions on capital movements, capture the intensity and provide information on disaggregated capital controls. Schindler's index is also based on information from AREAER and applies similar methodology in using equally weighted averages to construct the index. Schindler uses only six types of capital restrictions while Potchamanawong uses 13 categories of capital restrictions and one exchange rate arrangement to build his index. The coding method is also quite different from Potchamanawong index. Schindler's index codes each category in binary form i.e. 0 (unrestricted) or 1(restricted). As mentioned above, Potchamanawong index's range is 0 and 1 but with 0.25 intervals. Schindler's index covers 91 countries between 1995 and 2005.

CHAPTER THREE
CAPITAL ACCOUNT LIBERALIZATION IN INDIA

Introduction

There is still a lot of debate among academics regarding the merits and demerits of capital account liberalization. Proponents of capital account liberalization argue that it fosters financial globalization which in turn leads to more efficient allocation of financial resources across countries. However, some critics e.g. Bhagwati (1998) and Rodrik (1998) have blamed capital account liberalization as being the main cause of many of the financial crises experienced by countries in recent years.

In recent years, the Reserve Bank of India (RBI) has taken what it calls a calibrated approach to capital account liberalization prioritizing certain types of flows and particular classes of economic agents. This approach has meant that India's capital account liberalization has proceeded in fits and starts, as pointed out by Shah and Patnaik (2005). But the net effect is that, over time, the capital account has become increasingly open and India has been rapidly integrating into international capital markets. In this chapter, I present a historical account of the sequencing of capital account liberalization in India during the last two decades. The details of the changes in rules and restrictions on capital transactions in India are presented in Appendix 3A.

Capital Account Liberalization in India

India began to liberalize its economy in the 1980s in order to increase its market orientation. Then in 1991 India experienced a balance of payments crisis which led the

government to rapidly expand the market-oriented reforms. Key components of the reforms were removal of government licensing controls on domestic industrial activity and trade liberalization. As a complement of trade liberalization, India achieved effective current account liberalization, as indicated by acceptance of IMF Article VIII in 1994. However, Indian policy-makers proceeded with caution in liberalizing capital flows as they felt there was less theoretical agreement on the economic benefits of capital account liberalization than for trade, and in light of the externally triggered financial crises in emerging economies around that time. Prior to the reforms, there were numerous restrictions on capital transactions. For example, profit remittances of foreign companies and banks had to be approved by the RBI. Restrictions were placed on remittances on income earned by foreign nationals as well. Residents of India were not allowed to have bank accounts outside India and individuals borrowing from abroad had to obtain prior approval from the RBI. Since then many steps have been taken to liberalize the capital account and to allow certain kinds of foreign capital flows, but a host of restrictions and discretionary controls still remain.

On FDI the limits on the share of foreign ownership was slowly increased in every sector. By 2000, while most sectors were open up to 100 percent, sectors where FDI was restricted include retail trading (except single brand product retailing), atomic energy, and betting. So far, there has been very little reverse flow of FDI. For example, in 2006-07, it was 0.01% of GDP (Shah and Patnaik, 2008). Hence, for all practical purposes, inbound FDI has been a one-way process of capital coming into the country. The easing of capital controls, coupled with strong investment opportunities in India, led

to a strong rise in FDI flows into India: from 0.14% of GDP in 1992-93 to 0.53% in 1999-2000 and then to 2.34% of GDP in 2006-07 (Rajan, Rongala, and Ghosh, 2009).

Tarapore Committee I

In 1997, a government-appointed committee (led by S.S. Tarapore) on Capital Account Convertibility (CAC) was formed to provide a road map for liberalization of capital transactions. The committee's report (RBI, 1997) emphasized various domestic policy measures and changes in the institutional framework as preconditions for full CAC. These included fiscal consolidation, low inflation, adequate foreign exchange reserves, and development of a more robust domestic financial system. On the matter of the exchange rate regime, however, the report did not squarely tackle the issue of the 'impossible trinity,' and the challenge of managing domestic monetary policy and an effectively pegged exchange rate in the face of large foreign capital flows has plagued the RBI in recent years.

Some of the major recommendations of the committee were:
i. A reduction in the gross fiscal deficit (GFD)/GDP ratio from a budgeted 4.5 per cent in 1997- 98 to 3.5 per cent in 1999-2000. The reduction in the Centre's gross fiscal deficit should be accompanied by a reduction in the states' deficit as also a reduction in the quasifiscal deficit.
ii. Steps should be initiated to separate the debt management policy from monetary management and to this effect the Government should set up its

own Office of Public Debt. The RBI should totally avoid participating in the primary issues of Government borrowing.

iii.   Transparent and internationally comparable procedures for fiscal accounting should be adopted so as not to blur the true magnitude of the GFD/GDP ratio as well as the constituents of the budget as a whole.

iv.   The RBI should be given freedom to use the instruments at its command to attain a medium-term inflation target. The mandated rate of inflation from 1997-98 to 1999-2000 should be an average of 3 - 5 per cent. Such a mandate would necessarily need to provide for greater independence for the RBI.

v.   Interest rates should be fully deregulated in 1997-98 and there should be total transparency to ensure that there are no formal interest rate controls.

vi.   The RBI should have a Monitoring Exchange Rate Band of +/- 5.0 per cent around the neutral Real Effective Exchange Rate (REER). The RBI should ordinarily intervene as and when the REER is outside the band. The RBI should ordinarily not intervene when the REER is within the band. The RBI could, however, use its judgment to intervene even within the band to obviate speculative forces and unwarranted volatility. The Committee further recommended that the RBI should undertake a periodic review of the neutral REER which could be changed as warranted by fundamentals.

vii.   There must be transparency in exchange rate policy.

viii.   As part of exchange rate management greater attention should be focused on ensuring that the forward exchange markets reflect the interest rate differentials.

ix.   Reserves should not be less than six months of imports.

x.   A uniform regulatory system needs to be put in place for banks and non banks particularly FIs in relation to prudential norms, market participation, reserve requirements and the interest rate regime.

xi.   Banks should follow international accounting and disclosure norms.

xii.   Alongside further measures of liberalization of capital inflows it is desirable to simultaneously liberalize controls on outflows as a means of contending with capital inflows.

xiii.   Foreign direct and portfolio investment and disinvestment should be governed by comprehensive and transparent guidelines and prior RBI approval at various stages may be dispensed with subject to reporting by authorized dealers. Direct/portfolio investment may be open to all non residents.

xiv.   Individuals may be allowed to invest in assets in financial markets abroad to the extent of US $ 100,000.

xv.   At the end of the three-year phasing a stock taking of the progress on the preconditions/signposts as well as the impact of the measures outlined by the Committee should be undertaken.

While the Asian crisis and subsequent contagion that spread through 1997-98 derailed the committee's recommended timetable, significant liberalization of the capital account had occurred since then, particularly with respect to inward foreign investment, aided in part by improved macroeconomic indicators and financial sector reform. A second Tarapore Committee was set up in 2006 to explore the feasibility of adopting full CAC. The following paragraph presents the policy changes that took place between Tarapore Committees I and II.

Policy Changes between 1998 and 2006

Between 1998 and 2006, several policy measures were undertaken in terms of liberalization of the capital account. Reserve requirements on domestic and foreign currency deposits by nonresidents were reduced.

Foreign companies were allowed to establish branch offices or units in Special Economic Zones to undertake manufacturing and service activities. Registered partnerships were allowed to invest abroad up to 100% of their net worth through the automatic route. The limit on investments made by mutual funds in India in companies listed abroad was raised to $1 billion from $500 million.

Indian banks were allowed to invest in money market instruments and/or debt instruments abroad subject to limits approved by their Board of Directors. Local companies making direct investments abroad were allowed to hedge the exchange rate risk in the local market by purchasing forward or options contracts from banks against

proof of the exposures. The Indian companies were also permitted to extend foreign currency loans for the personal purposes of employees of their branches outside India. Indian corporations were allowed to fund direct investments in joint ventures or wholly owned subsidiaries abroad with external commercial borrowing (ECB).

Residents were allowed to acquire property abroad using a personal remittance up to the equivalent of $25,000. Resident individuals were permitted to remit $25,000 a year for any permissible current or capital transactions.

Tarapore Committee II

In July 2006, the Prime Minister of India declared the government's intention to adopt full Capital Account Convertibility (CAC) and hence the second round of Tarapore Committee was set up. The committee's report (RBI, 2006) presented a number of observations and recommendations. The committee recommended that the sequential full capital account convertibility (FCAC) would be adopted in three phases: 2006-2007 (Phase-I), 2007-2008 and 2008-2009 (Phase-II) and 2009-2010 and 2010-2011 (Phase-III). The details of the timing and sequencing of the three phases are presented in Appendix 3B. Appendix 3C presents an additional list of items to be reviewed separately by RBI.

The report identified the objectives of FCAC as: (i) to facilitate economic growth through higher investment by minimizing the cost of both equity and debt capital; (ii) to improve the efficiency of the financial sector through greater competition, thereby minimizing intermediation costs and (iii) to provide opportunities for diversification of

investments by residents. The arguments for strengthening of policies, markets and regulation/supervision are presented in Chapters 4, 5, 6 and 7 of the report. Among other things, the report suggested that foreign institutional investors (FIIs) should be banned from investing fresh capital through issue of fresh Participatory Notes (PNs) and PNs should then be gradually phased out. External Commercial Borrowing (ECB) yearly limit should be increased.

The Tarapore committee's report stressed that there was a need to break out of the "control" mindset and the substantive items subject to capital controls should be separated from the procedural issues. This would enable a better monitoring of the capital controls and enable a more meaningful calibration of the liberalization process.

Regarding monetary policy, the Committee recommended that, consistent with overall economic policy, the RBI and Government should jointly set out the objectives of monetary policy for a specific period and this should be put in the public domain. Once the monetary policy objectives are set out, the RBI should have unfettered instrument independence to attain the monetary policy objectives. Given the lagged impact of monetary policy action, the monetary policy objectives should have a medium-term perspective. The Committee also noted that the strengthening the institutional framework for setting monetary policy objectives was important in the context of FCAC.

On the strengthening of the banking system, some of the recommendations of the Committee included the following. Additional details are presented in Appendix 3D.

i. All commercial banks should be subject to a single Banking Legislation and separate legislative frameworks for groups of public sector banks should be scrapped.

ii.   In the first round of setting up new private sector banks, those private sector banks which had institutional backing have turned out to be the successful banks. The authorities should actively encourage similar initiative by institutions to set up new private sector banks.

iii.   Until amendments are made to the relevant statutes to promote consolidation in the banking system and address the capital requirements of the public sector banks, the RBI should evolve policies to allow, on a case by case basis, industrial houses to have a stake in Indian banks or promote new banks. The policy may also encourage non-banking finance companies to convert into banks. After exploring these avenues until 2009, foreign banks may be allowed to enhance their presence in the banking system.

The committee argued that any country intending to introduce FCAC needed to ensure that different market segments were not only well developed but also that they were well integrated. Otherwise, shocks to one or more market segments would not get transmitted to other segments efficiently so that the entire financial system was able to absorb the shocks with minimal damage.

As India moved to an FCAC regime, the committee noted that it would be necessary to improve relevant regulatory and supervisory standards across the banking system to enable them to become more resilient and sustain their operations with greater stability. The following key requirements were:

i.   robust and sophisticated risk management systems in banks supplemented by a regimen of appropriate stress testing framework;

ii. efficient and reliable IT systems providing on-line data to support the risk management systems in banks;

iii. robust accounting and auditing framework;

iv. adoption of economic capital framework and risk-based allocation of capital;

v. upgrading of skills;

vi. upgrading of IT-based surveillance systems and manpower skills in the RBI;

vii. fuller compliance with Anti-money Laundering (AML)/Know Your Customer (KYC) and Financial Action Task Force (FATF) requirements and;

viii. a need for prescription of a limit on the off-balance sheet items with reference to balance sheet size.

The Committee recommended that at the end of the five-year period ending in 2010-11, there should be a comprehensive review to chalk out the future course of action.

Policy Changes Since 2006

After the second report of the Tarapore Committee was released, several new policy measures were undertaken in order to further liberalize the capital account. Resident individuals are now allowed to remit up to the equivalent of $50,000 (previously, $25,000) a financial year for any permissible current or capital transactions, or a combination of the two. Foreign investment up to 49% is allowed now in stock exchanges, depositories, and clearing corporations, with the prior approval of the

(Foreign Investment Promotion Board (FIFB). Residents may acquire property abroad using a personal remittance up to the equivalent of $50,000 (previously, $25,000) a financial year. FDI is allowed up to 100% in certain industries such as distillation and brewing of potable alcohol, industrial explosives, coal and lignite mining, petroleum and natural gas, etc (Rajan, Rongala and Ghosh, 2009).

Under the new rules, authorized dealers (ADs) are allowed to permit remittances of gifts and donations by resident individuals with a limit subsumed under the limit of $50,000 (previously, the limit was $5,000) a financial year under the Liberalized Remittance Scheme (LRS). The limit for resident individuals of $50,000 a financial year under the LRS was raised from $100,000 and then to $200,000 for permitted current and capital account transactions. Indian Venture Capital Funds (VCFs) registered with the Securities and Exchange Board of India (SEBI) are allowed to invest in equity and equity-linked instruments of offshore venture capital undertakings, subject to an overall limit of $500 million and SEBI regulations. No separate permission from the RBI is necessary for such VCFs. Mutual funds may now invest in overseas mutual funds that make nominal investments in unlisted overseas securities. They can also invest in overseas exchange-traded funds that invest in securities and American depository receipts (ADRs) and Global depository receipts (GDRs) of foreign companies as well.

In the last few years, the limit for portfolio investment by listed Indian companies in the equity of listed foreign companies that have at least a 10% stake in a listed Indian company was raised from 25% to 35% and then to 50% of the net worth of the investing company. The yearly limit for resident individuals' portfolio investment abroad was

increased to $200,000 from $100,000 as well. The aggregate ceiling for overseas investment by mutual funds was raised to $5 billion from $4 billion. FDI in certain telecom services was raised to 74% from 49%.

The limit for overseas investment by an Indian company was raised to 300% from 200% of its net worth. Indian companies and registered partnership firms were permitted to invest in overseas joint ventures/wholly owned subsidiaries up to 400% of their net worth under the automatic route.

The yearly limit for residents' real estate acquisitions abroad was increased to $200,000 from $100,000. ADs were allowed to remit gifts and donations by residents with a limit of $100,000 (previously, $50,000) a financial year under the LRS. The limit was later raised to $200,000 from $100,000. However, RBI approval is still required for external borrowing up to $20 million. Table 2-1 presents a detailed documentation of the changes in rules and restrictions on capital transactions in India between 1988 and 2009.

How Open is India's Capital Account

Even though India has been opening up its economy since 1991, on a cross-country comparison and relative to its size, India appears to have been one of the least financially open economies in the world (Prasad, 2009). What do the current measures of capital control tell us?

Table 3-1 presents a comparison of the different measures of capital control with regards to India. The values in the table are average values over the time period (1995 to

2007). All the indices have been converted into 0-1 scale and some indices (e.g. Chinn-Ito an Edwards) needed to have their signs reversed so that all can be compared with each other. Higher values (closer to 1) indicate higher degree of capital controls.

The first four measures were introduced by Pariyate Potchamanawong in his dissertation. In5 and Out5 represent Potchamanawong's capital control indices with 5 point scale. In-binary and Out-binary measures capital controls by assigning dummy values on each capital transaction category (13 categories plus dual exchange rate arrangement) and taking average. The method is similar to In5 and Out5, the only difference being there are two values (0 and 1) for each category (therefore capturing intensity less effectively), instead of 5 possible values. The normalized Chinn-Ito measure is what the name suggests. It is derived by normalizing the original Chinn-Ito index into a 0-1 scale with reversed sign to conform to other indices. The original Chinn-Ito index is constructed by using the first standardized principal component of four different current and capital transactions. The capital control index presented in Schindler (2009) is similar to the one used in Potchamanawong. Schindler uses only six types of capital restrictions. Schindler's index codes each category in binary form i.e. 0 (unrestricted) or 1(restricted). Miniane's measure is an average of dummy values on 12 capital transactions and dual exchange rate. The IMF measure is a 0/1 dummy depending on whether country has controls on outflows (0 means no controls, 1 indicates there are controls). Quinn (1997) is normalized and reversed value of its original capital account restriction index. Edwards' measure is constructed by combining data from Quinn (1997) and Mody and Murshid (2005). Johnston's index is the average of the assigned values in each subcategory of capital transaction (a value of 1 is assigned to each subcategory if

there is any control, 0 otherwise). Additional details for each of the measures can be found in the second and fourth chapters of this dissertation.

According to several measures, such as IMF, In-binary, Out-binary, normalized Chinn-Ito, Schindler, Miniane and Johnston, India has very high degree of capital controls. On the other hand, measures such as Potchamanawong, Quinn and Edwards suggest that India has moderate levels of capital controls. Detailed analysis and comparisons of the different measures are presented in the next chapter.

Capital Flows in Recent Years

India's economy was among the first in the world to recover after the recent global financial crisis. Prompt fiscal and monetary easing; combined with fiscal stimulus and the return of risk appetite in financial markets have brought growth close to pre-crisis levels (IMF, 2010). Capital inflows are on the rise, and financial markets have also regained most of the lost ground.

Figure 3-1 shows portfolio inflows and the performance of the Indian stock market (represented by movements of the BSE Sensex[3]). As expected, portfolio inflows decreased substantially during the height of the recent global financial crisis. Inflows started to rise again from June 2009. The performance of the stock market followed a very similar pattern suggesting a strong link between portfolio flows and stock market

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[3] BSE Sensex or Bombay Stock Exchange Sensitivity Index is a value-weighted index composed of 30 stocks that started January 1, 1986. The Sensex is regarded as the pulse of the domestic stock markets in India. It consists of the 30 largest and most actively traded stocks, representative of various sectors, on the Bombay Stock Exchange. These companies account for around fifty per cent of the market capitalization of the BSE.

performance. The BSE Sensex had been steadily rising between June 2005 and January 2008 before starting its downward trend. Reversal of portfolio inflows started around the same time before it started to rise again around June 2009.

Figure 3-1: Portfolio Inflows and Stock Market Performances
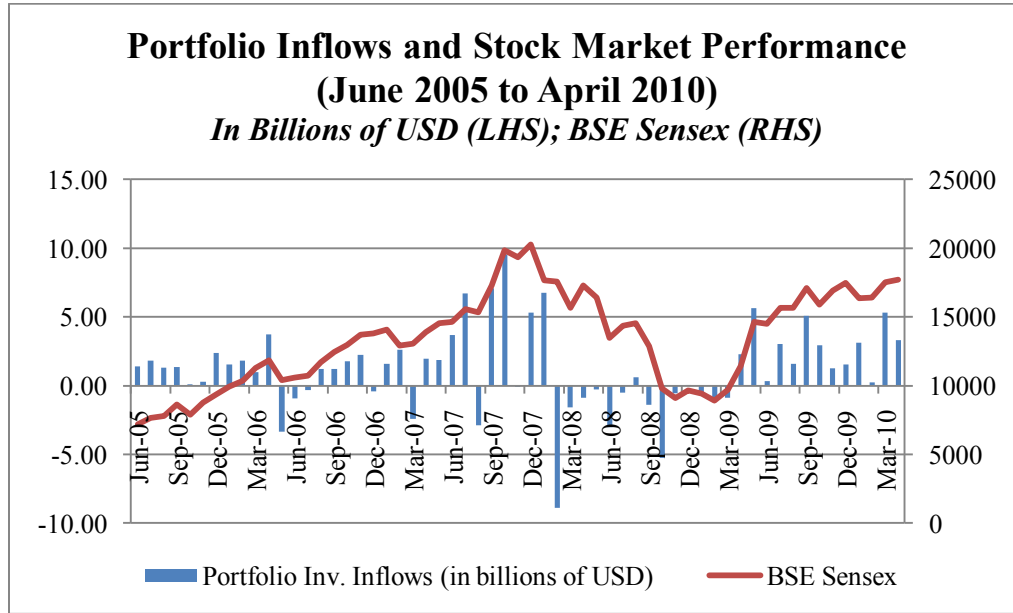
However, it would be more interesting to find out if there is any clear lead-lag relationship between portfolio flows and the stock market index. The following figures (Figures 3-2 to 3-5) show us the relationship between change in portfolio inflows and change in stock market index. Change in portfolio inflows is measured as $(PF_t - PF_{t-1})$ where PF_t is portfolio inflows in period t and PF_{t-1} is portfolio inflows in period t -1. Change in stock market index is measured as $(BSE_t - BSE_{t-1})$ where BSE_t is portfolio inflows in period t and PF_{t-1} is portfolio inflows in period t -1.

It is important to note a couple of details in the following graphs. The negative slopes of the portfolio inflows line do not necessarily imply negative portfolio inflows. Instead they imply that portfolio inflows are either slowing down or reversing. We get negative portfolio inflows or reversal of inflows only when the corresponding line dips below zero on the left-hand scale. Similarly, the negative slopes of the BSE Sensex line do not necessarily imply declining stock market index. Instead they imply that BSE Sensex is either slowing down or decling. We get declining or falling BSE Sensex only when the corresponding line dips below zero on the right-hand scale.

Figure 3-2 shows the changes in portfolio inflows and BSE Sensex. The figure does not appear to capture any obvious lead-lag relationship between the two. This is to be expected when we are looking at monthly data. If there is any lead-lag relationship it is more likely to be captured in either weekly or daily data. This is because any large change in portfolio inflows is likely to affect the stock market index almost immediately or any large change in BSE Sensex is likely to affect portfolio inflows almost immediately. Daily or weekly data for BSE Sensex is easily available. However, it is very hard to find consistent and reliable daily or weekly data on capital inflows.

Figure 3-2: Change in Portfolio Inflows and Change in BSE Sensex

Change in Portfolio Inflows vs Change in BSE
Sensex (June 2005 to April 2010)
In Billions of USD (LHS); CHange in BSE Sensex (RHS)

— Change in Portfolio Inflows (in billions of USD) — Change in BSE Sensex
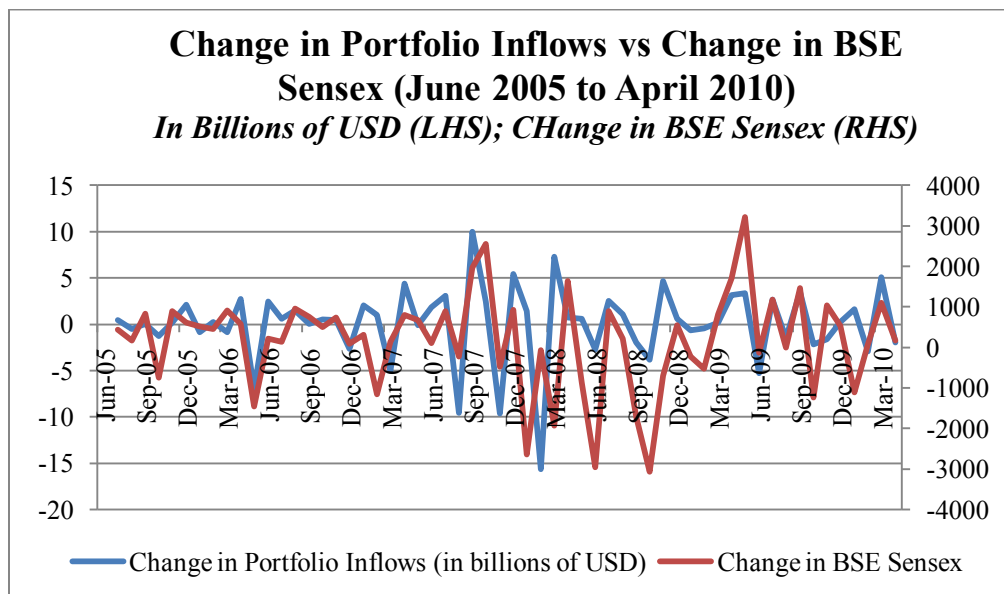
When we break the above time period into smaller periods, we see a slightly more interesting picture. We break the time period (June 2005 to April 2010) into three periods: June 2005 to June 2007 (pre Global Financial Crisis), July 2007[4] to August 2008 (early part of the crisis), and September 2008[5] (start of the severe phase of the crisis) to April 2010.

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[4] The first signs of major problems in financial markets were seen in July 2007. Bear Stearns, one of the largest investment banks in the United States, announced that two of its hedge funds had lost almost all of their investor capital and would file for bankruptcy. The bank had previously attempted to use money from other parts of its operations to bail out the funds and halted redemptions, but the losses at the funds, which eclipsed 90 percent of original holdings, proved too large. In August 2007, the subprime mortgage problems went global as hedge funds and banks around the world revealed substantial holdings of mortgage-backed securities in their investment portfolios.

[5] September 2008 marked the beginning of the most severe phase of the crisis. Several major financial events happened in quick succession. First, the U.S. government announced it would seize control of federal mortgage insurers Fannie Mae and Freddie Mac, in what was considered Washington's most dramatic credit crisis intervention to date. The two firms were plagued by mortgage defaults, and federal regulators fear their collapse could lead to massive collateral damage for financial markets and the U.S. economy. Next, a series of moves shook Wall Street. Lehman Brothers, a major investment bank, failed to find a buyer and filed for bankruptcy on September 15, marking the largest bankruptcy in U.S. history. Bank of America announced a $50 billion purchase of the investment bank Merrill Lynch, a move that reassured investors about Merrill's ability to cover its short-term debts and stave off bankruptcy. The

Figure 3-3 shows the changes in portfolio inflows and BSE Sensex between July 2005 and June 2007. There is still no clear lead-lag relationship between the two. The only pattern we see is that the changes in portfolio inflows and BSE Sensex almost always occur simultaneosly and in the same direction. There are only two instances when the changes do not occur simultaneously or move in the same direction. The first occurs between November 2005 and April 2006 when, on more than one occasion, the changes in BSE Sensex and portfolio inflows do not move in the same direction. This is interesting because the BSE Sensex was increasing at a rapid rate during that time period, from approximately 9000 in November 2005 to approximately 12000 in April 2006. The second example occurs March-April of 2007, when the recovery of BSE Sensex occurs ahead of the portfolio inflows.

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following day, ratings agencies downgraded the credit rating of the largest U.S. insurer, AIG, prompting speculation that it too might soon fail. On September 17, the U.S. Federal Reserve loaned AIG $85 billion to try to keep it afloat. The government eventually would pour substantially more money into the firm.

Figure 3-3: Changes in Portfolio Inflows and BSE Sensex *(July 05 to June 07)*

Change in Portfolio Inflows vs Change in Stock Market Index (July 2005 to June 2007)
In Billions of USD (LHS); Change in BSE Sensex (RHS)
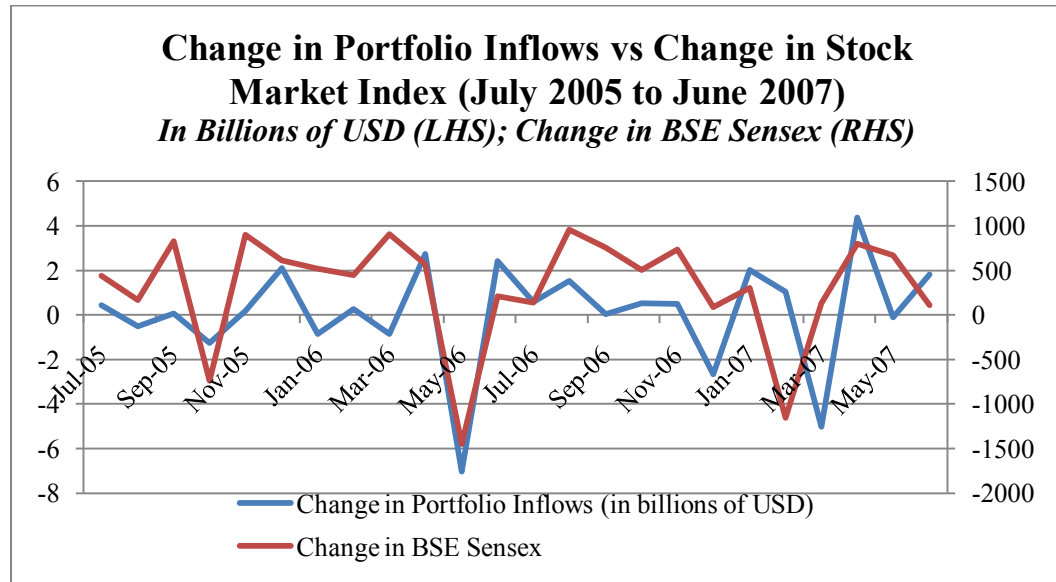
Figure 3-4 shows the changes in portfolio inflows and BSE Sensex between July 2007 and August 2008. Again, there is no clear lead-lag relationship between the two. However, between January 2008 and April 2008, the changes do not occur simultaneously or even move in the same direction. For example, BSE Sensex seems to fluctuate more than portfolio inflows. Recovery of BSE Sensex starts earlier than that of portfolio inflows. Then in February 2008, as portfolio inflows start to recover the BSE Sensex actually loses ground. After that, in March 2008, as BSE Sensex gains ground portfolio inflows slow down.

Figure 3-4: Changes in Portfolio Inflows and BSE Sensex (*July 07 to Aug 08*)
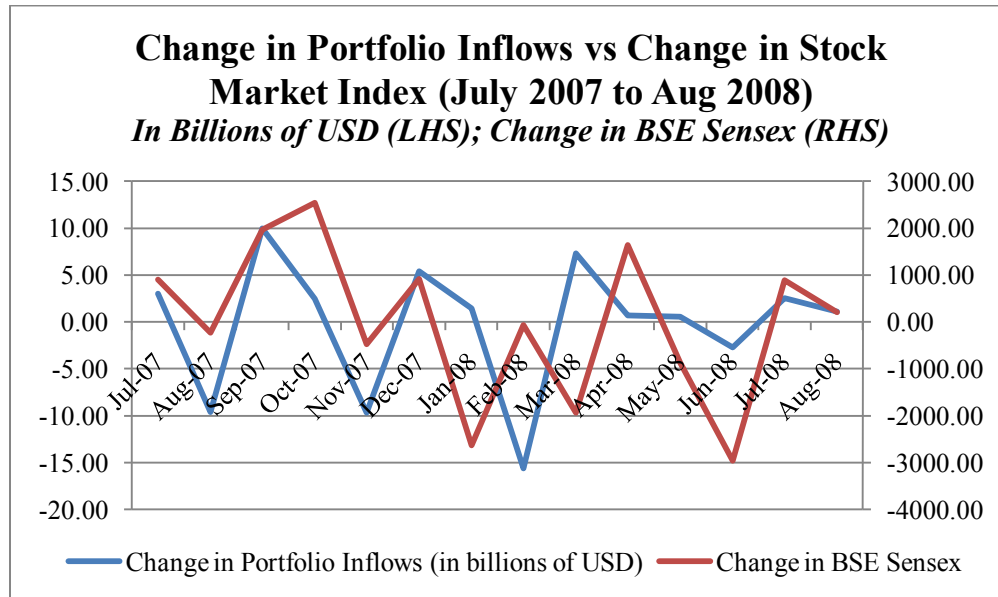
Figure 3-5 shows the changes in portfolio inflows and BSE Sensex between September 2008 and April 2010. This period includes the worst part of the financial crisis. Here too, we do not see a clear lead-lag relationship between portfolio inflows and movements of the stock market. As we can see from the figure, there is high volatility in both portfolio inflows and BSE Sensex. But the changes in them occur simultaneosly through most of this time period, except a little at the beginning and at the end. We notice that in December 2008 portfolio inflows start to slow down before BSE Sensex does so in January 2009. Then between December 2009 and January 2010, the changes in portfolio inflows and BSE Sensex do not occur simultaneously or even move in the same direction. For example, BSE Sensex starts to lose ground before portfolio inflows slow down and when the Sensex starts to recover in January 2010 we notice that portfolio inflows start to slow down at the same time.

Figure 3-5: Changes in Portfolio Inflows and BSE Sensex *(Sept 08 to Apr 10)*

Change in Portfolio Inflows vs Change in Stock Market Index (September 2008 to April 2010)
In Billions of USD (LHS); Change in BSE Sensex (RHS)

Change in Portfolio Inflows (in billions of USD)
Change in BSE Sensex
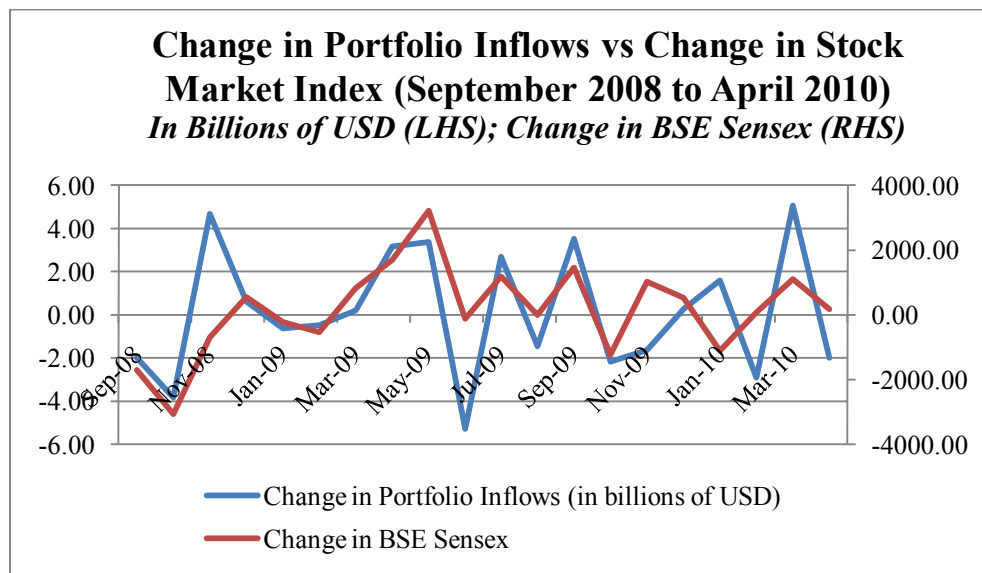
So, overall the above figures do not appear to capture any obvious lead-lag relationship between portfolio inflows and stock market movements. We find some interesting patterns when we break the time period into smaller periods, but even then we do not see any consistent patterns in their movements.

FDI (foreign direct investment) flows, as one would expect, were moderately affected during the global financial crisis. This is because FDI is unlikely to be greatly affected by short-term fluctuations in the stock market or even uncertainty in the global financial markets. Figure 3-6 nicely illustrates that. As we can see from the figure, FDI did slow down during the height of the crisis but overall it remained strong through the crisis period. This seems to suggest that the link between FDI and stock market performance is not that strong when compared to other types of capital flows.

Figure 3-6: FDI and Stock Market Performance

**FDI and Performance of Stock Market (June 2005 to April 2010)
In billions of USD (LHS); BSE Sensex (RHS)**
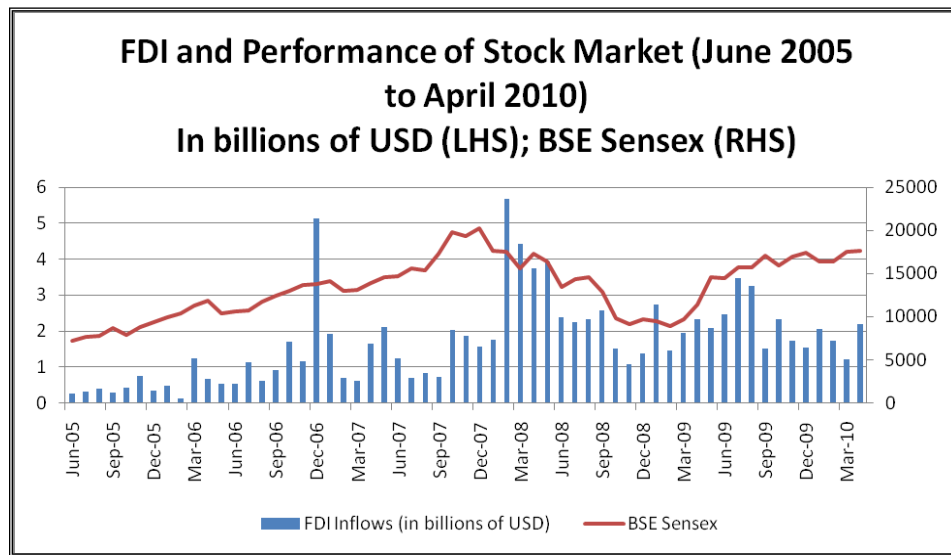
Figure 3-7 illustrates the relationship between net capital inflows and performance of the stock market between June 2005 and April 2010. Net capital inflows (which includes portfolio inflows and FDI inflows) decreased substantially during the crisis before rebounding in 2009. As we can see from the figure below, the relationship between net capital inflows and BSE Sensex is stronger than that between FDI inflows. This is because net capital inflows includes portfolio inflows. As we saw earlier, there is a strong relationship between portfolio inflows and stock market performance. So it's no surprise that will have an effect on the relationship between net capital inflows and BSE Sensex.

Figure 3-7: Net Capital Inflows and Stock Market Performance
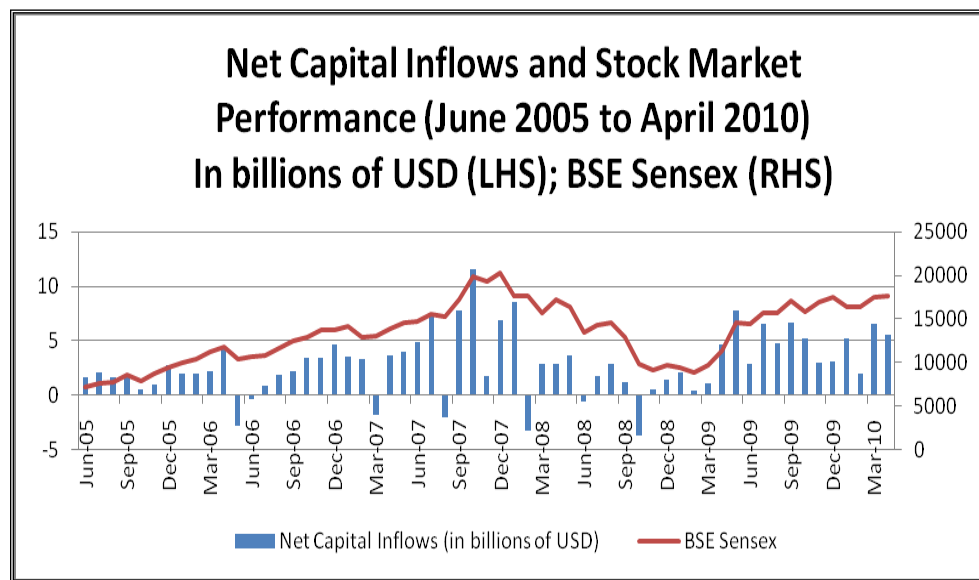
Chapter four introduces a new index of capital controls. The new measure uses a disaggregation approach and also provides data on a monthly basis. The index nicely incorporates the main strengths of the previous studies and addresses the weaknesses of some of the simplistic measures.

CHAPTER FOUR
A NEW MEASURE OF CAPITAL CONTROLS

Introduction

Chapter two presented a literature review of the various measures of capital controls. However, most of the measures fail to capture the complexity of capital controls. Many of the measures also failed to provide detailed information on a yearly basis. Some of it could be due to the limitation of information available at the time. However, it is now time to once again address the issue of capital control measures as available information is more detailed and up to date.

Many of the papers discussed in Chapter Two investigate the impact of capital controls on various issues, such as likelihood of currency crises. However, they failed to arrive at a unanimous conclusion. One of the reasons for the diverse results is that capital controls can have both positive and negative effects. That may depend on what type of controls are in place and also how long the flows have been restricted from the market mechanism. Capital controls can destabilize economic fundamentals if they have been imposed for a long period of time, since the controls will lead to inefficient allocation of resources. On the other hand, the restrictions can provide more time to the government and the central bank to deal with unexpected crises. Restricting capital flows, especially outflows, allows investors to reexamine whether the outflows are actually caused by the deterioration of fundamentals or pure panic. So, temporary capital controls could prevent crises caused by self-fulfilling speculation, herding behavior, and panic.

Almost all of the current indices on capital controls are constructed very simplistically, i.e. one if there is control otherwise zero, and high aggregate measuring of

the capital control indices. Thus a new method of constructing capital control index is absolutely necessary so that some of the weaknesses of the earlier measures can be adequately addressed. It is time to introduce a new measure using a disaggregation approach which will also provide information not only on a yearly basis but on a monthly basis. Most of the required information is already available in IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).

AREAER is the most reliable and widely-used source regarding restrictions on capital transactions. However, the information stated in the report does not always reflect the actual behavior of the government on controlling capital flows. For example, some countries state their controls intensively in their laws but don't enforce them strictly. One way to deal with this problem would be to look at de facto data. But using de facto data to measure capital restrictions is not going to ensure that the true degree of capital mobility will be captured either due to high level of noise in the data stream. So the best strategy, in my opinion, is to rely on data published in the AREAER.

Therefore, my construction of the new measure of capital controls is based mainly on the information available on AREAER. Additionally, I used information provided by the Reserve Bank of India. The new index is a de jure measure; it captures only what the country announces in its law and regulation of capital flows.

The AREAER has been published since the 1950s. The traditional way of reporting has been based on general description of restrictions on receipts and payments of the current and capital accounts. They mainly describe the overall circumstances of the restrictions and required procedures to operate on capital transactions. However, from

1996[6] the IMF changed the format of the report. This new format provides detailed information on the intensity of capital controls in each category and also differentiates between inflows and outflows.

AREAER now divides capital transactions into thirteen main categories with subcategories on restrictions on inflows and outflows which are enforced on the activities of the residents and nonresidents. However, my measure of capital control also includes information on the existence of dual or multiple exchange rates, restrictions on current account transactions, and requirements of the surrender of export proceeds. The details are as follows:

1. *Controls on capital market securities:* shares or other securities of a participating nature, and bonds other securities with an original maturity of more than one year.

2. *Controls on money market instruments:* securities with an original maturity of one year or less, such as certificates of deposit, treasury bills, and so forth.

3. *Controls on collective investment securities:* share certificates or any evidence of investor interest in an institution for collective investment, such as mutual funds.

4. *Controls on derivatives and other instruments:* refers to operations in other negotiable instruments and nonsecuritized claims not covered under the previous three items.

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[6] This is the year of publication. However, the information is from the previous year (1995).

5. *Controls on commercial credits:* covers operations directly linked to international trade transactions.

6. *Controls on financial credits:* credits other than commercial credits.

7. *Controls on guarantees, sureties, and financial backup facilities:* securities pledged for payment of a contract, such as warrants, letters of credit, and so on.

8. *Controls on direct investment:* creation or extension of full or partial ownership of a new or existing enterprise that results in effective influence over the operations of the enterprise.

9. *Controls on repatriation of profits or liquidation of direct investment.*

10. *Controls on real estate transactions:* the acquisition of real estate not associated with direct investment. The investment of a purely financial nature in real estate or the acquisition of real estate for personal use.

11. *Controls on personal capital movements.*

12. *Provisions specific to commercial banks and other credit institutions:* regulations which are specific to these institutions, such as monetary and prudential controls.

13. *Provisions specific to institutional investors:* one common example is a limit on the share of the institution's portfolio that may be held in foreign assets.

14. *Existence of dual or multiple exchange rate arrangements.*

15. *Restrictions on current account transactions.*

16. *Requirement of the surrender of export proceeds.*

The new index presented in this study is based in part on the works of Potchamanawong (2007) and Chinn and Ito (2006). Chinn-Ito measures a country's degree of capital account openness by using principal component analysis of four major categories of external account restrictions. The categories include multiple exchange rates, restrictions on current account transaction, equally weighted average of a five-year window of restriction on capital account transaction, and surrender of export proceeds. Chinn-Ito's index is based on AREAER. It uses the first standardized principal component of four external account categories to construct the index. A higher value implies a higher degree of openness. However, it fails to provide any information on disaggregated types of capital account openness. Also, it is not clear what additional benefit is obtained through the application of the principal component analysis[7]. Potchamanawong (2007), on the other hand, constructed a new measure of capital control which also based on data from IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). This index was based largely on Quinn's intensity measure. As mentioned in Chapter Two, Quinn was the first scholar to apply the level of intensity to capital control measure. Quinn's methodology is acknowledged as one of the

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[7] Principal component analysis is a multivariate technique used to examine relationships among several quantitative variables. It can be used to summarize data and detect linear relationships. Principal component analysis reduces the dimensionality of a set of data while trying to preserve the structure. However, one major drawback is that it cannot deal with missing values very well. If there is a missing value in the observations of a particular variable, the final score cannot be computed and the variable is treated as missing value.

best measures due to disaggregation of data and length of the covered period. But the study provides information on only selected years for non-OECD countries.

Potchamanawong constructed his capital control index by using equally weighted average of 13 different types of capital restrictions and on exchange rate arrangements. Each category ranges between 0 and 1 with 0.25 intervals. A higher value implies a higher degree of controls. In addition to nicely capture the degree of intensity of capital control like most indices, the Potchamanawong index also does a great job of distinguishing between controls on inflows and controls on outflows. However, unlike Chinn-Ito, it does not include information on current account restrictions and requirement of the surrender of export proceeds. It is useful to include this information in the index because even countries with open capital accounts may still be able to restrict the flow of capital by limiting transactions on the current account restrictions or other systems such as multiple exchange rates and requirements to surrender export proceeds. Also, countries that already have closed capital accounts might try to increase the stringency of those controls by imposing restrictions on current account and requirements for surrender of trade proceeds) so that the private sector cannot circumvent the capital account restrictions. Additionally, the Potchamanawong index like all the others provides information only on a yearly basis. My index, on the other hand, provides information on a monthly basis. It is also better than the Schindler (2009) index. The Schindler index is similar to the one used in Potchamanawong (2007). However, it looks only at breadth and uses only six types of capital restrictions. The coding method is also quite different from my index. Schindler's index codes each category in binary form i.e. 0 (unrestricted) or 1(restricted). Therefore, it does not do a good job in capturing the intensity of capital

controls. Overall, my index is an improvement over Chinn-Ito, Schindler and Potchamanawong indices because it provides information on disaggregated types of capital account openness, includes information on current account restrictions and surrender of export proceeds, and presents data on a monthly basis.

One might think that capital inflows are favored compared to outflows since it brings in capital into a country which can potentially lead to higher standards of living for its citizens. However, this only explains one side of the story. We need to also consider the potential impact on macroeconomic factors and the chances of instability when a country experiences a rapid, huge capital surge which may vanish just as rapidly later. That can wipe out the accumulated wealth within a short period of time especially when capital flees from the country due to panic reaction of investors. That is exactly what happened to some of the Asian and Latin American countries over the past two decades. Without a good measure of capital controls it is very difficult to adequately analyze the relative costs and benefits of such flows.

The rules of coding the various restrictions are as follows:

Value in each capital transaction ranges from 0 to 1, with 0.25 intervals. Higher values represent higher degrees of capital control.

- 0   Capital transaction(s) is/are allowed freely (i.e. no restriction); government may require report or notification after transactions take place.

0.25   Prior approval is not required; but required supporting evidence or registration. Transactions are required to be made through authorized banks or exchange houses.

0.5   Prior approval is not required; but quantitative restrictions exist, i.e. limited ownership; limited amount of transferring per period of time.

0.75   Prior approval is required before engaging in any transaction and is approved on a case-by-case basis.

1.0   Transaction is not permitted.

The existence of dual/multiple exchange rate arrangements is assigned a value of 0.75, zero otherwise.

For restrictions on current account transactions, values are assigned with ranges from 0 to 1, with 0.25 intervals. Higher values represent higher degrees of restriction.

For surrender requirements of export proceeds, values are assigned with ranges from 0 to 1, with 0.25 intervals. Higher value represents higher level of requirement.

The above rules are based in part on how much time an individual or firm has to spend dealing with red tape/bureaucratic procedures. These procedures and requirements discourage and slow down capital mobility, both for inflows and outflows. The main purpose of these criteria is to reflect the fact that the cost of moving capital between countries is increased substantially when restrictions are imposed. AREAER categorizes and reports each transaction by documenting the requirements of evidences, approvals,

and permission of transactions. However, due to limited availability of disaggregated information on capital transactions, the index could not constructed for the period prior to 1995. This limitation implies that we cannot do an extensive historical study on capital mobility.

In the coding of the restrictions, a value of zero indicates no restriction of any kind being enforced by the authorities on that particular type of transaction. On the other hand, a value of one indicates that the particular type of transaction is not permitted under any circumstances. A value of 0.25 indicates that investors have less freedom in completing capital transactions than the freely conducted transactions since they have to report to officials with prior evidence and/or are required to make transactions through specific channels for the purpose of government supervision. This may deter investors to transfer capital unless they have compelling reasons to do so. A value of 0.75 implies that investors are allowed to transfer capital but only with prior approval from either the central bank or the ministry of finance. However, officials have the right to allow or ban particular transactions depending on the regulations applied at that time. Moreover, it implies longer processing time relative to other categories since the investors need to prepare documents and wait until they get approval. This long process may cause the reduction in the demand for capital transfers internationally. A value of 0.5, the middle point in the coding scale, implies that this particular transaction does not require a long processing time. However, it indicates that there are restrictions on the amount of capital transfer either quantitatively or in the form of capital reserve requirements. In essence, the rules for the coding are intended to show the cumbersome nature of the official

processes for capital transactions. The coding is also very simple and is based on available information in AREAER.

There is one drawback of this method though. The problem arises when the AREAER does not have precise information on certain transactions. For example, when it states "Yes", it does not imply anything about the intensity level of the controls. It only implies that a control on a particular capital control exists. There is not much information beyond that. In those cases, where the IMF does not provide clear information, the author assigns a value of 0.5. However, if the information is available for another period of time, then the same score is used for all periods. Additionally, if the level of control is specified on inflows but not on outflows, the same score is used for both inflows and outflows.

The overall indices (separately for inflows and outflows) are calculated using an equally weighted average of all the different categories mentioned above. This generates the main capital control indices, rgcap-in and rgcap-out, which represent controls on capital inflows and outflows, respectively.

Characteristics of the New Measure

Table 4.1 presents the correlation matrix of controls on capital inflows and outflows related to various types of capital transactions. As we can clearly see, there is very high correlation, 0.97, between the inflow (rgcap-in) and outflow (rgcap-out) measures of overall capital controls. This suggests that the controls on inflows and outflows are usually imposed together. Moreover, the correlations between capital

controls on inflows and outflows of collective investment securities (0.9341), financial

credit (0.8775), real estate (0.9545), and personal capital movement (1.000) are quite

high. This confirms that controls on capital inflows and outflows are imposed together.

However, correlations between capital controls on inflows and outflows for direct

investments (0.6333) and commercial banks (0.5987) are moderate. In addition, we can

conclude that controls on capital market securities, collective investment securities,

derivatives, commercial credit, financial credit, real estate, and personal capital

movement are the major driving factors of overall controls on both capital inflows and

outflows, since there are high correlations between the overall indices and indices of

controls on these types of capital transactions.

Table 4.2 presents descriptive statistics of controls on various categories of capital

transactions. It shows that controls on capital outflows are generally higher when

compared to controls on capital inflows. It implies that Indian authorities, like in other

countries, are more worried about capital outflows because that can have profound

impact on the liquidity of the financial system. Moreover, the table shows that Indian

authorities are more concerned with mobility of capital related to speculation, such as

capital market securities, money market instruments and collective investment securities.

This is because these types of capital transactions fluctuate more and can also potentially

have a destructive effect on the economy. On the other hand, authorities seem to be less

worried about transactions related to trading businesses, such as commercial credits and

guarantees, since these types of capital transactions can improve the import and export

performance of the country and are also potentially less harmful to the financial system.

This also backs up the findings that capital transactions such as capital market securities

and collective investment securities are the main factors influencing the overall capital control indices.

Comparison of the New Measure with Other Measures of Capital Controls

Table 4-3 presents the comparison of the average values of the different measures of capital restrictions in India between 1995 and 2007. The new measure (Rgcap) is compared with the other measures of capital control. Its value is closer to that of the Potchamanawong, Quinn, and Edwards indices. Table 4-4 shows the correlation between the various measures of capital control. It is clearly evident that Rgcap values (Rgcap-in and Rgcap-out) are highly correlated to the Potchamanawong values (in5 and out5).

The values of the capital control indices, especially the new index and the Potchamanawong index, indicate only the level of intensity of restriction; they do not suggest the actual magnitude of capital restrictions. In other words, these values are ordinal numbers. The values indicate if the country has relatively high level of capital restriction but do not indicate how much higher. But, these measures are better in capturing the intensity when compared to the commonly used dummy variable based indices. The problem with those measures is that they do not adequately measure the degree of capital controls. Also, they underestimate the true level of capital restrictions because they assign values of either 0 or 1. They can only indicate if capital flows are fully controlled or fully liberalized. They cannot detect partial controls.

Overall, the new measure performs quite well. It is able to capture small changes in capital controls that most of the other measures fail to do. The new measure is compared with the most recent indices, namely Chinn-Ito, Potchamanawong and Schindler. Figure 4-1 shows the comparison of the indices between 1995 and 2007. As we can see from the figure, the new index (rgcap) is closely related to the Potchamanawong index. Both these measures are able to show that India has been gradually liberalizing its capital account since 1997. However, Chinn-Ito (normalized) and Schindler measures fail to capture that. The Chinn-Ito measure falls sharply in 2000 (indicating lower capital controls) and then goes back up to the initial level a couple of years later. Schindler's index falls sharply in 1997 and then goes back up sharply in 2004. The liberalizing trend captured by the Potchamanawong and the new (rgcap) indices more accurately reflect the gradual changes that have been taking place in India.

Figure 4-1: Comparison of Selected Capital Control Measures
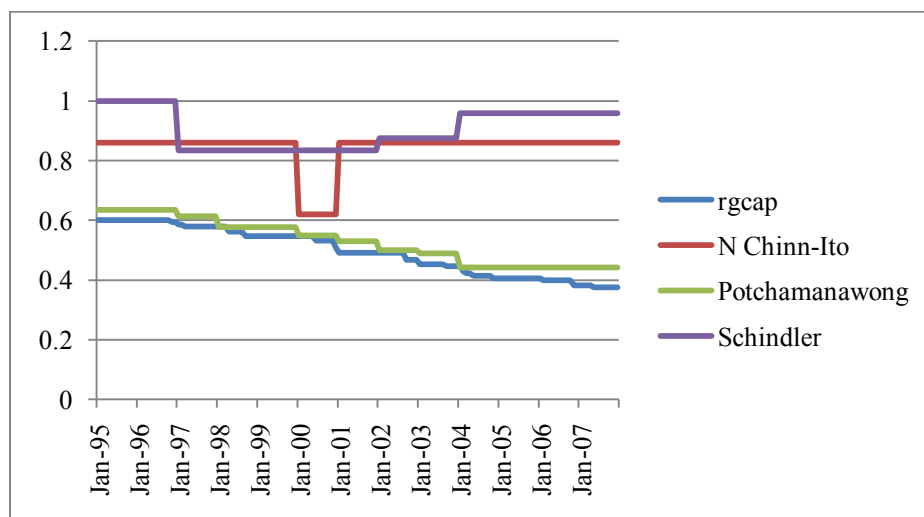
The new measure performs better even compared to Potchamanawong index because the new measure is able to capture the changes in the precise months. For example, figure 4-2 shows us that the new measure precisely captures the changes that occurred between June 2002 and May 2003. Several changes occurred during that period e.g. starting from September 2002 banks were allowed to invest in money market instruments and/or debt instruments abroad. Also in January 2003, the limit on investments made by mutual funds in India in companies listed abroad was raised to $1 billion from $500 million. In addition, FIIs (foreign institutional investors) and NRIs (non resident Indians) were allowed to trade in all exchange-traded derivative contracts, including interest rate derivatives.

Figure 4-2: The New Measure vs. Potchamanawong's measure (June 02 to May 03)
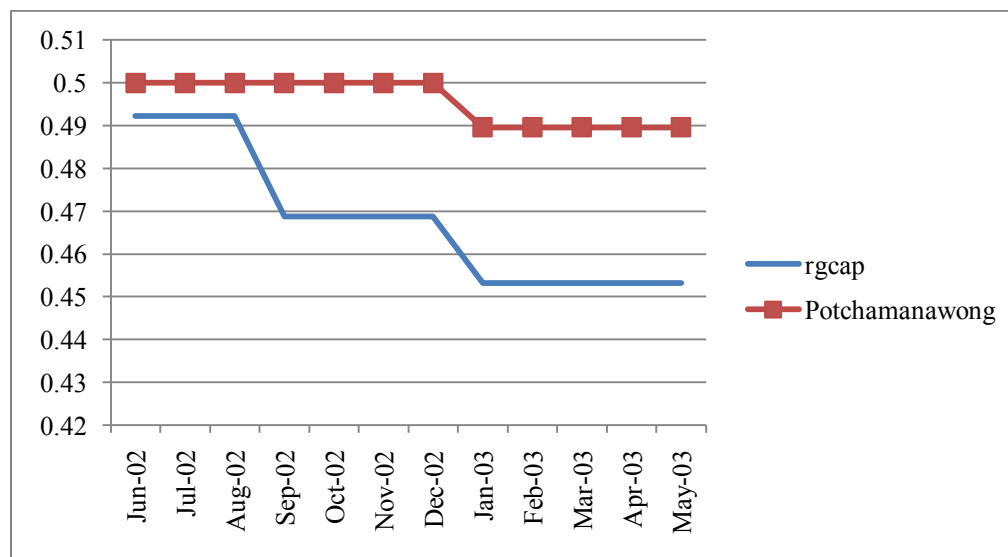
Figure 4-3 shows us that the new measure again more precisely captures the changes that occurred between June 2003 and July 2004. Several changes occurred during that

period e.g. starting from September 2003, local companies making direct investments abroad were allowed to hedge the exchange rate risk in the local market by purchasing forward or options contracts from banks against proof of the exposures. Indian companies were permitted to extend foreign currency loans for personal purposes for employees of their branches outside India. Also, between February 2004 and May 2004 several more changes took place. E.g. foreign companies were allowed to establish branch offices or units in Special Economic Zones to undertake manufacturing and service activities. Indian corporations were allowed to fund direct investments in joint ventures or wholly owned subsidiaries abroad with external commercial borrowing (ECB).

Figure 4-3: The New Measure vs. Potchamanawong's Measure (June 03 to July 04)
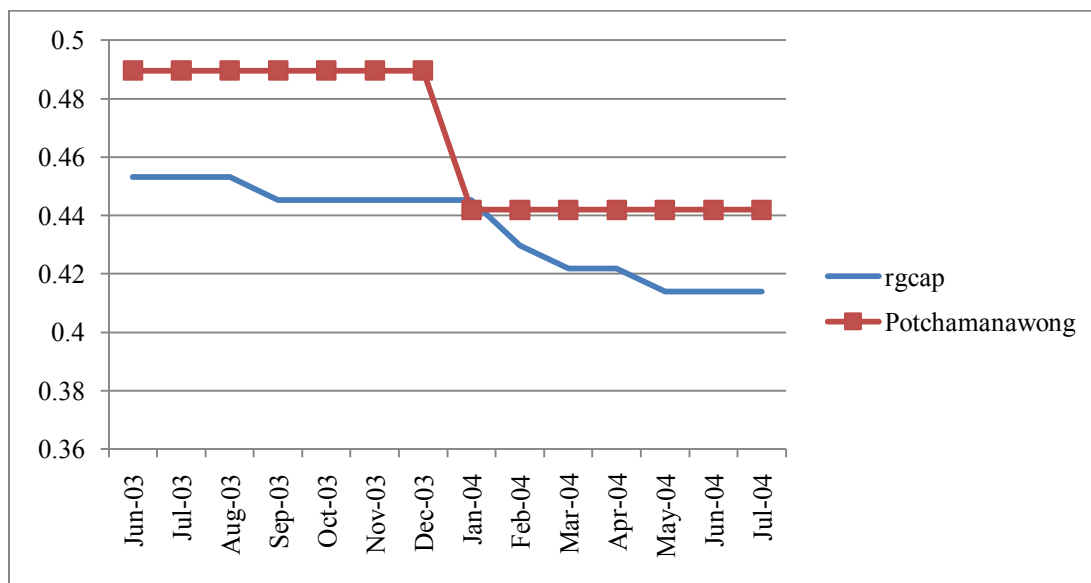
Then there were some changes in 2006 which were picked up by the new measure as well. Figure 4-4 captures the changes that occurred between November 2005 and January 2007. Several changes occurred during that period e.g. from February 2006 foreign

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investment up to 49% was allowed in stock exchanges, depositories, and clearing corporations, with the prior approval of the (Foreign Investment Promotion Board (FIFB).   Then from November 2006, FDI was allowed up to 100% in certain industries such as distillation and brewing of potable alcohol, industrial explosives, coal and lignite mining, petroleum and natural gas, etc. The Potchamanawong index provides data only up to 2004.

Figure 4-4: The New Index (November 2005 to January 2007)
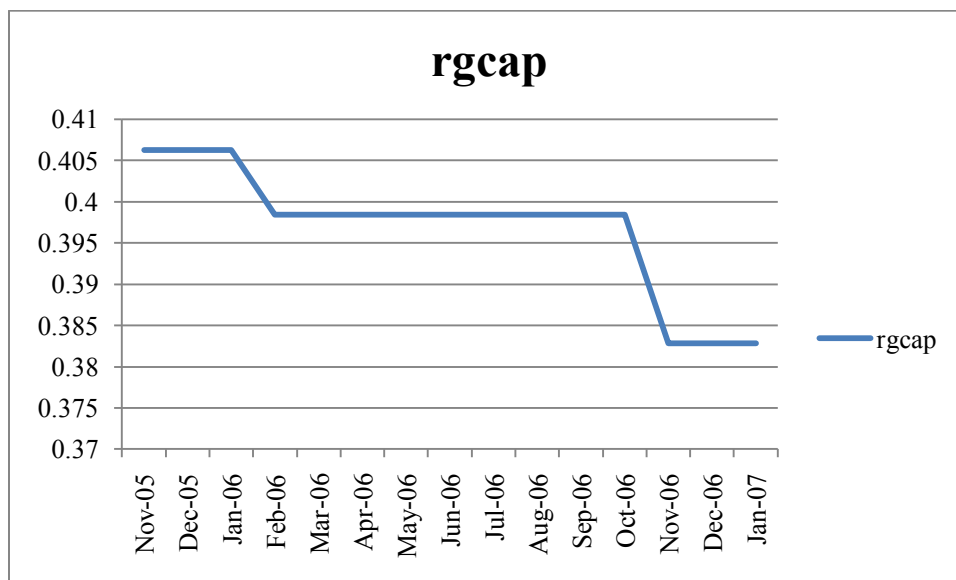
The New Measure and Capital Flows

The new measure performs quite well in showing the relationship between capital flows and the changes in capital controls. The following figures present evidence of that relationship. As we can see from Figure 4-5, as the degree of capital controls (as measured by the new index) gradually declined, the level of capital inflows (Portfolio and FDI inflows) increased.

Figure 4-5: New Measure and Capital Inflows (Yearly)
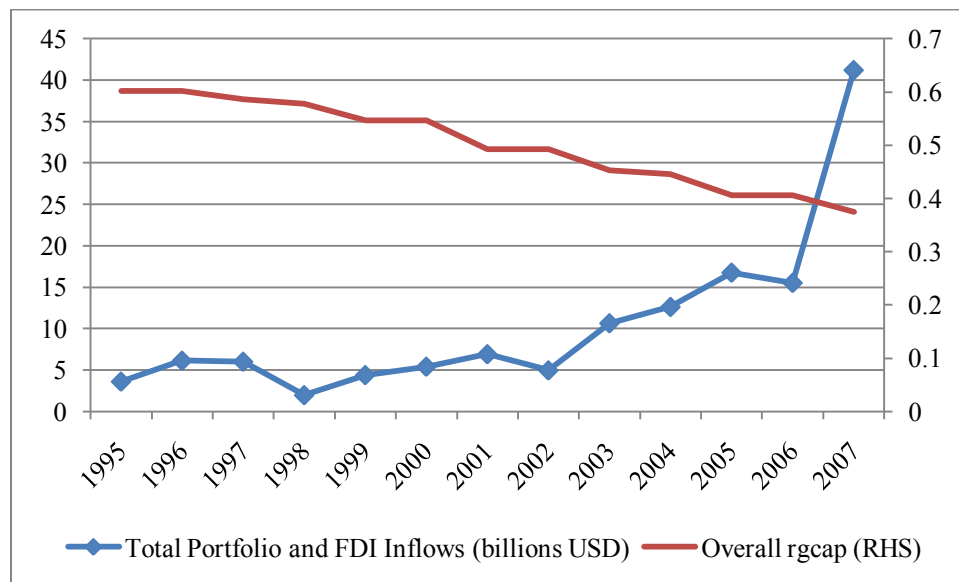
Even when we focus on specific types of capital inflows e.g. portfolio investment and FDI, we notice the same patterns. For example, figure 4.6 shows the relationship between portfolio inflows and degree on controls on portfolio investment (as captured by the new index). We can clearly see that as controls on portfolio inflows were gradually relaxed, inflows of portfolio investment increased during that period. Capital flows (especially portfolio inflows) can be affected by a lot of factors such as business cycles, global liquidity, etc. But the long-term trend of capital flows will be affected by the degree of capital controls as is evident from figure 4-6.

Figure 4-6: Portfolio Inflows (Yearly) and Portfolio Category of New Measure
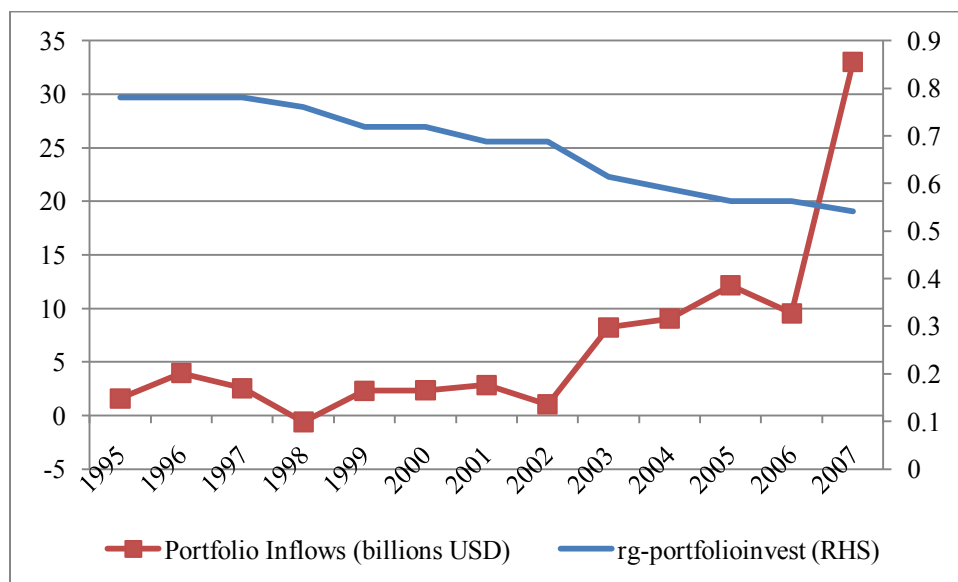
FDI inflows, on the other hand, are affected by the degree of restrictions on direct investment as shown in figure 4-7. The figure shows the relationship between FDI and the degree of controls on direct investment (as measured by the new index).

Figure 4-7: FDI Inflows (Yearly) and the FDI Category of New Measure
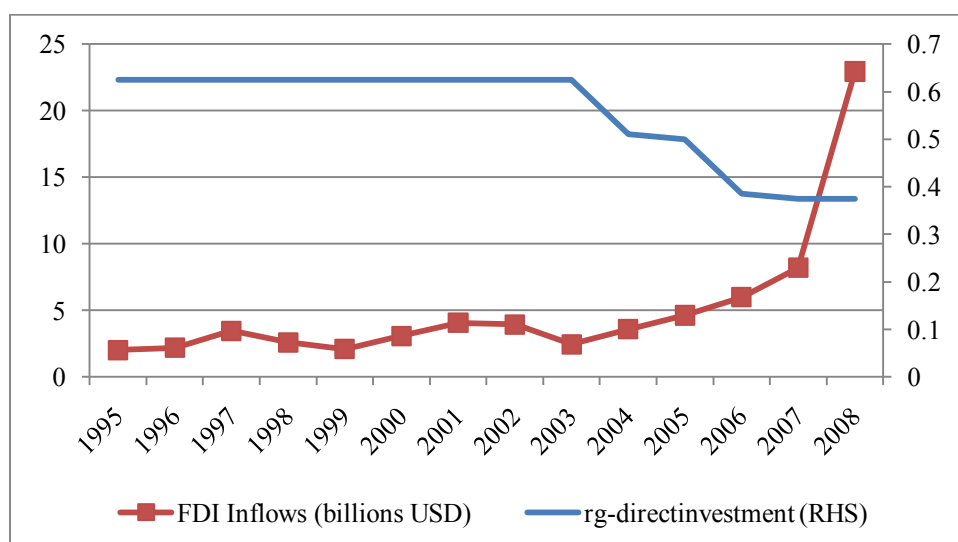
Monthly data also reveal similar pictures. Figure 4-8 shows the
relationship between monthly portfolio investment inflows and the degree of restrictions
on portfolio inflows. As mentioned earlier, fluctuations in portfolio investment can be
caused by many factors. Nevertheless, figure 4-8 shows us that when controls on
portfolio investment were relaxed between April and June of 2007[8], almost immediately
portfolio investment inflows went up sharply.

Figure 4-8: Monthly Portfolio Inflows and Portfolio Category of New Measure
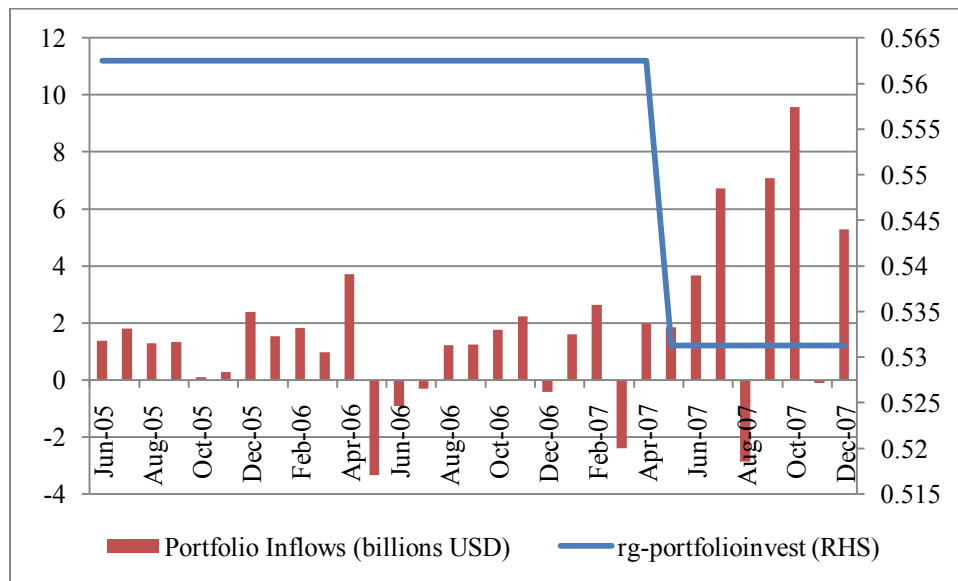
Similarly, figure 4-9 captures the relationship between monthly FDI inflows and
restrictions on direct investment (as measured by the new index). FDI decisions are not
taken overnight. It is fair to say that it takes time for FDI inflows to respond to changes in
policies and it is unlikely to be captured clearly in monthly data. Nevertheless, figure 4-9

[8] The requirement that a foreign company have a 10% stake in an Indian company to be eligible for
portfolio investment of up to 50% of the net worth of the investing company under the automatic route was
eliminated.

shows that when restrictions on FDI were eased in February of 2007, FDI inflows went up a little. The upward sloping trend line captures the gradual increase in FDI inflows. In February 2007 several restrictions on FDI inflows were removed e.g. restrictions on direct investment were completely removed in certain industries such as distillation and brewing of potable alcohol, industrial explosives, coal and lignite mining, petroleum and natural gas.

Figure 4-9: Monthly FDI Inflows and FDI Category of New Measure
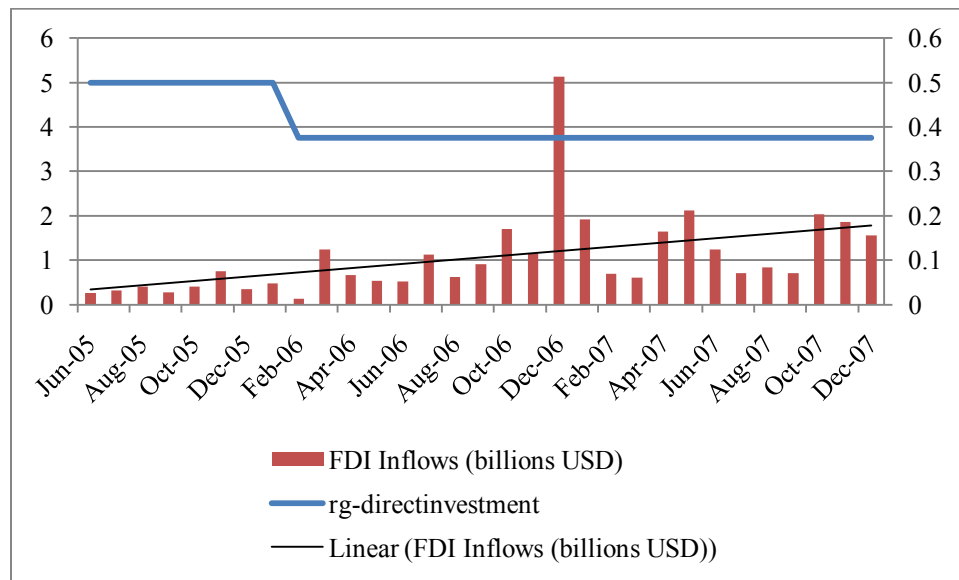
This chapter has presented and documented a new method of measuring a country's de jure restrictions on cross-border capital transactions. Like any measure of capital controls, its construction required striking a balance between various features of the data, such as breadth (information by assets and direction of flows) and depth (the intensity of controls). The distinctive feature of the data set presented here is not only its level of disaggregation, but also coverage by month, which is not found in other indices.

By coding the data at the level of individual types of transactions, this new dataset will allow future researchers to ''mix and match'' by averaging across the various subcategories in ways that best fit their research objectives. The method used in this study can open up several research avenues that could help us better understand the many facets of capital restrictions and financial globalization not only in India but other countries as well.

The new index provides information on disaggregated types of capital account openness, includes information on current account restrictions, surrender of export proceeds and also presents data on a monthly basis. All those things together allow us to record changes in capital controls more precisely. As mentioned earlier, that advantage is not there in any of the existing measures including Chinn-Ito, Schindler and Potchamanawong indices. So overall, the new index is clearly an improvement over the earlier indices.

PART II – EXCHANGE RATE REGIME

CHAPTER FIVE
EXCHANGE RATE CLASSIFICATION

Introduction

It is widely acknowledged that official classifications of exchange rate regimes can often be quite misleading. Some studies have tried to produce behavioral measures of exchange rate policies that capture what governments actually do rather than what they say they do. Examples of such behavioral measures are the new IMF measure that is based on staff judgments of the policies actually being followed (Bubula and Ötker-Robe, 2002), and Reinhart and Rogoff (RR, 2004)'s classification that puts emphasis on parallel rates. Some other studies are based on the statistical behavior of exchange rates, international reserves, and in some cases also interest rates, such as those of Weymark (1995, 1997, and 1998), Calvo and Reinhart (CR, 2002) and Levy Yeyati and Sturzenegger (LYS, 2005). The following few sections present reviews of some of the important studies in the area of the exchange rate classification.

Weymark (1995, 1997, and 1998)

Weymark uses the concept of exchange market pressure and constructs an intervention index based on a small open economy model with the assumption that monetary authority does not use domestic credit to influence the exchange rate. The concept of exchange market pressure was first introduced by Girton and Roper (1977). It is a measure of the gap between quantities demanded and supplied in the foreign exchange market at a particular exchange rate. It provides a way of comparing pressures under alternative exchange rate regimes by adding changes in reserves (as a measure of

official intervention) and exchange rate changes. Weymark's intervention index is given by:

$$EMP_t = \Delta e_t + n\Delta r_t => \omega_t = \frac{n\Delta r_t}{EMP_t}$$

where e_t is the period t exchange rate expressed in terms of domestic currency cost of one unit of foreign currency and Δr_t is the change in foreign exchange reserves expressed as a proportion of the inherited monetary base.

Weymark's intervention index ranges from $-\infty$ to $+\infty$. It is 0 for free floating and 1 for perfectly fixed exchange rate. Intermediate exchange rate regimes have an index value between 0 and 1. The index value is less than 0 when policy authorities actively depreciate (appreciate) the domestic currency with respect to its free float value when the exogenously generated excess demand for domestic currency is negative (positive). It is greater than 1 when policy authorities actively depreciate (appreciate) the domestic currency with respect to its free float value when the exogenously generated excess demand for domestic currency is positive (negative). However, it is not clear how strong indices less than 0 or higher than 1 are in Weymark's framework.

Calvo and Reinhart (CR, 2002)

This paper uses a probability approach and exchange rate flexibility in order to investigate foreign exchange rate policy. Three probabilities on exchange rate, foreign reserves, and interest rate provide information on authorities' intervention behaviors.

Basically, each probability measures the likelihood of one of the variables staying inside a particular threshold such as probability that absolute percentage changes in exchange rates are smaller than 2.5%, probability that absolute percentage changes in foreign reserves-gold are smaller than 2.5%, and probability that absolute changes of money market rates are greater than 4%. CV finds that high probabilities on foreign reserves and interest rates are common in many countries announcing that they have free floating exchange rate regimes. CV calls this phenomenon "fear of floating".

The authors believe that their approach can reduce outlier problems and thus they apply it mechanically. But outliers may have useful information regarding changes in foreign exchange policy. For example, authorities may change goals on fixed exchange rates and crawling rates which results in significant changes in exchange rates. It is wise to analyze those periods as well in order to check if there is any policy change or not.

They also construct an exchange rate flexibility index based on small open economy model. The index is given by:

$$\lambda = \frac{\sigma_e^2}{\sigma_i^2 + \sigma_F^2}$$

where e is rate of change in exchange rate, F is foreign asset in central bank balance sheet, and i is interest rate.

Ghosh, Gulde, and Wolf (GGW, 2003)

GGW uses data on 167 countries to classify de jure and de facto exchange rate regimes for 1970-1999. The study presents 15 detailed categories for de jure regimes and 3 categories for de facto regimes as well as de jure regimes. It uses the IMF classification for de jure classification and also to a large extent for de facto classification. GGW finds a relative frequency distribution of the IMF de jure classification for every year. This distribution has been divided into three broad categories: pegged, intermediate, and float. For de facto classification, GGW creates a composite statistic which represents annual behaviors of nominal exchange rates. The statistic, z-score, is calculated for all the observations. The z-score is given by the following formula:

$$z = \sqrt{\mu_{\Delta e}^2 + \sigma_{\Delta e}^2}$$

where $\mu_{\Delta e}^2$ is the average monthly rate of change of the nominal exchange rate during the year and $\sigma_{\Delta e}^2$ is the variance of those monthly changes.

GGW then finds the relative frequency distribution of z-scores and compares it with the relative distribution of the IMF de jure classification. It classifies de facto exchange rate regimes by imposing the relative frequency distribution of the IMF de jure regimes on the distribution of the z-score. One crucial assumption in the study is that the relative frequency distributions of the IMF de jure regimes and de facto regimes are same. However, no explanation was provided for that assumption. It is hard to find any intuitive or theoretical explanation. They create another classification, consensus classification, to reduce such weakness. The consensus classification is composed of

episodes which are in the same categories of de jure as well as de facto exchange rate regimes.

For the de facto classification, GGW depend on the z-score, which is composed of the average rate and the variance of monthly changes in nominal exchange rates. Since the score is constructed only based on the behaviors of exchange rates, GGW do not control shocks in the exchange rate market. For example, exchange rates with small volatility could result from a lack of shocks or strong interventions against shocks. Without considering intervention behaviors, it is impossible to distinguish one from the other.

Reinhart and Rogoff (RR, 2004)

RR uses date from 153 countries for 1946-2001. Its classification has 14 fine categories and 5 coarse categories. The study develops a new category named freely falling regimes. Freely falling is similar to freely floating in the sense that both have high volatility in exchange rates. However, freely falling is also associated with high inflation. RR use two rules to classify the freely falling: the twelve month rate of inflation equal or exceed 40 percent, and the six months immediately following a currency crisis.

In order to classify other exchange rate regimes, RR uses descriptive statistics of exchange rates, specifically the probability that percentage changes of exchange rates over rolling 5-year periods remain within certain levels of bands such as 1%, 2%, and 5%. Since multiple rates and parallel market have existed quite often, they use market rates rather than official rates. This is perhaps the most important contribution of RR.

RR also uses a special probability measure to distinguish the freely floating from the managed float. They construct an exchange rate flexibility index given by:

$$\frac{\varepsilon}{P(\varepsilon<1\%)}$$

Where the numerator is the mean absolute monthly percentage change in the exchange rate over a rolling five-year period and the denominator is the probability that percentage changes of exchange rates over rolling 5-year period remain within 1%. RR compare the frequency distribution of the index of each country with what they deem to be free floaters such as US Dollar/Euro, US Dollar/Yen, US Dollar/Australian Dollar, and US Dollar/New Zealand Dollar from post 1973 period.

One problem with RR is the study does not control shocks in the foreign exchange rate market since taking into account only behaviors of exchange rates.

When RR distinguishes the managed floating from the freely floating, the null hypothesis is that the episode in consideration is free floating. Thus, RR are very conservative about classifying countries as managed floating and their decision rule is biased toward freely floating. They separate observations with large volatility of exchange rates and high inflation from the freely floating using the category "freely falling". Therefore, the freely floating is free from serious inflation problems. One important issue regarding the role of exchange rate regime is its discipline effect. If any researchers use RR's classification, they would conclude that the freely floating has good performance against inflation.

Levy Yeyati and Sturzenegger (LYS, 2005)

LYS classifies exchange rate regimes across 183 countries between 1974 and 2004. It classifies episodes into 5 categories such as flexible, dirty float, crawling peg, fixed, and inconclusive based on three classifying variables. The three classifying variables are exchange rate volatility, volatility of exchange rate changes, and volatility of reserves.

The exchange rate volatility is measured by the average of the absolute monthly percentage changes in the nominal bilateral exchange rate during a calendar year. The volatility of exchange rate changes is measured as the standard deviation of the monthly percentage changes in the exchange rate. To compute the volatility of reserves, they use several steps. First, they subtract central government deposit from net foreign asset and divide it by the exchange rate, which is denoted by R_t in the equation below. Second, they compute first order differenced value of R_t and divide it by lagged money base, which is their intervention proxy and denoted by r_t. The volatility of reserves is the average absolute monthly changes in r_t.

$$r_t = \frac{\Delta R_t}{S_t} = \frac{\frac{FA_t - FL_t - CGD_t}{e_t} - \frac{FA_{t-1} - FL_{t-1} - CGD_{t-1}}{e_{t-1}}}{\frac{MB_{t-1}}{e_{t-1}}}$$

where R is net foreign asset, S is monetary scaling variable, FA is foreign asset, FL is foreign liability, CGD is central government deposit, and MB is money base.

They use K-means cluster (KMC) analysis with three classifying variables. The K-means cluster algorithm produces groups from episodes such that they have the smallest total distance between episodes and the center of the group. According to LYS,

"k-means cluster analysis has advantage of avoiding any discretion from the researcher except selection of the classifying variables and assignment of clusters to different exchange rate regimes and our method evaluates the deviations in the classifying variables relative to the world norm, rather than to some ad hoc reference cases".

However, it may be necessary to verify such rules as there is no economic rationale behind them. First, the 5 categories may not capture all possible cases. They divide each classifying variable into two categories such as having high level or low level. Then, they get eight cases including the 5 cases and additional 3 cases such as

(i) low volatile exchange rate, highly volatile exchange rate changes, and low volatile reserves (ii) low volatile exchange rate, highly volatile exchange rate changes, and high volatile reserves (iii) highly volatile exchange rate, low volatile exchange rate changes, and low volatile reserves. The first and second cases can be ruled out because low volatile exchange rate cannot have highly volatile exchange rate changes. However, the third case is possible implying LYS should have taken a total of 6 groups into account. The third group could be regarded as flexible regime or inconclusive depending on whether episodes with the volatile exchange rate can be considered as having enough flexibility for the flexible regime.

Another drawback of LYS is that it does not provide clearly defined reference variables for each exchange rate regime. LYS reports minimum, centroid, and maximum values of each classifying variable. The values of each classifying variable are overlapped across exchange rate regimes. There are also several peculiar levels of classifying variables. For example, centroids of volatility of exchange rate, volatility in

the change of the exchange rate, and volatility of reserves for the flexible regime are 2.3, 2.0, and 4.6. LYS describe them as high, high, and low. The volatility measures in the dirty float regime are 17.3, 8.5, and 6.98. The authors describe them as high, high, and high even though the first number is significantly different from the other two.

Willett, Kim, and Nitithanprapas (WKN, 2007)

WKN uses a two parameter EMP approach. It calculates the two parameter indices by breaking down the two main variables, the exchange rate and policy instrument, into trend and deviation from trend components. There are various ways to filter trends. WKN uses a linear time trend as the main method. The trend coefficient of the exchange rate reflects the average rate of the appreciation or depreciation over time. Under a crawling peg or band or a managed float operated as a de facto crawl, it would reflect the rate of crawling. Under a free floating rate it would just reflect the average rate of appreciation or depreciation. The trend coefficient of reserves gives the average rate of accumulation or loss in reserves. The paper estimates trend propensities to intervene, smoothing propensities to intervene, and combined propensities to intervene, CPI according to the following equations. In order to calculate propensities to intervene, it is necessary to make an assumption on the intervention elasticity of the exchange rate. Following most of the literature, WKN assumes a unitary elasticity. WKN's approach allows one to distinguish (at least conceptually) whether a low level of exchange rate volatility is due to a low level of shocks or to a high propensity of the authorities to intervene. Therefore, this approach is better than looking at the behavior of the exchange

rate alone. Another advantage of this approach is that we can obtain a ratio of changes in exchange rate to changes in reserves for each month, allowing us to investigate changes in regimes on an intra year basis.

Cavoli and Rajan (2008)

Cavoli and Rajan (2008) focuses on the degree of de-facto exchange rate flexibility of the INR by using different methods. They first use Frankel and Wei (1994) regressions for the INR. The method essentially involves conducting an Ordinary Least Squares (OLS) test of the local currency on other currencies that are considered to influence the former. This approach is discussed in detail in Chapter Six. Cavoli and Rajan then augment the basic estimation by employing time-varying parameter estimation techniques through recursive OLS. The second method in their study involves the construction and examination of two exchange rate flexibility indices based on the concept of EMP. The indices are similar to the ones introduced in Willett *et al.* (2007). Finally, they also examine the degree of exchange rate flexibility by using a simple Generalized Autoregressive Conditional Heteroskedasticity (GARCH) technique. The GARCH model essentially allows one to observe the conditional volatility of the exchange rate, once the influence of the effect of possible intervention and other influences are controlled for. In effect, it provides information about the underlying flexibility of a currency. The authors conclude that the INR is on a *de facto* soft US dollar peg.

Frankel and Wei (2008)

This study presents a somewhat refined version of the EMP approach. They argue that most basket peggers keep the weights in the basket secret, so inferring de facto weights is as important as inferring de facto flexibility. Most other studies have done only one or the other. That's why Frankel and Wei propose a synthesis specification that allows estimation of weights at the same time as estimation of the tendency of monetary authorities to allow exchange market pressure to show up in the price, versus the quantity, of foreign exchange. They have tried out the technique on some 20 currencies. The majority are countries reported by the IMF to have declared the use of baskets. But they have also included some floaters and some simple peggers. For the most part their synthesis technique seems to work as it should. Known floaters tend to score much higher flexibility parameters than known peggers, with the BBC (Band-Basket-Crawl) countries in between. In some cases, the inferred behavior differs in some way from the de jure regime. For example China's "basket" puts more weight on the dollar than the impression given by the government, while other declared basket peggers are not as firmly tied to the basket as they claim. Meanwhile, declared floaters often intervene heavily to dampen exchange rate fluctuations (fear of floating), but sometimes with reference to an anchor that is not a simple dollar parity as other studies may have assumed.

Various methods are frequently used to measure de facto exchange rate regimes. However, no single measure summarizes all the applicable characteristics of an actual regime. It is, therefore, essential to employ more than one measure so that we can get a clearer picture of the exchange rate regime. Chapter Six focuses on the exchange rate flexibility of the Indian rupee. This is done by employing Frankel and Wei (1994)

regressions for the INR as well as the synthesis equation model introduced in Frankel and Wei (2008) and Frankel and Xie (2010). Chapter six also utilizes the exchange rate flexibility index introduced in Willett *et al.* (2007) to get a better understanding of the exchange rate regime in India.

CHAPTER SIX
EXCHANGE RATE REGIME IN INDIA

Introduction

According to the Reserve Bank of India (RBI), the country's central bank, the Indian rupee is a market-determined exchange rate. That seems to imply there is a currency market and the exchange rate is not determined by the authorities. The official classification from the IMF is that India maintains a "managed floating" exchange rate regime. The chapter presents an analysis of India's *de facto* exchange rate regime.

The rupee has been classified as a managed float by the IMF AREAER (Annual Report on Exchange Agreements and Exchange Restrictions). According to the RBI (the Indian central bank), the Indian rupee is a market-determined exchange rate, in the sense that there is a currency market and the exchange rate is not administratively determined. India has clearly moved away from fixed exchange rates. However, the RBI actively trades in the market, with the goal of containing volatility, and influencing the market price.

According to the RBI, *"The objective of the exchange rate management has been to ensure that the external value of the Rupee is realistic and credible as evidenced by a sustainable current account deficit and manageable foreign exchange situation. Subject to this predominant objective, the exchange rate policy is guided by the need to reduce speculative activities, help maintain an adequate level of reserves, and develop an orderly foreign exchange market"*.

India's De Facto Exchange Rate Regime

India shifted to a "market determined exchange rate" in March 1993. Figure 6-1 shows the exchange rate between the Indian rupee and the U.S. dollar from 1995 to 2011.

Figure 6-1: Indian Rupee-US Dollar Exchange Rate (1995 to 2011)
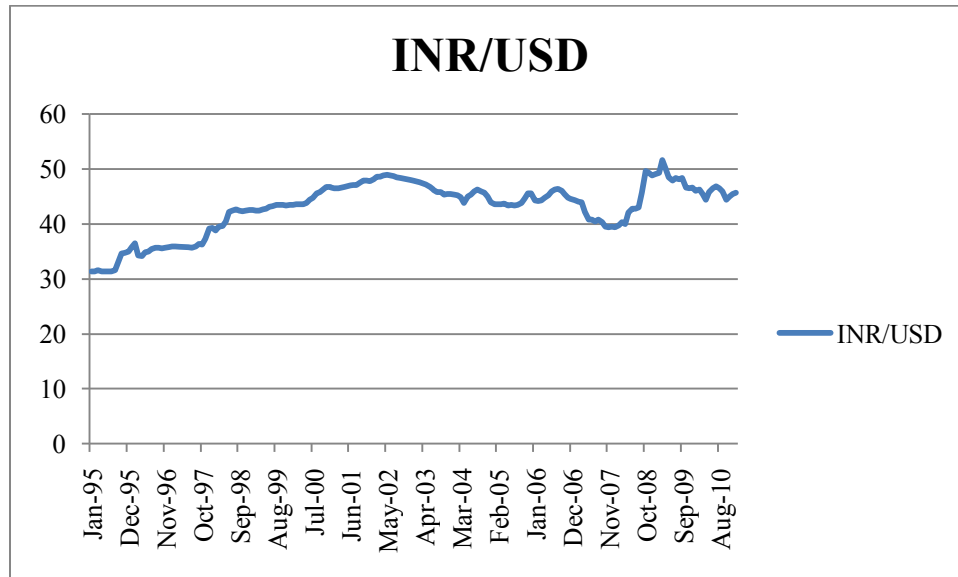
While the rate is determined on a market, the price coming out of this market does not necessarily reflect the true market demand and supply (Patnaik and Shah, 2009), since the RBI actively trades in the market. In fact, recent literature suggests that India has a *de facto* pegged exchange rate, where policy makers desire to influence the bilateral exchange rate against the US Dollar (Shah et al., 2005; Frankel, 2009). As is expected with such a currency regime, the nominal INR/USD (Indian Rupee/US Dollar) exchange rate has had low volatility, while all other measures of the exchange rate have been more volatile. From 1993-2006, the annualized volatility of the INR/USD was 4.2%. In comparison, the annualized volatility of the USD/JPY rate was 11.6% (Patnaik and Shah, 2009). Table 6-1 compares some major currencies by their depreciation against the US

Dollar and also offers an international comparison for the annualized volatility of the bilateral exchange rate against the US Dollar. The table shows clear evidence that the Indian currency had very low exchange rate flexibility compared to some other currencies.

One can utilize a linear regression model based on cross-currency exchange rates (with respect to a numeraire) to estimate the basket weights of the currencies the home currency is pegged to. This model was popularized by Frankel and Wei (1994) and therefore is also known as the Frankel-Wei model. Recent applications include Bénassy-Quéré *et al.* (2006), Shah *et al.* (2005), and Frankel and Wei (2007). In this approach, an independent currency, such as the Swiss Franc (CHF) or IMF's SDR[9], is chosen as an arbitrary 'numeraire'[10].

Algebraically, if the home currency, with value defined as H, is pegged to a set of currencies with values defined as $X_1, X_2, \dots$ and X_n, and weights equal to $w_1, w_2, \dots$ and w_n then

$$logH_{t+s} - logH_t = c + \sum w_j \, [logX_{j,t+s} - logX_{j,t}] \qquad (1)$$

From (1) we get,

$$\Delta \, log \, H_t = c + \sum w_j \, [\Delta \, logX_{j,t}]$$

$$= c + \beta_1 \Delta \log \$_t + \beta_2 \Delta \log ¥_t + \beta_3 \Delta \log €_t + \alpha \, \Delta \log £_t \qquad (1')$$

This regression picks up the extent to which the INR/CHF or INR/SDR rate

fluctuates in response to fluctuations in the USD/CHF or USD/SDR rate. If there is

pegging to the USD, then fluctuations in the other currencies would be irrelevant, and we

will observe $\beta_2 = \beta_3 = 0$ while $\beta_1 = 1$. If there is no pegging, then all the three betas would

be different from 0. According to Patnaik and Shah (2009), the R^2 of this regression is

also of interest, as values near 1 would suggest reduced exchange rate flexibility. In my

opinion, that is not the correct interpretation of R^2 in this situation. A high R^2 just implies

a low level of exchange rate volatility which can either be due to a low level of shocks or

due to a high propensity of the authorities to intervene.

Frankel and Wei (2008) and Frankel and Xie (2010) argue for constraining the

weights on the currencies to add up to 1. The easiest way to implement the adding up

constraint is to run the regressions with the changes in the log of the local currency value

on the left-hand side of the equation transformed by subtracting the changes in the log

value of one of the currencies, say the pound, and the changes in the values of the other

major currencies on the right-hand side transformed in the same way. To do that, the

authors impose the adding up constraint $\boldsymbol{\alpha = 1 - \beta_1 - \beta_2 - \beta_3}$ in equation (1'). They

implement it by running the regression equation (2):

$$[\Delta \log H_t - \Delta \log £_t] \quad = c \; + \; \beta_1 \, [\Delta \log \$_t - \Delta \log £_t \,]$$

$$+ \; \beta_2 \, [\, \Delta \log ¥_t - \Delta \log £_t] \; + \; \beta_3 \, [\Delta \log €_t - \Delta \log £_t] \qquad (2)$$

It is possible to recover the implicit weight on the value of the pound by adding the estimated weights on the non-dollar currencies, and subtracting the sum from 1. The authors then introduce the synthesis equation which is written as:

$$\Delta \log H_t \; = \; c + \; \sum w_j \, \Delta \log X_{j,t} \; + \delta \, \{\Delta \, EMP_t\} + u_t \qquad (3)$$

where $\Delta \, EMP_t$ denotes the percentage change in exchange market pressure, that is, the increase in international demand for the Home currency, which may show up either in the its price or its quantity, depending on the policies of the monetary authorities. Frankel and Wei (2008, 2010) define the percentage change in total exchange market pressure by

$$\Delta \, EMP_t \; \equiv \Delta \log H_t + \Delta Res_t \,/MB_t$$

Where, $Res \equiv$ foreign exchange reserves and $MB \equiv$ Monetary Base. The w_j coefficients capture the de facto weights on the constituent currencies. The coefficient δ captures the de facto degree of exchange rate flexibility. A value of $\delta = 1$ means the currency floats purely, because there is little foreign exchange market intervention (few changes in reserves; in the limit, $\Delta Res = 0$, so $\Delta EMPt = \Delta logH$ and $\delta = 1$). A value of $\delta = 0$ means the exchange rate is purely fixed, because it never changes in value.

The authors then use equation (3), with the four major basket currencies made explicit:

$$\Delta \log H_t \; = \; c + \; \sum w_j \, [\Delta \log X_t] \; + \delta \, \{\Delta \, EMP_t\} + u_t \qquad (3')$$

$$= c + w_1 \Delta \log \$_t + w_2 \Delta \log €_t + w_3 \Delta \log ¥_t + w_4 \Delta \log £_t +$$

$$+ \delta \, \{\Delta \, EMP_t\} \; + \; u_t \, .$$

Then they impose the adding up constraint $w_4 = 1 - w_1 - w_2 - w_3$

They implement the constraint by running the following regression equation (4):

$$[\Delta \log H_t - \Delta \log £_t] = c + w_1 [\Delta \log \$_t - \Delta \log £_t]$$

$$+ w_2 [\Delta \log €_t - \Delta \log £_t] + w_3 [\Delta \log ¥_t - \Delta \log £_t] + \delta \{\Delta EMP_t\} + u_t \quad (4)$$

Frankel and Xie (2010) then inserted their synthesis technique in a multiple structural change model proposed by Bai and Perron (1998). With this integrated inference framework, one can extract the structural breaks in a country's currency regime over time. The Bai-Perron methodology is a general-form partial structural change model. For more details on the methodology, please see Bai and Perron (1998, 2003) and also Frankel and Xie (2010). They use weekly data in their estimation technique on five currencies, including the Indian rupee.

The Frankel-Xie estimation result for India is presented in Table 6-2. They found 5 structural breaks in India's exchange rate regime between 2000 and 2009. The structural breaks occurred in the weeks of 11/3/2000, 6/24/2001, 1/14/2002, 9/30/2003, and 3/4/2007. According to the study, India apparently fixed its exchange rate during two of the sub-periods (between 11/3/2000 and 6/17/2001 and also between 1/14/2002 and 9/23/2003) but pursued a managed float in the other four sub-periods. The dollar was always the most important of the anchor currencies, but the euro was also significant in four out of six sub-periods, and the yen in two.

Interestingly, this contradicts the findings of Patnaik and Shah (2009). They ran their regression on (1') using the CHF (Swiss Franc) as the numeraire currency, using weekly data from 19 March 1993 to 17 April 2009. They found only three structural breaks in India's exchange rate regime during that time period and only one over Frankel

and Xie's shorter period (2000-2009). Also, the timing of the Shah-Patnaik structural break differs by six months from the closest break in Frankel and Xie. The structural breaks occurred in the weeks of 3/10/1995, 8/28/1998, 3/26/2004. According to their study, India apparently fixed its exchange rate during two of the sub-periods (between 3/19/1993 and 3/3/1995 and also between 8/28/1998 and 3/19/2004) but pursued greater flexibility in the other two sub-periods. The dollar was always the most important of the anchor currencies, but the euro has been gaining prominence. This contradiction may be due to the estimation equations being used by the two studies. Patnaik and Shah (2009) estimate using equation (1') whereas Frankel and Xie (2010) use their synthesis equation. So basically, the two studies are testing for different things i.e. Patnaik and Shah (2009) estimates the weights of the basket currencies whereas Frankel and Xie (2010) is estimating the degree of exchange rate flexibility. Another explanation could be the choice of numeraire currency. Patnaik and Shah (2009) chose the CHF whereas Frankel and Xie (2010) chose the SDR. Both studies used a Bai-Perron methodology to check for structural breaks but they got different results. The two studies could also be using slightly different versions of the Bai-Perron methodology. It is impossible to find out since Patnaik and Shah (2009) did not provide details of the exact specification of Bai-Perron they used in their study. They did a similar study earlier using this methodology.

The following two panel diagrams compare the structural breaks over the common time periods included in the two studies. Figure 6-2 (Panel A) shows the INR/CHF, INR/SDR, and USD/EUR exchange rates along with information on (Reserve Changes) / (Monetary Base). From the chart on Reserve Changes/Monetary Base, we can see that there were several fluctuations. According to Patnaik and Shah (2009), the only

structural break within that time period occurred in March 2004. The figure seems to confirm this as we notice a big drop in the value of (Reserve Changes) / (Monetary Base) right after March 2004. That's what one would expect if the exchange rate regime moved toward greater flexibility. However, Patnaik and Shah (2009) do not include this in their analysis.

The structural breaks in Frankel and Xie (2010), as mentioned earlier, are located at very different time points. According to their study, the first structural break occurred in November of 2000 when the exchange rate regime became more rigid. The diagram doesn't seem to convey the same story. The value of (Reserve Changes) / (Monetary Base) actually dropped around that time, which is exactly opposite to what one expects to see.

The second structural break apparently happened in June 2001 when the exchange rate regime became more flexible. The chart seems to confirm that since we see a drop in the value of the ratio of Reserve Changes to Monetary Base. According to Frankel and Xie, the third structural break occurred in January 2002 when the regime again became more rigid. However, we don't see evidence of that in the chart.

The fourth break occurred in September of 2003 when the currency regime became flexible once more but the evidence, once again, does not back that finding. According to Frankel and Xie the final structural break occurred in March 2007. Even though the value of the ratio (Reserve Changes/Monetary Base) started falling right before that date, there were also a lot of fluctuations in its value around that time, suggesting greater flexibility of the exchange rate. Very similar conclusions can be made

from figure 6-3 (Panel B) which presents the INR/CHF, INR/SDR, and USD/EUR exchange rates along with information on Reserve Changes.

Based on the evidence so far, it seems that Patnaik and Shah (2009) does a better job in presenting a more accurate picture of the structural breaks. Also, right after the Patnaik-Shah structural break in March 2004, there were greater fluctuations in the data related to reserves. All these seem to suggest that the structural break(s) likely occurred closer to the ones suggested by Patnaik and Shah (2009).

Figure 6-2: Panel A - Structural Breaks in Patnaik-Shah and Frankel-Xie
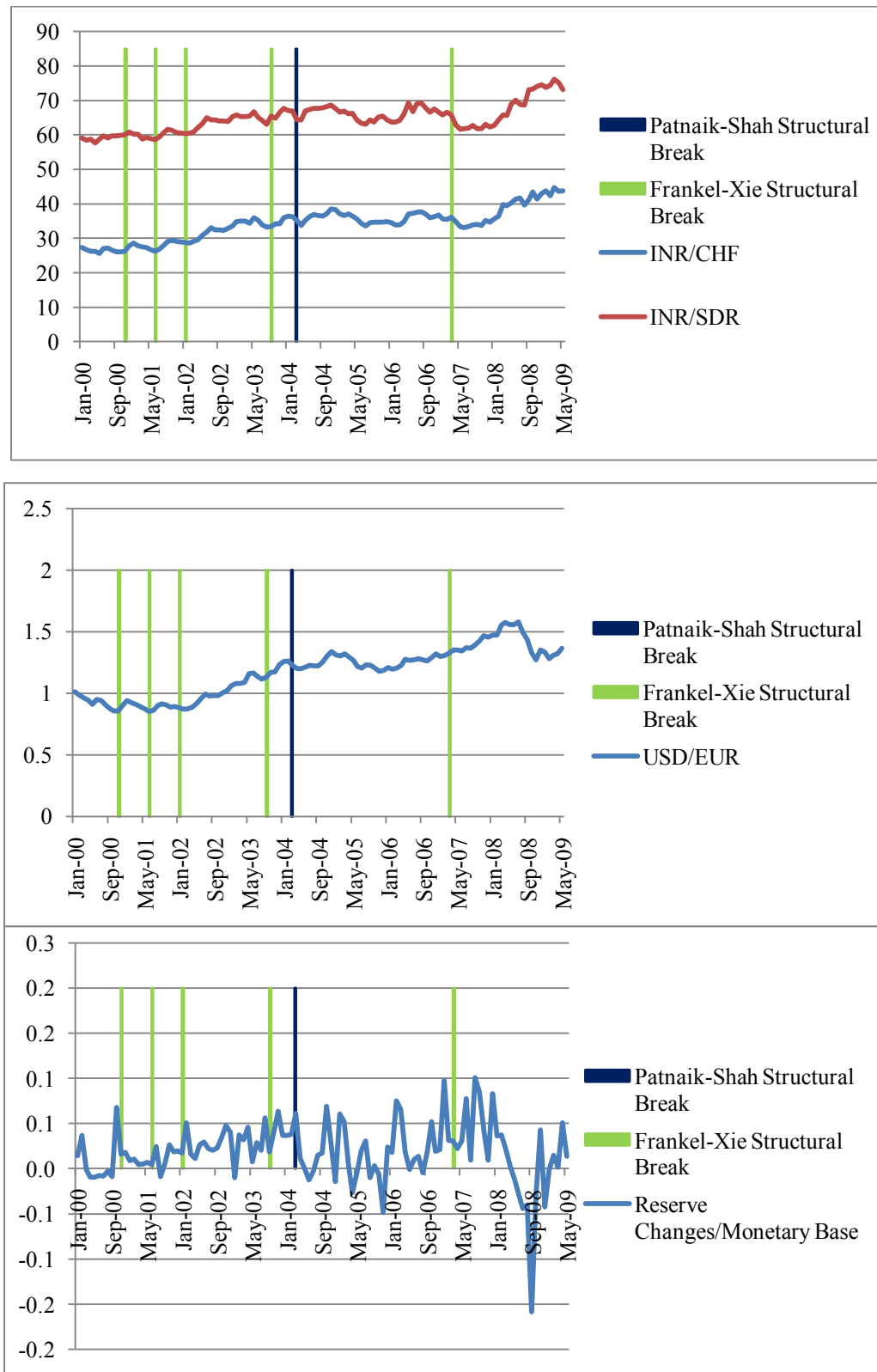
Figure 6-3: Panel B - Structural Breaks and Reserve Changes
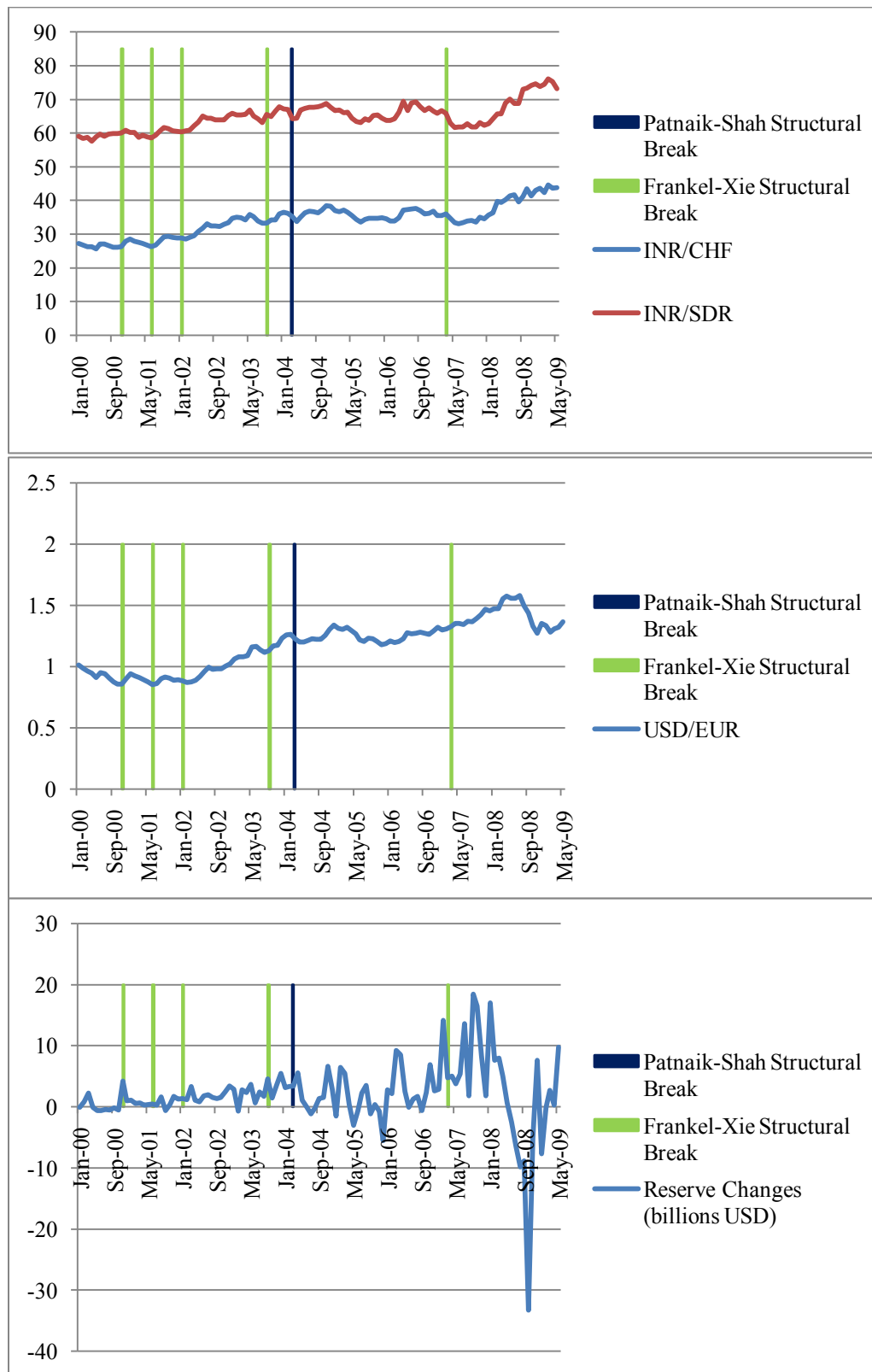
I take a different approach in this study. I ran regressions on equations (2) and (4) based on monthly data from 2001 to 2009. I used monthly data because it was very difficult to get consistent weekly data on reserves and monetary base. Instead of using the Bai-Perron methodology for my estimations, I broke down the time period into the following sub-periods – January 2001 to January 2003, February 2003 to May 2004, June 2004 to November 2006, and December 2006 to December 2009. The reason for choosing those particular time periods is because significant changes to capital controls occurred on those particular dates. We know that when exchange rate inflexibility is present, capital controls are necessary in order to maintain a consistent monetary policy regime. Therefore, if the capital account is opened up then the central bank will have difficulty in pursuing an autonomous monetary policy unless the policy makers are willing to switch to a more flexible exchange rate regime. In essence, there is a tradeoff between degree of capital controls and degree of exchange rate flexibility assuming monetary policy autonomy is desired.[11]

As mentioned above, regressions are run on the standard equation (2) and the synthesis equation (4). The results are presented in Tables 6-3 to 6-10. The first four tables (Tables 6-3 to 6-6) present the results of the estimation on the standard equation based on the above periods. Table 6-3 shows the estimation result for the first time period i.e. January 2001 to January 2003. During that period, the Indian rupee was pegged to the U.S. dollar. The only significant coefficient in the regression was the USD (U.S. dollar). Its coefficient was 0.9514 and the R^2 was as high as 0.9528, suggesting low exchange

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[11] In many countries, monetary policy autonomy may not be the top priority of their central banks. But the RBI lists monetary policy objectives as its top priority. The main objectives of monetary policy in India are maintaining price stability and financial stability as well as ensuring adequate flow of credit to the productive sectors of the economy to support economic growth.

rate flexibility. Table 6-4 shows the estimation result for the second time period, i.e., February 2003 to May 2004. During this period, the Indian rupee was relatively more flexible compared to the previous period. The USD was still significant and its coefficient was approximately 0.83 while the R^2 fell to 0.84. The only other significant coefficient was for the Japanese Yen with an approximate value of 0.37. Table 6-5 presents the results for the next period i.e. June 2004 to November 2006. The USD was still significant and its coefficient was approximately 0.91 while the R^2 fell further to 0.74, suggesting increased flexibility in the exchange rate. The coefficient for the Euro was high for this period and its value approximately 0.46. The results for the last time period (December 2006 to December 2009) are presented in Table 6-6. They suggest significant exchange rate flexibility with the R^2 falling further to 0.51. The coefficients for the Euro and the USD were both significant. So overall, the results from the standard equation seem to suggest that the Indian rupee was pegged to the U.S. dollar between 2001 and 2003 and after that India gradually moved towards greater exchange rate flexibility.

Now, let us analyze the results from the estimation of the synthesis equation. Table 6-7 shows the estimation result for the first time period i.e. January 2001 to January 2003. During that period, the Indian rupee was pegged to the U.S. dollar. The U.S. dollar was the only currency with a significant coefficient and the R^2 was as high as 0.9562, suggesting little exchange rate flexibility. Table 6-8 shows the estimation result for the second time period i.e. February 2003 to May 2004. During this period, the Indian rupee was relatively more flexible compared to the previous period. The USD was still significant and its coefficient was approximately 0.67 while the R^2 fell to 0.87. Table 6-9 presents the results for the next period i.e. June 2004 to November 2006. The USD was

still significant and its coefficient was approximately 0.52 while the R^2 fell further down to 0.84, suggesting increased flexibility in the exchange rate. The coefficient for the Euro was also significant for this period and its value was greater than that of USD at approximately 0.70. The results for the last time period (December 2006 to December 2009) are presented in Table 6-10. They suggest significant exchange rate flexibility with the R^2 falling further to 0.62. Interestingly, the only significant coefficient was the Euro and its value (0.52) was substantially higher than that of the USD (0.14). So overall, the results from the standard equation seem to suggest that the Indian rupee was pegged to the U.S. dollar between 2001 and 2003 and after that India had gradually moved towards greater exchange rate flexibility with the Euro gaining more importance. As pointed out earlier in this chapter, the findings of Frankel and Xie that the regime went back and forth between pegging and more flexibility, do not match the findings of this study. The results of this study match closely with that of Patnaik and Shah (2009) for the period of overlap but include more recent periods.

The findings of this study (based on estimation of both the standard and the synthesis equations) suggest that India's exchange rate regime was highly inflexible between January 2001 and January 2003. After that, the regime became gradually relatively more flexible and moved more and more toward very low degrees of intervention by the central bank. In fact, according to the latest IMF Article IV report on India, there has been no intervention by the RBI between June 2009 and December 2010 (IMF, 2011). In my judgment, the structural breaks could have possibly occurred close to the dates I picked for the regression analyses i.e. January 2003, May 2004 and November 2006 because we saw that the flexibility of the exchange rates changed after those dates.

Figure 6-4 shows the possible structural breaks in the exchange rate regime and comparison of the locations of the different structural breaks. Patnaik-Shah has only one structural break within that time period whereas Frankel-Xie has five structural breaks within that same time period. We can also see that the fluctuations in the value of (Reserve Changes) / (Monetary Base) increased after each break (suggested by the author of this study). This can be viewed as evidence that the changes in capital controls led to changes in exchange rate flexibility.

Figure 6-4: Comparison of Structural Breaks (between January 2000 and May 2009)
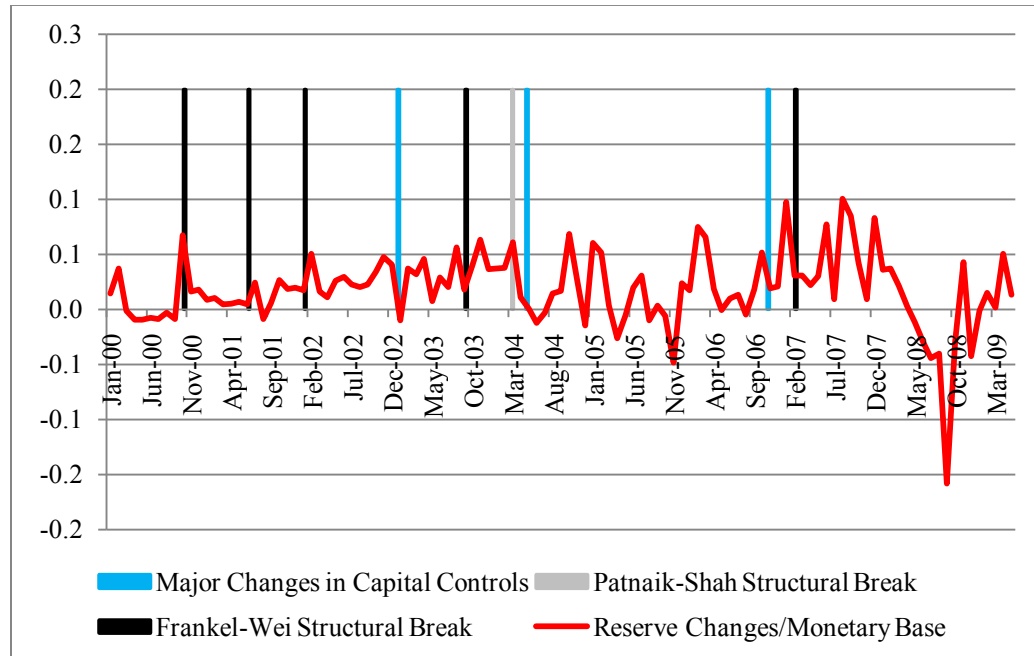
Degree of Exchange Rate Flexibility

Willett *et al.* (2007) introduces the concepts of propensity to intervene and degree of exchange rate flexibility. They look at the ratio of changes in the exchange rate

to the sum of changes in the exchange rate and reserves and come up with a continuous index of the propensity to intervene in the foreign exchange market that varies between zero and one. In there are no trends, then one minus the index of the propensity to intervene gives us the degree of exchange rate flexibility (Willett *et al.*, 2007). Thus, the degree of exchange rate flexibility is the absolute percentage change in exchange rate divided by the absolute percentage change in reserves plus the absolute percentage change in the exchange rate. This approach is better than looking at the behavior of the exchange rate alone because it allows one to conceptually distinguish whether a low level of exchange rate volatility is due to a low level of shocks or due to a high propensity of the authorities to intervene. Another advantage of this approach is that it allows one to investigate changes in regimes on an intra year basis. Obviously, there will be a great deal of variability in the monthly ratios. So it would be a good idea to look at the average of the ratio over longer time periods. Still, plots of the ratios can be quite helpful in classifying shifts in regimes.

Figure 6-5 shows us the relationship between the degree of exchange rate flexibility and changes in capital controls. It is clear from the figure that exchange rate flexibility increased after capital controls were reduced in India. In fact, the average value of the flexibility index is only 0.19 during the time period before January 2003 when the first major change in capital controls happened. After November 2006 (the third and last major change in capital controls since 2000), the average value increased substantially to 0.40 suggesting higher degree of exchange rate flexibility. The second major change occurred in May 2004. The average value of the index is 0.17 between January 2003 and May 2004 while the average value is 0.39 between May 2004 and November 2006.

Figure 6-5: Exchange Rate Flexibility Index and Changes in Capital Controls
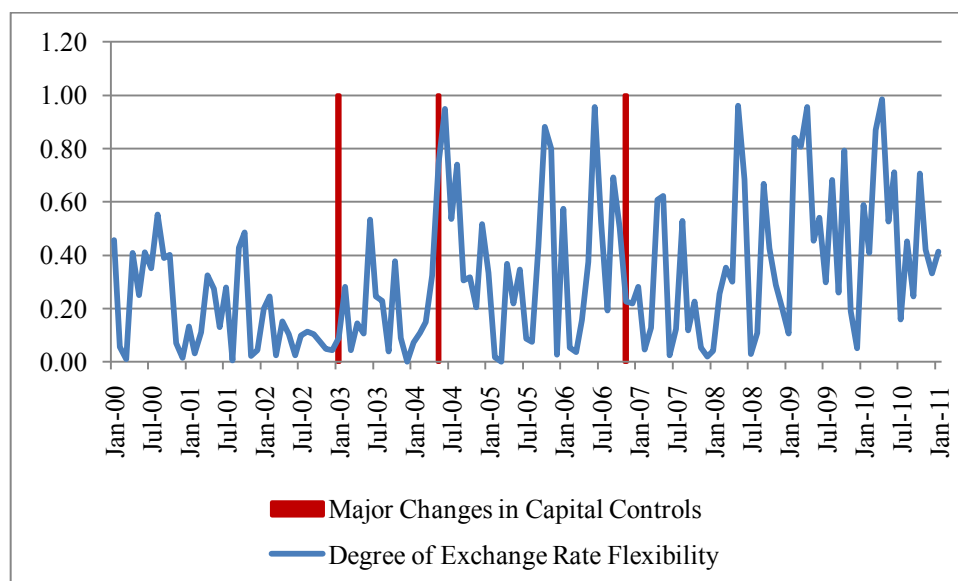
Implications for Monetary Policy

A consistent monetary policy regime requires capital controls when exchange rate inflexibility is present, so as to ensure autonomy of domestic monetary policy. Hence, the use of *de jure* capital controls by India was consistent with the exchange rate inflexibility of the Indian currency. However, as we saw from Chapter 4 of this study, India has been gradually opening up the capital account. India has also pursued trade integration, and that has lead to a massive expansion in the size of the current account relative to GDP. This implies that there will be more opportunities for people to evade capital controls e.g. through misinvoicing. It is very likely that as economic agents understand how to evade them, the effectiveness of capital controls will diminish over time. If capital controls were binding on some or all capital flows, then a given country would enjoy a consistent monetary policy regime. This is because a closed capital account and exchange rate

rigidity will not interfere with autonomy of monetary policy. If there is more *de facto* openness of the capital account, then countries would find that exchange rate inflexibility would lead to monetary policy distortions.

In India, currency pegging was done through intervention in the foreign exchange market leading to a large buildup of reserves. Figure 6-6 shows the buildup of reserves over the years.

Figure 6-6: Rising Foreign Exchange Reserves
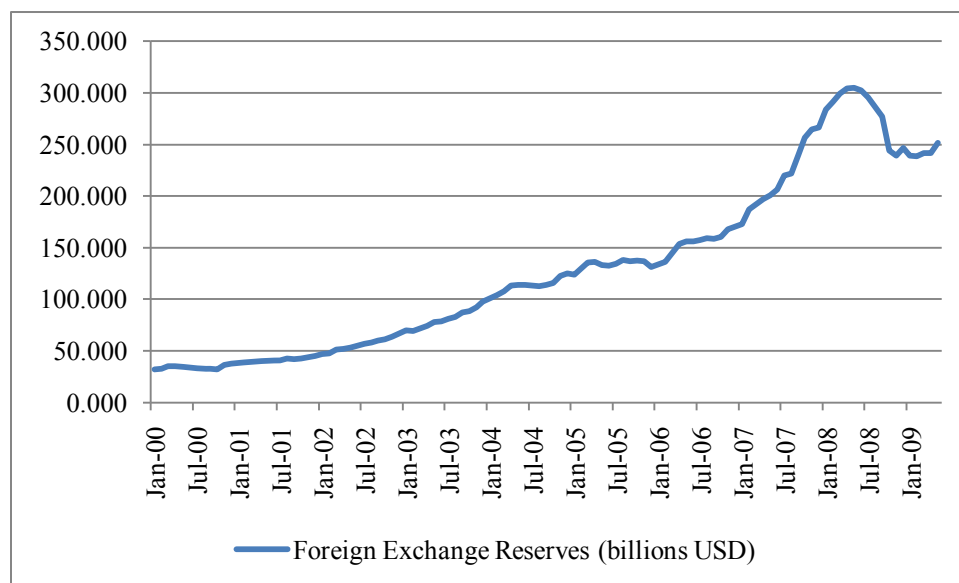
To avoid the inflationary impact of this intervention, the Reserve Bank of India attempted to sterilize this intervention (Aizenman and Glick, 2008). This involved sale of MSS (market stabilization scheme) bonds by the RBI as an agent of MOF (Ministry of Finance). In late 2003, RBI ran out of bonds for sterilization (Patnaik and Shah, 2009). A short while later, the exchange rate regime changed towards greater exchange rate flexibility. This time frame closely matches the possible structural breaks suggested in this study.

Attempts at exchange rate pegging will come at the expense of monetary policy autonomy when the capital account is relatively open. Capital flows generally tend to be procyclical. As a consequence, when business cycle conditions are good, capital tends to come into the country. If the central bank tries to prevent appreciation by using monetary policy, this requires low short term interest rates. Conversely, if exchange rate depreciation is prevented by the central bank when times are difficult, this requires higher interest rates. The late 1990s and early 2000s marked a period of unprecedented business cycle expansion. However, the Indian central bank was forced to implement loose monetary policy due to the constraints imposed by its exchange rate policy (Patnaik and Shah, 2009). But despite these distortions there was no push for reforms of the exchange rate/monetary policy framework. The Indian political leadership preferred to live with the prevailing regime even though it was imposing significant distortions on the economy. Figures 6-7 and 6-8 show the relationship between GDP growth and interest rates (nominal and real). Figure 6-7 shows the relationship between GDP growth and nominal interest rate. As we can see, even when the economy was expanding rapidly between 2002 and 2004, nominal rates were falling.

Figure 6-7: Quarterly GDP growth and Nominal Interest Rate
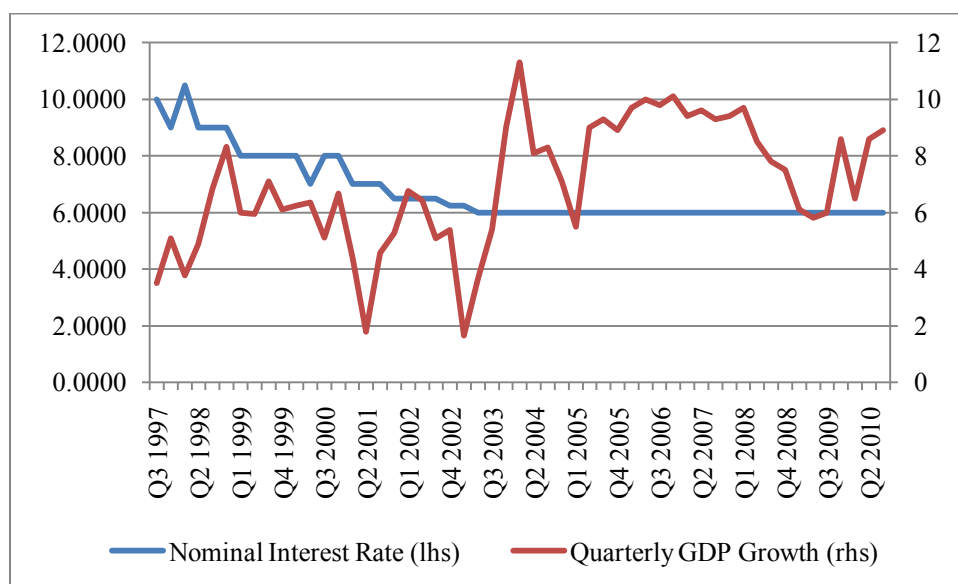
Similarly, figure 6-8 shows the relationship between real interest rate and GDP growth. Once again we can see evidence of distortions on monetary policy caused by constraints of the exchange rate policy. When the economy was booming from 2002 to 2004 and again from 2005 to 2006, we can clearly see that the real interest rate was falling.

Figure 6-8: Quarterly GDP growth and Real Interest Rate
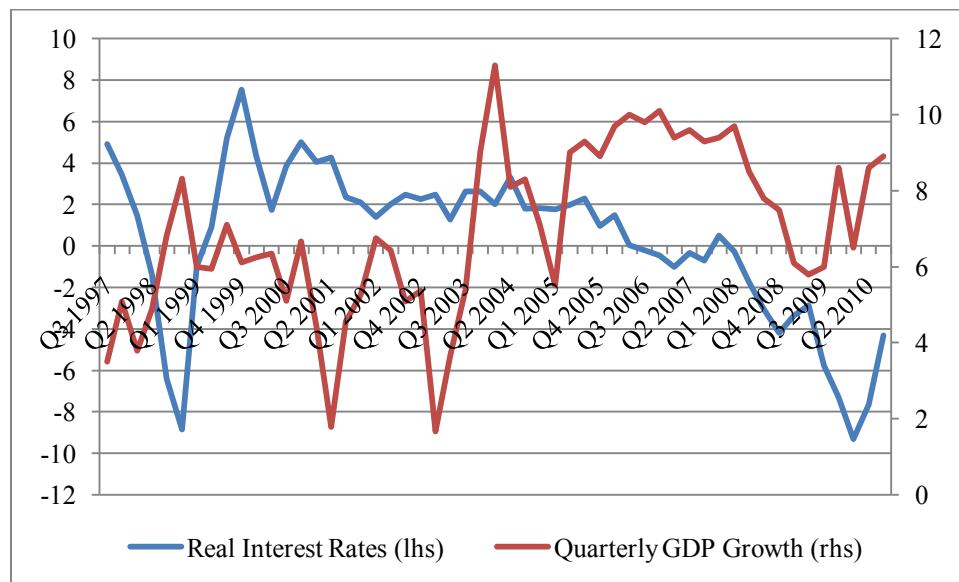
However, after 2006 we can no longer see evidence of the monetary policy distortions caused by exchange rate policy as the real rate and GDP growth were moving in same direction. This is another piece of evidence that shows that RBI abandoned its policy of pegging the exchange rate in recent years.

CHAPTER SEVEN
CONCLUSION

The main purposes of this study were to analyze the degree of capital controls in India, to classify the exchange rate regime, and to investigate whether changes in capital controls had an influence on the exchange rate regime. The first part of the dissertation focused on capital controls and provided a detailed documentation of the changes in capital restrictions in India based on data from the IMF and the Reserve Bank of India (RBI). This study also introduced a new method of measuring a country's de jure restrictions on cross-border capital transactions. The distinctive feature of the new index presented in this study is not only its level of disaggregation, but also coverage by month, which is not found in other indices. That allows us to record changes in capital controls more precisely. So, in that sense the new index is better than the earlier measures such as Chinn-Ito, Schindler and Potchamanawong indices. Most of the standard measures, particularly Chinn-Ito and Schindler indices, fail to pick up some of the important changes in capital controls. The new index, on the other hand, does an excellent job in that regard. The index tells us that even though India still maintains significant capital controls, there has been substantial movement toward a more open capital account in recent years.

The second part of the dissertation focused on the classification of India's exchange rate regime which has been the subject of considerable controversy over the extent to which India's managed float was a *de facto* peg. The analysis was based on the Frankel-Wei model. We analyzed the findings of two separate papers on this topic – Frankel and Xie (2010) and Patnaik and Shah (2009). Both studies used Bai-Perron

structural break model to identify instances of shifts in exchange rate regime. However, the two papers came up with very different results. The timing and also the number of occurrences of the structural breaks were very different in the two papers. This contradiction might be due to the fact that the two studies were testing for different things i.e. Patnaik and Shah (2009) estimated the weights of the basket currencies whereas Frankel and Xie (2010) was estimating the degree of exchange rate flexibility. Another explanation could be the choice of numeraire currency. Patnaik and Shah (2009) chose the CHF whereas Frankel and Xie (2010) chose the SDR. The two studies could also be using slightly different versions of the Bai-Perron methodology. Based on data related to reserves, we concluded that the structural break(s) likely occurred closer to the ones suggested by Patnaik and Shah (2009).

We also investigated a different question whether changes in capital controls had any influence on the exchange rate regime. We concluded that there was indeed a link between exchange rate regime and changes in capital controls i.e. as capital controls were gradually removed the exchange rate regime became more and more flexible. We ran regressions on both the standard equation as well as the synthesis equation of the Frankel-Wei model. Both sets of regression results suggest that the Indian rupee was de facto pegged to the U.S. dollar between 2001 and 2003. But the results also revealed that the exchange rate regime has moved toward greater flexibility in recent years with the Euro gaining more importance. We then use the method of Willett *et al.* (2007) to verify whether changes in capital controls had any influence on the exchange rate regime. We conclude that exchange rate flexibility did in fact increase after capital controls were reduced in India. The average value of the flexibility index was very low before the first

major change in capital controls happened. After the third and last major change in capital controls occurred, the average value increased substantially suggesting higher degree of exchange rate flexibility.

This study also addresses the issue of monetary policy distortions due to constraints imposed by exchange rate policy. An autonomous domestic monetary policy regime requires capital controls when strong exchange rate inflexibility is present. So it was not surprising that India maintained strong *de jure* capital controls when the rupee was de facto pegged to the US dollar. However, in recent years India has removed many of the restrictions on capital transactions. Also, *de facto* capital controls might have started to become relatively weak because there were more opportunities for avoiding capital controls through misinvoicing as India pursued trade integration and the size of its current account increased relative to GDP. When the capital account is relatively open, any attempt at exchange rate pegging usually leads to loss of monetary policy autonomy. We were able to show evidence that India's exchange rate policy did in fact lead to distortions in monetary policy objectives of the central bank. That ultimately led RBI (Reserve Bank of India) to abandon its policy of de facto pegging the Indian currency to the U.S. dollar.

Possible future research should focus on the political economy aspect of India's monetary policy and exchange rate regime. It would also be worthwhile to further analyze the reasons behind shifts in exchange rate regimes. Another area of future research would be look into the feasibility of constructing a new index of capital controls that combined both the de facto and de jure measures.

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Table 3-1: Overall Capital Restrictions in India (1995 – 2007)

Index	Average Values
in5 (Potchamanawong)	0.55
out5 (Potchamanawong)	0.56
In-binary (Potchamanawong)	0.92
Out-binary (Potchamanawong)	0.93
Normalized Chinn-Ito	0.84
Miniane	0.92
Schindler (aggregate)	0.87
IMF	1.00
Quinn (1997)	0.50
Edwards	0.54
Johnston (1996)	0.87

Table 4-1: Correlations of Capital Controls by Types of Capital Transactions

Type of Capital Control		(1)	(2)	(3)	(4)	(5)	(6)	(7)
rgcapital-inflow	(1)	1						
rgcapital-outflow	(2)	0.9711	1					
in-capital market securities	(3)	.	.	.				
out-capital market securities	(4)	0.7656	0.719	.	1			
in-money market instruments	(5)	.	.	.	.	.		
out-money market instruments	(6)	.	.	.	.	.	.	
in-collective investment securities	(7)	0.9019	0.8492	.	0.7178	.	.	1
out-collective investment securities	(8)	0.8793	0.8335	.	0.7447	.	.	0.9341
in-derivatives	(9)	0.9566	0.9436	.	0.7257	.	.	0.8914
out-derivatives	(10)	0.6845	0.8005	.	0.3557	.	.	0.4955
in-commercial credits	(11)	0.9289	0.8942	.	0.5966	.	.	0.8312
out-commercial credits	(12)	.	.	.	.	.	.	.
in-financial credits	(13)	0.9292	0.8873	.	0.5977	.	.	0.8327
out-financial credits	(14)	0.9427	0.9393	.	0.6381	.	.	0.889
in-guarantees	(15)	.	.	.	.	.	.	.
out-guarantees	(16)	0.656	0.7624	.	0.3276	.	.	0.4564
in-direct investment	(17)	0.6165	0.5568	.	0.7328	.	.	0.526
out-direct investment	(18)	0.8484	0.7942	.	0.8642	.	.	0.8306
in-liquidation of DI	(19)	.	.	.	.	.	.	.
out-liquidation of DI	(20)	.	.	.	.	.	.	.
in-real estate	(21)	0.8281	0.7685	.	0.9054	.	.	0.7928
out-real estate	(22)	0.8484	0.7942	.	0.8642	.	.	0.8306
in-personal capital movement	(23)	0.8623	0.9027	.	0.5186	.	.	0.7225
out-personal capital movement	(24)	0.8623	0.9027	.	0.5186	.	.	0.7225
in-commercial banks	(25)	0.8435	0.7855	.	0.8775	.	.	0.818
out-commerial banks	(26)	0.8656	0.9015	.	0.5254	.	.	0.7319
in-institutional investors	(27)	0.5587	0.535	.	0.2299	.	.	0.3203
out-institutional investors	(28)	.	.	.	.	.	.	.
dual exchange arrangement	(29)	.	.	.	.	.	.	.
restrictions on current account	(30)	0.8291	0.8831	.	0.4796	.	.	0.6682
surrender of export proceeds	(31)	0.4914	0.4572	.	0.5533	.	.	0.3972

Table 4-1 (continued)

Type of Capital Control		(8)	(9)	(10)	(11)	(12)	(13)	(14)
out-collective investmt securities (8)		1						
in-derivatives	(9)	0.8458	1					
out-derivatives	(10)	0.4628	0.6193	1				
in-commercial credits	(11)	0.7764	0.8369	0.727	1			
out-commercial credits	(12)	.	.	.	.	.		
in-financial credits	(13)	0.7778	0.835	0.7119	0.9877	.	1	
out-financial credits	(14)	0.8304	0.9548	0.6443	0.8794	.	0.8775	1
in-guarantees	(15)	.	.	.	.	.	.	.
out-guarantees	(16)	0.4263	0.5705	0.9211	0.7305	.	0.713	0.5935
in-direct investment	(17)	0.6424	0.5318	0.2606	0.4372	.	0.438	0.4676
out-direct investment	(18)	0.8169	0.8397	0.4116	0.6904	.	0.6917	0.7384
in-liquidation of DI	(19)	.	.	.	.	.	.	.
out-liquidation of DI	(20)	.	.	.	.	.	.	.
in-real estate	(21)	0.792	0.8015	0.3929	0.659	.	0.6602	0.7048
out-real estate	(22)	0.8169	0.8397	0.4116	0.6904	.	0.6917	0.7384
in-personal capital movemnt	(23)	0.6749	0.9031	0.6858	0.7747	.	0.7696	0.9395
out-personal capital movemnt	(24)	0.6749	0.9031	0.6858	0.7747	.	0.7696	0.9395
in-commercial banks	(25)	0.8085	0.8269	0.4053	0.6799	.	0.6812	0.7272
out-commercial banks	(26)	0.6837	0.9148	0.677	0.7782	.	0.7734	0.9378
in-institutional investors	(27)	0.2992	0.4004	0.6465	0.7004	.	0.7211	0.4165
out-institutional investors	(28)	.	.	.	.	.	.	.
dual exchange arrangement	(29)	.	.	.	.	.	.	.
restrictions on current account	(30)	0.6241	0.8351	0.7416	0.7561	.	0.749	0.8688
surrender of export proceeds	(31)	0.604	0.4015	0.1968	0.3301	.	0.3307	0.3531

Table 4-1 (continued)

Type of Capital Control		(15)	(16)	(17)	(18)	(19)	(20)	(21)
in-guarantees	(15)	.						
out-guarantees	(16)	.	1					
in-direct investment	(17)	.	0.2401	1				
out-direct investment	(18)	.	0.3791	0.6333	1			
in-liquidation of DI	(19)	.	.	.	.	.		
out-liquidation of DI	(20)	.	.	.	.	.	.	
in-real estate	(21)	.	0.3619	0.6635	0.9545	.	.	1
out-real estate	(22)	.	0.3791	0.6333	1	.	.	0.954
in-personal capital movement	(23)	.	0.6317	0.3801	0.6001	.	.	0.572
out-personal capital movement	(24)	.	0.6317	0.3801	0.6001	.	.	0.572
in-commercial banks	(25)	.	0.3734	0.6431	0.9848	.	.	0.969
out-commercial banks	(26)	.	0.6236	0.385	0.6079	.	.	0.580
in-institutional investors	(27)	.	0.7018	0.1685	0.2661	.	.	0.254
out-institutional investors	(28)	.	.	.	.	.	.	.
dual exchange arrangement	(29)	.	.	.	.	.	.	.
restrictions on current account	(30)	.	0.6831	0.3515	0.555	.	.	0.529
surrender of export proceeds	(31)	.	0.1813	0.7551	0.4782	.	.	0.501

Table 4-1 (continued)

Type of Capital Control		(22)	(23)	(24)	(25)	(26)	(27)	(28)
out-real estate	(22)	1						
in-personal capital movement	(23)	0.6001	1					
out-personal capital movement	(24)	0.6001	1	1				
in-commercial banks	(25)	0.9848	0.591	0.591	1			
out-commercial banks	(26)	0.6079	0.9872	0.9872	0.5987	1		
in-institutional investors	(27)	0.2661	0.4433	0.4433	0.262	0.4377	1	
out-institutional investors	(28)	.	.	.	.	.	.	.
dual exchange arrangement	(29)	.	.	.	.	.	.	.
restrictions on current account	(30)	0.555	0.9247	0.9247	0.5465	0.9129	0.4794	.
surrender of export proceeds	(31)	0.4782	0.287	0.287	0.4856	0.2907	0.1272	.

Table 4-1 (continued)

Type of Capital Control		(29)	(30)	(31)
dual exchange arrangement	(29)	.		
restrictions on current account	(30)	.	1	
surrender of export proceeds	(31)	.	0.2654	1

Table 4-2: Capital Controls (95-07) in India by type of transactions (Descriptive Statistics)

Variable	Observations	Mean	Min	Max
Rgcap-in	156	0.476	0.359	0.578
Rgcap-out	156	0.517	0.391	0.625
in-Capital market Securities	156	0.500	0.500	0.500
out-Capital market Securities	156	0.689	0.500	0.750
in-Money market instruments	156	0.750	0.750	0.750
out-Money market instruments	156	0.750	0.750	0.750
in-Collective investment securities	156	0.654	0.500	0.750
out-Collective investment securities	156	0.641	0.250	0.750
in-Derivatives	156	0.782	0.500	1.000
out-Derivatives	156	0.641	0.500	1.000
in-Commercial credits	156	0.439	0.250	0.750
out-Commercial credits	156	0.500	0.500	0.500
in-Financial credits	156	0.436	0.250	0.750
out-Financial credits	156	0.511	0.250	0.750
in-Guarantees	156	0.250	0.250	0.250
out-Guarantees	156	0.375	0.250	0.750
in-Direct investment	156	0.463	0.250	0.500
out-Direct investment	156	0.675	0.500	0.750
in-liquidation of direct investment	156	0.000	0.000	0.000
out-liquidation of direct investment	156	0.250	0.250	0.250
in-Real estate	156	0.679	0.500	0.750
out-Real estate	156	0.675	0.500	0.750
in-Personal capital movements	156	0.614	0.500	0.750
out-Personal capital movements	156	0.614	0.500	0.750
in-Commercial banks	156	0.676	0.500	0.750
out-Commercial banks	156	0.615	0.500	0.750
in-Institutional investors	156	0.535	0.500	0.750
out-Institutional investors	156	0.500	0.500	0.500
dual exchange arrangement	156	0.000	0.000	0.000
restrictions on current account	156	0.354	0.250	0.500
surrender of exports proceeds	156	0.477	0.250	0.500

Table 4-3: Overall Capital Restrictions in India (1995 – 2007)

Index	Average Value
Rgcap-in	**0.476**
Rgcap-out	**0.517**
in5 (Potchamanawong)	0.55
out5 (Potchamanawong)	0.56
Schindler (aggregate)	0.87
Normalized Chinn-Ito	0.84
Miniane	0.92
IMF	1.00
Edwards	0.537
Glick-Hutchison (1995-97)	1.00
Quinn (1997)	0.50
Johnston (1996)	0.87

Table 4-4: Correlation between Various Measures of Capital Controls

	Rgcap-in	Rgcap-out	in5	out5	Miniane
Rgcap-in	1				
Rgcap-out	0.6103	1			
in5	0.9983	0.5774	1		
out5	0.6103	1	0.5774	1	
Miniane	-0.9983	-0.5774	-1	-0.5774	1

The values of Chinn-Ito, Glick-Hutchison, IMF, Edwards indices remain unchanged for India for the selected time-period (1995-2008).

Table 6-1: Depreciation of Select Currencies Against the US dollar Between 31 January 2002 and 18 March 2008 (Source: Patnaik and Shah, 2009)

Country or Area	Currency	Depreciation (percent)	Volatility (Annualized)
New Zealand	New Zealand dollar	-48.44	11.94
Eurozone	Euro	-45.43	8.74
Australia	Australian dollar	-45.21	10.29
Switzerland	Swiss franc	-42.38	9.66
Great Britain	Pound	-29.97	8.11
Thailand	Thai baht	-29.41	7.49
Brazil	Real	-29.33	15.49
Japan	Yen	-26.57	9.47
Singapore	Singapore dollar	-24.93	4.05
South Korea	Won	-23.47	6.77
India	Indian rupee	-17.20	3.83
Malaysia	Ringgit	-17.01	2.48
China	Yuan-Renminbi	-14.46	1.19
Taiwan	Taiwan dollar	-12.23	3.85
Hong Kong	Hong Kong dollar	-0.38	0.55
Mexico	Mexican peso	17.02	6.78

Table 6-2: Frankel and Xie (2010) Estimation Results in Identifying Break Points in India's Exchange Rate Regime (M1:2000-M5:2009)

VARIABLES	(1) 1/14/2000- 10/27/2000	(2) 11/3/2000- 6/17/2001	(3) 6/24/2001- 12/31/2001	(4) 1/14/2002- 9/23/2003	(5) 9/30/2003- 2/25/2007	(6) 3/4/2007- 5/6/2009
US dollar	0.77***	0.92***	0.66***	0.91***	0.72***	0.59***
	(0.06)	(0.04)	(0.08)	(0.04)	(0.06)	(0.10)
Euro	0.12***	0.10***	0.23***	0.03	0.06	0.32***
	(0.03)	(0.03)	(0.07)	(0.03)	(0.05)	(0.07)
Jpn yen	0.09***	0.04*	0.05	0.03	0.24***	0.02
	(0.02)	(0.02)	(0.05)	(0.02)	(0.06)	(0.07)
ΔEMP	0.44***	0.04	0.46***	0.06	0.15***	0.37***
	(0.06)	(0.04)	(0.10)	(0.04)	(0.05)	(0.07)
Observations	42	32	28	88	172	109
R-squared	0.98	0.98	0.98	0.98	0.86	0.78
Br. Pound	0.02	-0.06	0.06	0.03	-0.01	0.08

Notes:

1. ΔEMP is the exchange rate market pressure variable, which is defined as the percentage increase in the value of the local currency plus the increase in reserves (scaled by the monetary base)

   Definition: $\Delta EMP_t = \Delta \log H_t + \dfrac{[\mathrm{Re}\,serve_t - \mathrm{Re}\,serve_{t-1}]}{MB_{t-1}}$

2. All data are weekly
3. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 6-3: Estimation Results of the Standard Equation (Jan 2001 to Jan 2003)

```
      Source |       SS       df       MS              Number of obs =      25
-------------+------------------------------           F(  3,    21) =  141.17
       Model | .00883069       3  .002943563           Prob > F      =  0.0000
    Residual | .000437866     21  .000020851           R-squared     =  0.9528
-------------+------------------------------           Adj R-squared =  0.9460
       Total | .009268556     24   .00038619           Root MSE      =  .00457


     dloginr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     dlogusd |  .9514355   .0497566    19.12   0.000     .8479609    1.05491
     dlogeur |  .0550346   .0561249     0.98   0.338    -.0616835   .1717527
     dlogjpy | -.0050473   .0395469    -0.13   0.900    -.0872896    .077195
       _cons |   .001397   .0009499     1.47   0.156    -.0005784   .0033723
```

Table 6-4: Estimation Results of the Standard Equation (Feb 2003 to May 2004)

```
      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  3,    12) =   21.79
       Model | .011463309      3  .003821103           Prob > F      =  0.0000
    Residual | .002104438     12   .00017537           R-squared     =  0.8449
-------------+------------------------------           Adj R-squared =  0.8061
       Total | .013567748     15  .000904517           Root MSE      =  .01324


     dloginr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     dlogusd |  .8275112   .1595417     5.19   0.000     .4798996   1.175123
     dlogeur | -.1503858   .1834402    -0.82   0.428    -.5500677    .249296
     dlogjpy |  .3670636   .1383004     2.65   0.021     .0657329   .6683944
       _cons |   -.00186   .0035257    -0.53   0.607    -.0095419   .0058219
```

Table 6-5: Estimation Results of the Standard Equation (June 2004 to Nov 2006)

Source	SS	df	MS			
Model	.017296043	3	.005765348			
Residual	.006095592	26	.000234446			
Total	.023391635	29	.000806608			

Number of obs = 30
F(3, 26) = 24.59
Prob > F = 0.0000
R-squared = 0.7394
Adj R-squared = 0.7093
Root MSE = .01531

dloginr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dlogusd	.9128283	.154746	5.90	0.000	.5947432	1.230913
dlogeur	.4614841	.2601106	1.77	0.088	-.0731808	.996149
dlogjpy	.0630471	.174485	0.36	0.721	-.295612	.4217062
_cons	-.0014096	.002924	-0.48	0.634	-.00742	.0046007

Table 6-6: Estimation Results of the Standard Equation (Dec 2006 to Dec 2009)

Source	SS	df	MS			
Model	.014799765	3	.004933255			
Residual	.014260693	33	.000432142			
Total	.029060458	36	.000807235			

Number of obs = 37
F(3, 33) = 11.42
Prob > F = 0.0000
R-squared = 0.5093
Adj R-squared = 0.4647
Root MSE = .02079

dloginr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dlogusd	.50641	.1671132	3.03	0.005	.1664157	.8464044
dlogeur	.292077	.1179119	2.48	0.019	.0521835	.5319705
dlogjpy	-.0277795	.1116347	-0.25	0.805	-.2549021	.1993431
_cons	.0003094	.0035571	0.09	0.931	-.0069275	.0075464

Table 6-7: Estimation Results of the Synthesis Equation (Jan 2001 to Jan 2003)

Source	SS	df	MS		Number of obs =	25
					F(4, 20) =	109.28
Model	.008863043	4	.002215761		Prob > F =	0.0000
Residual	.000405513	20	.000020276		R-squared =	0.9562
					Adj R-squared =	0.9475
Total	.009268556	24	.00038619		Root MSE =	.0045

dloginr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dlogusd	1.036411	.083263	12.45	0.000	.8627275	1.210095
dlogeur	.0269677	.0596389	0.45	0.656	-.0974369	.1513723
dlogjpy	-.0169964	.0401286	-0.42	0.676	-.1007031	.0667103
demp	-.098771	.0781914	-1.26	0.221	-.2618753	.0643333
_cons	.0032133	.0017161	1.87	0.076	-.0003664	.0067929

Table 6-8: Estimation Results of the Synthesis Equation (Feb 2003 to May 2004)

Source	SS	df	MS		Number of obs =	16
					F(4, 11) =	17.97
Model	.011766902	4	.002941725		Prob > F =	0.0001
Residual	.001800846	11	.000163713		R-squared =	0.8673
					Adj R-squared =	0.8190
Total	.013567748	15	.000904517		Root MSE =	.0128

dloginr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dlogusd	.6736862	.1911062	3.53	0.005	.2530644	1.094308
dlogeur	.1177856	.2649424	0.44	0.665	-.4653488	.70092
dlogjpy	.2701197	.1514055	1.78	0.102	-.0631216	.603361
demp	.2829589	.2077876	1.36	0.201	-.1743786	.7402963
_cons	-.0105022	.0072028	-1.46	0.173	-.0263553	.005351

Table 6-9: Estimation Results of the Synthesis Equation (June 2004 to Nov 2006)

```
      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  4,    25) =   32.14
       Model | .019583265      4  .004895816           Prob > F      =  0.0000
    Residual | .003808369     25  .000152335           R-squared     =  0.8372
-------------+------------------------------           Adj R-squared =  0.8111
       Total | .023391635     29  .000806608           Root MSE      =  .01234


     dloginr |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     dlogusd |  .5185581   .1609745     3.22   0.004     .1870249    .8500913
     dlogeur |  .7026269   .2187108     3.21   0.004     .2521836    1.15307
     dlogjpy |   .012064   .141263      0.09   0.933    -.2788727    .3030006
        demp |  .3182137   .0821229     3.87   0.001     .1490785    .4873489
       _cons | -.0050057   .0025331    -1.98   0.059    -.0102227    .0002113
```


Table 6-10: Estimation Results of the Synthesis Equation (Dec 2006 to Dec 2009)

```
      Source |       SS       df       MS              Number of obs =      37
-------------+------------------------------           F(  4,    32) =   13.35
       Model | .01816896       4  .00454224            Prob > F      =  0.0000
    Residual | .010891499     32  .000340359           R-squared     =  0.6252
-------------+------------------------------           Adj R-squared =  0.5784
       Total | .029060458     36  .000807235           Root MSE      =  .01845


     dloginr |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     dlogusd |  .1416624   .1882428     0.75   0.457    -.2417756    .5251004
     dlogeur |  .5220867   .1276509     4.09   0.000     .2620703    .782103
     dlogjpy |  .0199399   .1002271     0.20   0.844    -.1842161    .2240959
        demp |  .2832697   .0900339     3.15   0.004     .0998767    .4666627
       _cons | -.0040198   .0034437    -1.17   0.252    -.0110343    .0029947
```

India's Position on Capital Controls and its Policy Changes on the Capital Account, 1988–2009 *(Source: Annual Report of Exchange Arrangements and Exchange Restrictions, 1989 – 2009)*

Year	Changes in India's Policy on the Capital Account
1988	• Profit remittances of foreign companies, banks have to be approved by the Reserve Bank of India (RBI). • Restrictions on remittances on income earned by foreign nationals. • Residents of India are not allowed to have bank accounts outside India. • Limits on payments for invisibles. • Export proceeds need to be surrendered to the RBI. • Individuals borrowing from abroad have to have prior approval from the RBI.
1989	• There were no major changes in rules and policy on capital transactions.
1990	• Foreign investment policy slightly liberalized. The government allowed automatic approval of foreign investment proposals of foreign companies with equity shares of up to 40 percent.
1991	• The government continued liberalization of foreign investment policy by allowing automatic approval of foreign investment proposals of foreign companies with equity shares of up to 51 percent.
1992	• Tax on foreign exchange sold for travel abroad abolished. • Limit of $2,000 per person for business trips. • Foreign institutional investors (FIIs) are now allowed to invest in the primary and secondary equity markets.
1993	• Foreign companies would be treated on a par with domestic investors and a number of restrictions were removed on them. • The foreign exchange travel expense was increased to $5,000.
1994	• Accepted Article VIII of the IMF's articles of agreement. **August 15** • Transfers abroad subject to limits.
1995	• There were no major changes in rules and policy on capital transactions.
1996	• FIIs were allowed to invest up to 100 percent of their funds in corporate debt. **November 9** • Limits placed on banks on foreign exchange exposure replaced from a uniform limit to individual limits approved by the RBI**. April 3** • Granted automatic approvals up to 100 percent foreign equity to coal, hydro and non-conventional energy based power projects. **August 21**
1997	• Foreign equity participation was increases to 74 percent in some industries. **January 17** • Limits on legal services relating to import transactions was increased. **March 31**
1998	• Foreign companies are now allowed to remit profits without RBI approval net of taxes. **June 6**
1999	• Authorized dealers (ADs) were permitted to grant credit facilities according to their commercial value against the security of balances held in an EEFC account. **June 2** • The stipulation that banks must charge a minimum of 20% interest rate on overdue export bills was withdrawn. **October 31** • The interest rate surcharge on import financing was withdrawn. **October 31** • Reserve requirements on domestic and foreign currency deposits by nonresidents were reduced by 9%. **November 20**
2000	• There were no major changes in rules and policy on capital transactions.
2001	• The facility for acquisition by foreign investors of shares and convertible debentures of Indian companies engaged in the print media sector was eliminated. **February 16** • Indian employees of foreign-owned companies were allowed to invest up to $20,000 a

		year in employee-stock ownership plan schemes (previously $10,000 a year in a block of five years). **March 2**
2002	•	Prepayments of loans and credits and payments of interest and other charges from nonresidents to residents up to the equivalent of $100 million may be made by authorized dealers (ADs) through the automatic route without RBI approval. **September 17**
	•	ADs were allowed to approve short-term credit proposals for periods of less than three years for up to $20 million an import transaction, provided that the charge for the credit does not exceed LIBOR (London Interbank Offered Rate) plus 50 basis points up to one year or LIBOR plus 125 points for periods between one and three years. **September 27**
	•	Banks were allowed to invest in money market instruments and/or debt instruments abroad subject to limits approved by their Board of Directors. **December 21**
2003	•	The limit on investments made by mutual funds in India in companies listed abroad was raised to $1 billion from $500 million. **January 13**
	•	Sri Lankan companies were allowed to issue securities in India. Payments and subscriptions for these are effected through Indian depository receipts. **January 27**
	•	Overseas corporate bodies (OCBs) were no longer allowed to purchase securities under the portfolio investment scheme. **September 16**
	•	FIIs and NRIs were allowed to trade in all exchange-traded derivative contracts, including interest rate derivatives, approved by the SEBI, subject to prescribed limits. **September 1**
	•	Prepayments of loans to residents from nonresidents through authorized dealers (ADs) were permitted without any limit under the automatic route. Previously, the limit was up to the equivalent of $100 million. **March 1**
	•	External borrowing in excess of $50 million was permitted only for financing equipment imports and infrastructure projects. **November 14**
	•	OCBs that are unincorporated entities were not allowed to make new investments under the Foreign Direct Investment Scheme, including through the automatic route. **September 16**
	•	Local companies making direct investments abroad were allowed to hedge the exchange rate risk in the local market by purchasing forward or options contracts from banks against proof of the exposures. **December 12**
2004	•	Resident individuals were permitted to remit $25,000 a year for any permissible current or capital transactions. **February 4**
	•	The overall investment limit under the 70:30 debt route in dated government securities and treasury bills was raised to $200 million from $100 million. The limit did not include corporate debt. **November 2**
	•	The cumulative debt investment limit for the FIIs or subaccounts was raised to $1.75 billion from $1 billion in the July 2004 budget. **November 2**
	•	Indian companies were permitted to extend foreign currency loans for personal purposes for employees of their branches outside India. **February 20**
	•	Trade credits of up to one year for noncapital goods and up to three years for capital goods for amounts up to $20 million were permitted. Authorized dealers (ADs) were permitted to guarantee such trade credits. **April 17**
	•	Registered partnerships were allowed to invest abroad up to 100% of their net worth through the automatic route. **January 3**
	•	Foreign companies were allowed to establish branch offices or units in Special Economic Zones to undertake manufacturing and service activities. **January 16**
	•	Resident employees of a foreign company's office, branch, or subsidiary in India, in which the foreign company held a share of not less than 51%, could invest under an employee stock option plan without limit, subject to certain conditions. **February 9**
	•	Indian corporations were allowed to fund direct investments in joint ventures or wholly owned subsidiaries abroad with external commercial borrowing (ECB). **February 23**

	- Outstanding external commercial borrowing and lump-sum fees and royalties were permitted to be converted into equity without prior RBI approval. **October 1** - Residents no longer needed prior approval of the government and RBI in respect of transfer of shares or convertible debentures to nonresidents. **October 4** - Residents were allowed to acquire property abroad using a personal remittance up to the equivalent of $25,000. **February 4** - ADs and housing finance companies in India were permitted to extend loans to non-resident Indians (NRIs) and persons of Indian origin (PIOs) for acquiring residence in India. **May 25** - ADs were permitted to avail of foreign currency borrowing not exceeding 25% of their Tier I capital or the equivalent of $10 million, whichever was higher. **March 24**
2005	There were no major changes in rules and policy on capital transactions.
2006	- Resident individuals were allowed to remit up to the equivalent of $50,000 (previously, $25,000) a financial year for any permissible current or capital transactions, or a combination of the two. **December 20** - Foreign investment up to 49% is allowed in stock exchanges, depositories, and clearing corporations, with the prior approval of the (Foreign Investment Promotion Board (FIFB). **December 22** - Proceeds from the sale of immovable property may be remitted without a limitation on how long the property was owned (previously, the property had to be owned at least 10 years). **November 16** - Residents may acquire property abroad using a personal remittance up to the equivalent of $50,000 (previously, $25,000) a financial year. **December 20** - FDI was allowed up to 100% in certain industries such as distillation and brewing of potable alcohol, industrial explosives, coal and lignite mining, petroleum and natural gas, etc. **February 10** - FDI in single-brand product retail trading is allowed up to 5% with prior government approval. **February 10** - ADs are allowed to permit remittances of gifts and donations by resident individuals with a limit subsumed under the limit of $50,000 (previously, the limit was $5,000) a financial year under the Liberalized Remittance Scheme (LRS). **December 20**
2007	- The limit for resident individuals of $50,000 a financial year under the LRS was raised to first $100,000 and then to $200,000 for permitted current and capital account transactions. **May 8 then September 26** - The cumulative debt investment limit for FIIs/subaccounts is $3.2 billion (previously, $2 billion). **March 31** - Indian Venture Capital Funds (VCFs) registered with the Securities and Exchange Board of India (SEBI) were allowed to invest in equity and equity-linked instruments of offshore venture capital undertakings, subject to an overall limit of $500 million and SEBI regulations. No separate permission from the RBI is necessary for such VCFs. **April 30** - Mutual funds may invest in overseas mutual funds that make nominal investments in unlisted overseas securities. They can also invest in overseas exchange-traded funds that invest in securities. Mutual funds can invest in American depository receipts (ADRs) and Global depository receipts (GDRs) of foreign companies as well. **May 31** - The limit for portfolio investment by listed Indian companies in the equity of listed foreign companies that have at least a 10% stake in a listed Indian company was first raised from 25% to 35% and then to 50% of the net worth of the investing company. **June 14** - The requirement that a foreign company have a 10% stake in an Indian company to be eligible for portfolio investment of up to 50% of the net worth of the investing company under the automatic route was eliminated. **September 26** - The yearly limit for resident individuals' portfolio investment abroad was increased to

	$200,000 from $100,000. **September 26**
	• The aggregate ceiling for overseas investment by mutual funds was raised to $5 billion from $4 billion. **October 30**
	• SEBI-registered FIIs and subaccounts of FIIs were permitted to sell short, lend, and borrow equity shares of Indian companies, subject to regulatory conditions. **December 31**
	• Only regulated entities may issue or renew offshore derivative instruments or participatory notes with underlying derivatives. FIIs may not issue or renew such instruments. **October 25**
	• Banks were prohibited from granting new loans or renewing existing loans in excess of Rs. 2 million against nonresident external rupee (NR(E)RA) and foreign currency nonresident (FCNR (B)) deposits either to depositors or third parties. **January 31**
	• Borrowing up to $500 million for permissible end uses is allowed only for foreign currency exposure. **August 7**
	• RBI approval is required for external borrowing up to $20 million. **August 7**
	• FDI in certain telecom services was raised to 74% from 49%. **April 9**
	• The limit for overseas investment by an Indian company was raised to 300% from 200% of its net worth. **June 14**
	• Indian companies and registered partnership firms were permitted to invest in overseas joint ventures/wholly owned subsidiaries up to 400% of their net worth under the automatic route. **September 26**
	• The yearly limit for residents' real estate acquisitions abroad was increased to $200,000 from $100,000. **September 26**
	• ADs were allowed to remit gifts and donations by residents with a limit of $100,000 (previously, $50,000) a financial year under the LRS. The limit was later raised to $200,000 from $100,000. **May 8 then September 26**
2008	• There were no major changes in rules and policy on capital transactions.
2009	• Information not available yet.

Fuller Capital Account Convertibility – Timing and Sequence of Selected Measures
(Source: Report of Tarapore Committee on Fuller Capital Account Convertibility, 2000)

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	**Phase II (2007 – 2008 and 2008 – 2009)**	**Phase III (2009-2010 and 2010 – 2011)**
I. Corporates/Businesses **Corporate/Businesses – Residents**				
1. Financial capital transfers abroad including for opening current/chequeable accounts.	(i) Listed Indian companies are permitted to invest up to 25 per cent of their net worth in overseas listed companies having at least 10 per cent stake in listed Indian companies and in rated bonds/fixed income securities.	This separate facility should be terminated and made a sub-limit of Item I.A.	-	-
2. External Commercial Borrowings (ECB).	An overall limit is fixed annually for ECB in consultation with GOI. Within this limit entities are eligible to avail of ECBs under the Automatic route and approval route. ECB up to USD 500 million per financial year can be availed by corporates under automatic route. NGOs engaged in microfinance activities are permitted to borrow up to US$ 5 million under the automatic route.	(i) The current overall limit for ECB of US$ 18 billion should be retained for 2006-07 but the scheme should be restructured. (ii) The limit for Automatic Approval should be retained at US$ 500 million. (iii) ECBs of over 10 years' maturity should be outside the overall limit without call/put options up to 10 years.	(i) The overall ceiling for ECB should be raised gradually. (ii) The limit for automatic approval could be raised to US$ 750 million per financial year.	(i) The overall ceiling for ECB should be raised gradually. (ii) The limit for Automatic Approval could be raised to US $ 1 billion per financial year.
3. Trade credit	Import linked short term loans (Trade credit) up to US$ 20 million per transaction for all permissible imports with a maturity period of less than 1 year are allowed. Trade credit up to US$ 20 million per import transaction with maturity between 1-3 years is allowed for import of capital goods.	Import linked short term loans (trade credit) should be monitored regularly and in a comprehensive manner. The per transaction limit of US$ 20 million should be reviewed and the scheme revamped to avoid unlimited borrowing.	As in Phase I	As in Phase I
4. Joint	Proposals for investment	The present limit of	The overall	The

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	Phase II (2007 – 2008 and 2008 – 2009)	Phase III (2009-2010 and 2010 – 2011)
ventures/wholly Owned subsidiaries abroad.	overseas by Indian companies/registered partnership firms up to 200 per cent of their net worth as per the last audited balance sheet, in any bonafide business activity are permitted by ADs irrespective of the export/exchange earnings of the entity concerned within this limit loans and guarantees by the parent company and associates are also permitted. The condition regarding dividend balancing has been dispensed with.	200 per cent should be raised to 250 per cent but the separate limit of 25 per cent for financial transfers abroad (including opening current/ chequable accounts) should be a sub-limit (25 per cent of the overall limit of 250 per cent; the stipulation of a 10 per cent stake in an Indian Company should be withdrawn.	limit should be raised to 300 per cent and the sub-limit of 25 per cent raised to 35 per cent.	overall limit should be raised to 400 per cent and the sub-limit raised to 50 per cent.
5. Establishment of offices abroad	No prior approval of RBI is required for opening offices abroad. AD banks have been permitted to allow remittance up to 10 per cent for initial and up to 5 per cent for recurring expenses of the average annual sales/income or turnover during last two accounting years. RBI permits remittance of higher percentage based on the merits of the case. Permission to acquire property for the Branch office is accorded by RBI.	To be subsumed under I.A.4	To be subsumed under I.A.4	To be subsumed under I.A.4
6. Direct investment abroad by partnership firms.	Partnership firms registered under the Indian Partnership Act, 1932 and having a good track record are permitted to make direct investments outside India in any bonafide activity 200 per cent of their net worth under the automatic route.	Same as for I.A.4	Same as for I.A.4	Same as for I.A.4
7. Investment in agriculture overseas by	Resident corporates and registered partnership firms are allowed to undertake	To be subsumed under I.A.4	To be subsumed under I.A.4	To be subsumed under

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	**Phase II (2007 – 2008 and 2008 – 2009)**	**Phase III (2009-2010 and 2010 – 2011)**
Resident corporates and registered partnership firms other than through JV/WOS abroad.	agricultural activities including purchasing of land incidental to this activity either directly or through their overseas office (i.e. other than through JV/WOS) within the overall limit available for investment under the automatic route.			I.A.4
8. Direct investment overseas by proprietorship/ unregistered partnership concerns	RBI will consider applications from proprietorship/unregistered partnership concerns which satisfy eligibility criteria as stated in the circular.	Same as for I.A.4	Same as for I.A.4	Same as for I.A.4
9. Exchange Earners Foreign Currency (EEFC) accounts for exporters and exchange earners.	EEFC accounts are permitted for any person resident in India who are exporters or exchange earners, subject to the limits indicated below : (i) Status holder Exporter (as defined by Foreign Trade Policy in force) – 100 per cent. (ii) A resident in India for professional services rendered in his individual capacity – 100 per cent.	The limit for 'any other person resident in India' should be raised from 50 per cent to 100 per cent. The EEFC holders should be allowed Foreign Currency Current/Savings accounts with cheque writing facilities and interest bearing terms deposits.	As in Phase I	Same as Phase I
10. Project Exports	Powers have been delegated to ADs/Exim Bank to approve Project/Service export proposals up to contract value of USD 100 million. Contracts of value more than USD 100 million are approved by the Working Group. ADs/Exim Bank have also been delegated powers to approve various facilities such as initial remittance, overseas borrowing to meet temporary mismatch in cash flow, inter- project	(i) Large turnkey project exporters with satisfactory track record may be permitted to operate one account with the facility of inter-project transferability of funds and/or machineries. There should be no stipulation regarding recovery of market value of machinery from the transferee project. (ii) Provisions regarding purchase of	As in phase I	As in phase I

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	**Phase II (2007 – 2008 and 2008 – 2009)**	**Phase III (2009-2010 and 2010 – 2011)**
	transfer etc.	machinery/ equipment by project exporters from third country sources should be permitted.		
I. Corporates **B. Non-Residents**				
1. Foreign Direct Investment	GOI have permitted FDI under the Automatic Route in items/activities in all sectors up to the sectoral caps except in certain sectors where investment is prohibited. There is no requirement of RBI approval for foreign investments. Investments not permitted under the automatic route require approval from FIPB. The receipt of remittance has to be reported to RBI within 30 days from the date of receipt of funds and the issue of shares has to be reported to RBI within 30 days from the date of issue by the investee company. Shares and Takeover] (SAST) Regulations.	As a strong signal for encouraging FDI the FIPB/RBI regulations/procedures should be liberalised and a sunset clause of two years put on all regulations/procedures unless specifically reintroduced afresh.	As in Phase I	As in Phase I
2. Portfolio Investment through stock exchanges in shares/debentures.	Investments by non residents is permitted under the Portfolio Investment Scheme to entities registered as FIIs and their sub accounts under SEBI(FII) Regulations and is subject to ceilings indicated therein. No RBI approval is required for registration of FIIs. The transactions are subject to daily reporting by designated ADs to RBI.	(i) Fresh inflows under Participatory Notes (P-Notes) should be banned and existing P-Notes should be phased out over a period of one year. (ii) Corporates should be allowed to invest in Indian stock markets through SEBI registered entities (including Mutual Funds and Portfolio Management Schemes), who will be individually responsible for	(i) As in Phase I (ii) As in Phase I	(i) As in Phase I (ii) As in Phase I

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	**Phase II (2007 – 2008 and 2008 – 2009)**	**Phase III (2009-2010 and 2010 – 2011)**
		fulfilling KYC and FATF norms. The money should come through bank accounts in India.		
3. Disinvestment	RBI approval for transfer of shares from non-residents to residents has been dispensed with in cases where shares are sold on stock exchange or in case of sale under private arrangements, where it complies with the pricing guidelines. The cases of transfer of shares involving deviation from the pricing guidelines requires to be approved by RBI.	The disinvestment procedures, particularly for FDI, should be simplified so as to provide for symmetry between investments and disinvestments.	As in Phase I	As in Phase I
4. Multilateral institutions permitted to raise resources in India	Multilateral institutions like International Finance Corporation (IFC) have been allowed to raise resources in India by way of issue of Rupee Bonds with prior approval of Government/ RBI.	This should be liberalised to allow other institutions/ corporates to raise rupee bonds (with an option for conversion into foreign exchange). The regulator should devise a suitable scheme with overall limits.	As in Phase I but the cap should be gradually raised.	As in Phase I but the cap should be gradually raised.
II. Banks **A. Banks – Residents**				
1. Loans and Borrowings from overseas banks and correspondents including overdrafts in nostro account.	ADs are allowed to borrow from overseas banks and correspondent banks subject to a limit of 25 per cent of the unimpaired Tier I capital as at the close of the previous quarter or US$ 10 million (or its equivalent), whichever is higher. Within this limit, there is no further restriction regarding short term borrowings. The overseas borrowings by ADs for the purpose of financing export credit as	The limit should be raised to 50 per cent of paid up capital and free reserves of which there should be a sub-limit of one third of the overall limit for short-term up to less than one year. The stipulation of US$ 10 million should be withdrawn.	The limit should be raised to 75 per cent of paid up capital plus free reserves with a sublimit of one-third for short-term.	The limit should be raised to 100 per cent of paid up capital plus free reserve with a sublimit of one-third for short term.

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	Phase II (2007 – 2008 and 2008 – 2009)	Phase III (2009-2010 and 2010 – 2011)
	well as Subordinated debt placed by head offices of foreign banks with their branches in India as Tier-II capital is excluded from the limit.			
2. Investments in overseas markets	Authorised Dealers are allowed to undertake investments in overseas markets up to the limits approved by their Board of Directors within a ceiling in terms of section 25 of BR Act 1949. Such investments may be made in overseas money market instruments and/or debt instruments issued by a foreign state with a residual maturity of less than one year and rated at least as AA (-) by Standard & Poor/FITCH IBCA or Aa3 by Moody's.	No change	As in Phase I	As in Phase I
III. Non Banks – Financial A. Residents				
1. SEBI registered Indian investors (including Mutual Funds) Investments overseas.	The aggregate ceiling on investment overseas by Mutual Funds is US$ 2 billion with an individual ceiling as decided by SEBI. In terms of SEBI instructions it has been stipulated that limit for individual fund would be 10 per cent of net asset value (NAV) as on 31st January, subject to US$ 5 million and maximum of US$ 50 million.	The aggregate ceiling of US$ 2 billion should be raised to US$ 3 billion. This facility should be extended to SEBI registered portfolio management schemes. The individual fund limit and proportion of NAV should be removed.	The aggregate ceiling should be raised to US$ 4 billion.	The aggregate ceiling should be raised to US$ 5 billion.
Non-Banks – Financial B. Non-Residents				
1. FIIs (a) Portfolio Investment	Investments by non residents is permitted under the portfolio investment scheme to entities	Fresh inflows in P-Notes should be banned and existing P-Notes should be phased	As in Phase I	As in Phase I

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	Phase II (2007 – 2008 and 2008 – 2009)	Phase III (2009-2010 and 2010 – 2011)
	registered as FIIs and their sub accounts under SEBI(FII) regulations and is subject to ceilings of 10 per cent for each FII, and 10 per cent for each of their subaccounts, within the overall ceiling for FIIs investment in each company. No RBI approval is required for registration of FIIs. The transactions are subject to daily reporting by designated ADs to RBI.	out over a period of one year.		
(b) Primary market investment/ private placement.	FII investments in primary market is now allowed. The ceiling referred to above is inclusive of primary market investments/private placements.	No Change	No Change	No Change
(c) Disinvestment	RBI approval for transfer of shares from non-residents to residents has been dispensed with in cases where shares are sold on stock exchange or in case of sale under private arrangements, where it complies with the pricing guidelines.	No Change	No Change	No Change
(d) Investments Debt instruments	The FII investments in debt permitted subject to a sub ceiling within the overall ECB ceiling as indicated below : (i) Government securities and T-bills – US$ 2.00 Billion) (ii) Corporate debt – US$ 1.5 Billion.	(a) Limit of 6 per cent of total gross issuance by Centre and States in a year. (b) Limit of US$ 1.5 billion (c) The allocation by SEBI of the limits between 100 per cent debt funds and other FIIs should be discontinue	(a) Limit of 8 per cent of total gross issuance by Centre and States in a year. (b) Limit of 15 per cent of fresh issuance during a year	(a) Limit of 10 per cent of total gross issuance by Centre and States in a year. (b) Limit of 25 per cent of fresh issuance during a year.
IV. INDIVIDUALS A. Individuals – Residents				
1. Financial capital	(i) Resident individuals	(i) This limit should be	This limit	This limit

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	**Phase II (2007 – 2008 and 2008 – 2009)**	**Phase III (2009-2010 and 2010 – 2011)**
Transfers including for Opening current/chequeable accounts.	have been permitted to freely remit up to US$ 25,000 per calendar year for any permissible current or capital account transactions or a combination of both from February 2004. Residents can use this amount to open foreign currency accounts abroad. (ii) They can invest, without limit, in overseas companies listed on a recognised stock exchange and which have the shareholding of at least 10 per cent in an Indian company listed on a recognised stock exchange in India (as on 1st January of the year of the investment) as well as in rated bonds/fixed income securities. No current chequable accounts are permitted.	raised to US$ 50,000 per calendar year (where limits for current account transactions are restricted, gifts, donation and travel, this should be raised to an overall ceiling of US$ 25,000 without any sub-limits). (ii) This facility should be abolished.	should be raised to US$ 100,000 per calendar year As in Phase I	should be raised to US$ 200,000 per calendar year. As in Phase I
2. RFC Account	Under the RFC scheme, persons of Indian nationality or origin, who, having been resident outside India for a continuous period of not less than one year, have become persons resident in India are eligible to open and maintain the RFC accounts with authorised dealers in India in any freely convertible foreign currency. (The amounts may be retained in a current, savings or term deposit account.)	General permission should be given to RFC Account holders to move their foreign currency balances to overseas banks; those wishing to continue RFC Accounts should be provided Foreign Currency Current/Savings chequable accounts in addition to Foreign Currency term deposits	As in Phase I	As in Phase I
2. RFC(D) Account	Residents are permitted to open, hold and maintain with an AD in India Resident Foreign Currency	Merge with RFC Accounts and give General Permission to move balances to	As in Phase I	As in Phase II

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	Phase II (2007 – 2008 and 2008 – 2009)	Phase III (2009-2010 and 2010 – 2011)
	(Domestic) Account, out of foreign exchange acquired in the form of currency notes, bank notes and travelers cheques from specified sources. The account has to be maintained in the form of current account and shall not bear any interest. Cheque facility is available. There will be no ceiling on the balances held in the account.	overseas banks. Holders could be given time to choose either option after which the scheme should be terminated.		
B. Individuals: Non-Residents				
1. Capital transfers from non repatriable assets held in India (including NRO and NRNR RD accounts)	Remittance, up to USD one million, per calendar year, out of balances held in NRO accounts/sale proceeds of assets/the assets in India acquired by way of inheritance is permitted. Repatriation of sale proceeds of a House bought out of domestic assets is repatriable after 10 years of acquisition.	RBI should ensure collection of relevant data on outflows under this scheme in view of the large limit for individuals.	As in Phase I	As in Phase I
2. Remittance of assets	ADs have been permitted to allow remittance/s up to US$ 1 million per calendar year on account of legacy, bequest or inheritance to a citizen of foreign state permanently resident outside India subject to conditions.	RBI should ensure collection of relevant data on outflows under this scheme in view of the large limit for individuals.	As in Phase I	As in Phase I
3. Deposit Schemes for Non-Resident Indians (NRI)	NRIs are permitted two special bank deposit facilities, viz., Non-Resident (External) Rupee Account [NR(E)RA] and Foreign Currency Non-Resident (Banks) Scheme [FCNR(B)]	(i) While the FCRN(B) and NR(E)RA deposit schemes for NRIs could be continued, the present tax benefits on these deposit schemes should be reviewed by the Government. (ii) A separate and distinct deposit facility should be provided to	(i) As in in Phase I (ii) As in Phase I	(i) As in in Phase I (ii) As in Phase I

Item	Present Position	Committee's Recommendation		
		Phase I (2006 – 2007)	Phase II (2007 – 2008 and 2008 – 2009)	Phase III (2009-2010 and 2010 – 2011)
		non-residents (other than NRI) to open FCNR(B) Accounts without tax benefits and subject to KYC and FATF norms.		
4. Portfolio Investment in India through stock exchange.	Individual NRIs can invest Up to 5 per cent of the total paid up capital (PUC) of the investee company or 5 per cent of the total paid-up value of each series of the convertible debentures of the company. The aggregate ceiling for NRI investments in a company is 10 per cent of the PUC or 10 per cent of the total paid-up value of the each series of debentures. This ceiling can be raised up to 24 per cent of the PUC by the company.	Individual Non-Residents should be allowed to invest in Indian stock markets through SEBI registered entities including Mutual Funds and Portfolio Management Schemes, who will be individually responsible for fulfilling KYC and FATF norms. The money should come through bank accounts in India.	As in Phase I	As in Phase I

Additional List of Select Items for RBI to Review Separately *(Source: Report of Tarapore Committee on Fuller Capital Account Convertibility, 2006.)*

Item	Present Position
I. Corporate Business **A. Corporate/Business - Residents**	
1. Accessing capital markets abroad through GDRs & ADRs other forms of equity issues	(a) Companies eligible to issue equity in India and falling under the automatic route for FDI are allowed to access the ADR/GDR markets without approval from Govt./RBI subject to reporting to RBI within 30 days from close of issue. GOI considers cases not permitted under the automatic route. (b) Companies eligible to raise ADRs GDRs are permitted to open foreign currency accounts abroad to retain the proceeds and invest the proceeds in rated bonds/fixed income securities pending repatriation of proceeds.
2. Disinvestment from JV/WOS overseas	General permission for disinvestment has been given to Indian Parties (i) in cases where the JV/WOS is listed in the overseas stock exchange (ii) where the Indian promoter is listed on a stock exchange in India and has a net worth of not less than Rs.100 crore and (iii) where the Indian promoter is an unlisted company and the investment in the overseas venture does not exceed US$ 10 million. Reporting requirements to RBI are prescribed for this purpose.
3. Foreign Currency Accounts for Units in SEZs	Units located in a Special Economic Zone have been allowed to open, hold and maintain a Foreign Currency Account with an authorised dealer in India subject to the following conditions: (i) all foreign exchange funds received by the unit in the Special Economic Zone (SEZ) are credited to such account, (ii) no foreign exchange purchased in India against rupees shall be credited to the account without prior permission from the Reserve Bank.
4. Rupee loans to NRI employees	A body corporate registered or incorporated in India, has been permitted to grant rupee loans to its employees who are Non-Resident Indians or Persons of Indian Origin, subject to the following conditions. (i) The loan is to be granted only for personal purposes including purchase of housing property in India; (ii) The loan is to be granted in accordance with the lender's Staff Welfare Scheme/Staff Housing Loan Scheme and subject to other terms and conditions applicable to its staff resident in India.
5. Conversion of ECB and Lump Sum Fee/Royalty into equity	Capitalisation of Lump sum Fee/Royalty/ECB has been permitted subject to the following conditions : i) The activity of the company is covered under the Automatic Route for FDI or they had obtained Government approval for foreign equity in the company, ii) The foreign equity after such conversion of debt into equity is within the sectoral cap, if any, iii) Pricing of shares is as per SEBI and erstwhile CCI guidelines/regulations in the case of listed/unlisted companies as the case may be.

| **I. Corporates –** | |
A. Non-Residents	
1. Establishment of project offices in India	ADs have been delegated powers to permit foreign companies to establish project offices in India subject to the following conditions. (a) It has secured from an Indian company a contract to execute a project in India; and (b) the project is funded by inward remittance from abroad; or (c) the project is funded by a bilateral or multilateral International Finance Agency; or (d) the project has been cleared by an appropriate authority; or (e) a company or entity in India awarding the contract has been granted Term Loan by a Public Financial Institution or a bank in India for the project. Banks have been allowed to remit surplus on winding up/completion of the project.
2. Buyers' credit/ acceptance for financing goods and services from India. (including financing of overseas projects)	Banks in India are permitted to provide at their discretion Buyer's Credit/Acceptance Finance to overseas parties for facilitating export of goods and services from India, on "Without Recourse" basis and with prior RBI approval
3. Lending to nonresidents	Banks have been allowed to grant rupee loans to NRIs as per the loan policy laid down by the bank's Board of Directors, barring certain specific purposes. Repayment of the loan may be made by debit to NRE/FCNR/NRO accounts of the non-resident borrowers or out of inward remittances by the borrowers.
B. Banks – Non-Residents	
1. Rupee Accounts of non-resident banks	Banks are permitted to allow overdrafts in the rupee accounts of overseas banks. The Overdraft limit has been increased to Rs.500 lakh. However no investments are allowed and no forward cover is permitted.
III. NON-BANKS – FINANCIAL	
A. Residents	
1. Insurance policies in foreign currency	Insurance companies registered with IRDA have been permitted to issue general insurance policies denominated in foreign currency and receive premium in foreign currency without prior approval of RBI.
IV. NON-BANKS – FINANCIAL	
A. Individuals – Residents	
1. Loans from non residents	Borrowings up to US$ 250,000 with a minimum maturity of one year permitted from close relatives on interest free basis.
2. Diplomatic Missions/Personnel - immovable property.	Foreign Embassy/Diplomat/Consulate General have been allowed to purchase/sell immovable property in India other than agricultural land/plantation property/farm house provided (i) clearance from Government of India, Ministry of External Affairs is obtained for such purchase/sale, and (ii) the consideration for acquisition of immovable property in India is paid out of funds remitted from abroad through banking channel.
3. Employees Stock Options (ESOP)	ADs can allow remittance for acquiring shares of a foreign company offered under an ESOP scheme either directly by the issuing company or indirectly through a Trust/SPV/step down subsidiary to employees or directors of the Indian office or

	branch of a foreign company or of a subsidiary in India of a foreign company or of an Indian company in which the company issuing shares effectively holds directly or indirectly at least 51 per cent stake. Foreign companies have been given general permission to repurchase the shares issued to residents in India under any ESOP scheme.
B. Individuals – Non-Residents	
1. Foreign Direct Investment (FDI) in India (other than in real estate)	GOI have permitted FDI under the Automatic Route in items/activities in all sectors up to the sectoral caps except in certain sectors where investment is prohibited. There is no requirement of RBI approval for foreign investments. Investments not permitted under the automatic route require approval from FIPB. The receipt of remittance has to be reported to RBI within 30 days from the date of receipt of funds and the issue of shares has to be reported to RBI within 30 days from the date of issue by the investee company. Non-resident individuals are at par with non-resident corporate for the purposes of FDI.
2. Loans from nonresidents	(a) NRIs are permitted to invest in NCDs offered under a public issue subject to conditions regarding end use, minimum tenor and rate of interest: Minimum tenor – 3 years Rate of interest – not exceeding SBI PLR + 300 basis The funds shall be used for the company's points own funds. (b) NRIs are also permitted to subscribe to CPs issued by Indian companies on non-repatriation basis, subject to compliance with the Regulations governing issue of CPs. The CPs are also not transferable.
3. Disinvestment	Sale of shares through private arrangement is allowed. However sale transactions which are not in compliance with pricing guidelines requires approval of RBI.
4. Two way fungibility of ADRs/GDRs	A registered broker in India has been allowed to purchase shares of an Indian company on behalf of a person resident outside India for purpose of converting the shares into ADRs/GDRs subject to compliance with provisions of the Issue of Foreign Currency Convertible Bonds and Ordinary Shares (through Depository Receipt Mechanism) Scheme, 1993 and guidelines issued by the Central Government from time to time.
5. Housing loan to NRI that can be repaid by close relative in India	Close relatives of NRIs or PIOs can repay the loans taken by NRIs or PIOs for acquisition of a residential accommodation in India through their bank account directly to the borrower's loan account with the AD/Housing Finance Institution

Appendix 3D

Selected Listing of Measures for Strengthening Regulation and Supervision in the Banking Sector *(Source: Report of Tarapore Committee on Fuller Capital Account Convertibility, 2006.)*

Present Position	Issues	Proposed Measures
1. Liquidity Risk At present banks are required to monitor their liquidity position with regard to their assets and liabilities (including off-balance sheet items) at the domestic branches. The prudential limits on the negative mismatches in the first two time buckets, viz., 1-14 days and 15-28 days has been fixed at 20 per cent of the cash outflows. At the foreign branches, banks are required to comply with the following prudential limits at each territory which focus on mismatches in the long term and medium term: (A) Long term liabilities should be at least 70 per cent of long term assets; and (B) Long and medium term liabilities should be at least 80 per cent of long and medium term assets	Large, uneven flows of funds will expose the banks to greater fluctuations in their liquidity position and hence refinements in the management of liquidity risk by banks would be required.	(a) The liquidity position should be monitored at the head/ corporate office level on a global basis - including both at the domestic branches and at foreign branches. (b) The liquidity positions should be monitored for each currency – where the total liabilities in that currency exceed a stipulated percentage of the bank's total assets or total liabilities. (c) Banks should be required to monitor their liquidity position at a more granular level over the near term. Accordingly, they should monitor their liquidity positions on a daily basis for the next seven days. i.e., next day + six following days.
2. Interest Rate Risk (IRR) RBI had issued guidelines on Asset Liability Management vide Circular No. DBOD. BP. BC. 94/ 21.04.098/99 dated February 10, 1999, which, inter alia, covered interest rate risk measurement/ reporting frameworks. The immediate impact of changes in interest rates is on bank's earnings (i.e. reported profits) through changes in its Net Interest Income (NII). These guidelines approach interest rate risk measurement from the 'earnings perspective' using the Traditional Gap Analysis (TGA). To begin	With interest rate movements becoming more frequent/dynamic and the potential for greater fluctuations in interest rates, it would be necessary for banks to improve their interest rate risk management systems.	(a) Banks are presently following the Traditional Gap Analysis which will enable them to capture the impact of Interest Rate Risk (IRR) on their earnings. Banks may upgrade their IRR management framework to assess the impact of the IRR assumed by them. With the opening of the capital account and the resultant flows, as also the ease with which such flows can materialise on either side, banks should adopt the duration gap analysis to measure interest rate risk in their balance sheet from the economic value perspective and manage the IRR. Furthermore, banks may be required to fix

Present Position	Issues	Proposed Measures
with, the TGA was considered as a suitable method to measure Interest Rate Risk. RBI had also indicated its intention to move over to modern techniques of Interest Rate Risk measurement, which included Duration Gap Analysis (DGA). A long-term impact of changes in interest rates is on bank's Market Value of Equity (MVE) or Net Worth through changes in the economic value of its assets, liabilities and offbalance sheet positions. The interest rate risk, when viewed from this perspective, is known as 'economic value' perspective.		appropriate internal limits on their IRR exposures. Towards this end, the RBI has issued draft guidelines for upgrading the Asset Liability Management guidelines. In terms of the draft guidelines banks would be required to adopt the modified duration gap approach; compute the volatility of earnings (in terms of impact on Net Interest Income); compute the volatility of equity (in terms of impact on the book value of net worth) under various interest rate scenarios; fix internal limits under both earnings and economic value perspective. The RBI should finalise the guidelines and require banks to fully implement the above revised requirements by March 2008. (b) RBI should introduce capital requirements for banks with reference to the extent of IRR assumed by it and the likely impact of such risks on the bank's net worth during stress situations.
3. Forex Open Position At present banks are required to fix their open foreign exchange position limits and approach the RBI for approval. While approving the open position limits RBI relates the proposed limits to the bank's capital funds.	Under a more liberalised environment, banks would expect greater freedom to fix their own open foreign exchange position limits without prior approval of the RBI, since the open forex position limits attract capital requirements.	While the fact that banks' open position limits attract capital requirements may give some comfort, RBI should consider reviewing the process for approving open position limits and consider issuing prudential limits for open position limits, which will be linked to the banks' capacity to manage the foreign currency risks and their unimpaired Tier 1 capital funds. The RBI should undertake the review before March 2007 and implement the revised procedure by March 2008.
4. Asset Concentration The following limits have been prescribed for credit exposures to :	With the greater inflows into the Indian banking system, proper deployment is crucial. Hence it is necessary to address the issue of asset	Following prudential limits may be laid down to identify and manage concentrations within the portfolio: (a) Banks were advised to fix

Present Position	Issues	Proposed Measures
(a) Individual exposure : • 15 per cent of the capital funds • 20 per cent, if exposure is on infrastructure sector (b) Group of borrowers : • 40 per cent of the capital funds • 50 per cent, if exposure is on infrastructure sector In addition to the above, in exceptional circumstances, banks may assume an additional exposure up to 5 per cent of capital funds with the approval of Board.	concentrations in banks more comprehensively.	internal limits for substantial exposures vide RBI guidelines issued in October 1999. Since these were not mandatory, many banks may not be adopting these limits. Banks should be directed to monitor their 'large exposures' (i.e., exposures in excess of 10 per cent of capital funds) and ensure that the aggregate of these large exposures do not exceed the substantial exposure limit, i.e., sum total of all large exposures not to exceed a specified multiple of capital funds say 600 per cent to 800 per cent. This should be done immediately. (b) With a view to ensure diversification/ avoid concentration, banks may be required to fix internal limits on exposure to the following: i) a particular sector/industry; ii) a particular counterparty category; iii) a particular country, region or state.
5. Income Recognition Asset Classification and Provisioning (IRAC) Norms Banks are required to follow strict prudential norms with regard to identification of NPAs and making provisions. These are largely in alignment with the international best practices. (a) The current provisioning norms for Non Performing Assets (NPAs) require banks to make provisions for funded exposures. The non-fund based exposures to entities whose fund based exposures are classified as NPAs do not attract a provisioning requirement as per the present RBI regulations. In terms of AS-29: Provisions, contingent liabilities and contingent assets; banks will be required to subject their contingent liabilities to an	With the prospect of greater inflows under a fuller CAC regime, it may be necessary for tightening the provisioning requirements, so as to enhance the shock absorbing capacity of banks and thus enhance their resilience.	(a) RBI should require banks to make provisions for their non fund based commitments in NPA accounts with reference to the credit equivalent amounts. RBI should consider prescribing explicit conditions/ situations when the banks should make a higher level of provisions for the contingent liabilities. (b) RBI should re-introduce the concept of uniform asset classification across the banking system such that if an exposure to a counterparty becomes NPA in any bank, all banks having an exposure to that counterparty should classify the exposure as NPA.

Present Position	Issues	Proposed Measures
impairment test and if there is a likelihood of the bank incurring a loss in settlement of the obligations, they are required to make a provision. (b) At present the asset classification status of an account is based on the record of recovery in each bank. As a result, this gives rise to scope for a borrower to keep the non performing portion of his exposures in one particular bank and keep the other exposures as performing. Though the exposure to the banking system - when viewed at an aggregated level - might have become NPA.		
6. Capital Adequacy Banks in India are at present adopting the capital adequacy framework as required under Basel I. Banks are maintaining capital for both credit risk and market risk exposures. The minimum CRAR required to be maintained by the banks in India is 9 per cent as against the 8 per cent norm prescribed by the Basel Committee on Banking Supervision. As of March 2005, 86 banks were maintaining capital in excess of the regulatory minimum and 2 banks were falling short of the regulatory requirement. Reserve Bank has advised banks in India to implement the revised capital adequacy framework (popularly known as Basel II) with effect from March 31, 2007. Banks will be maintaining capital for operational risks under Basel II in addition to credit risks and market risks. The Indian banking system will be adopting the standardised approach for credit risk, standardized duration method for	Migration to a fuller CAC is likely to throw up numerous challenges to banks' risk management systems. Migration to Basel II at the minimum approaches, would be making the banks' capital adequacy framework more risk sensitive than under Basel I. The capital adequacy framework, even under Basel II, will need to be strengthened even beyond the Basel II requirements with a view to ensure that it enhances banks' capacity to sustain unexpected losses/shocks.	(a) It will not be adequate to have a uniform 9 per cent norm for all banks. The system should move forward to a differential capital regime. The 'complex' banks (as defined in Paragraph 7.11 of the Report) should be moved over to this regime in the next 3 years and all other banks may be moved over to this regime over the next 5 years. (b) Banks should be encouraged to migrate to an economic capital model for allocation of capital and measuring efficiency of capital. This may be dovetailed to the Pillar II requirement under Basel II which requires banks to have in place an internal capital adequacy assessment process (ICAAP). (c) Consider introducing a higher core capital ratio (than the default 50 per cent of total capital funds) at present. It may be raised to at least 66 per cent.

Present Position	Issues	Proposed Measures
market risk and the basic indicator approach for operational risk. On a quick broad assessment, it is expected that the impact of Basel II on banks' CRAR will be adverse to the extent of 150 to 250 basis points		
7. Risk Mitigants Banks are having the benefit of the following hedging tools for managing their risk exposures: Credit – collateral, guarantees, insurance Interest Rate Swaps (IRS), Forward Rate Agreement (FRA), Interest Rate Futures (IRF) Equity – None Forex – forwards, currency swaps, options	In view of the potential for greater fluctuations and uncertainties, banks may assume a greater degree of risks and, therefore, would need to have access to greater array of risk mitigants.	Banks may feel the need for the following risk mitigants to hedge or manage their risk exposures in a situation where there is FCAC. These are at present not effectively available to the banks and hence will need to be made available: (a) Interest rate futures and options (b) Credit derivatives (c) Commodity derivatives (d) Equity derivatives However, it is essential for the RBI to put in place the appropriate infrastructure to enable banks to conduct their operations in the above products in a stable and efficient manner. Some of these essential pre-requisites are: (a) a robust accounting framework; (b) a robust independent risk management framework in banks, including an appropriate internal control mechanism, before it is allowed to undertake these activities; (c) appropriate senior management oversight and understanding of the risks involved; (d) Comprehensive guidelines from the RBI on derivatives, including prudential limits wherever necessary; (e) Appropriate and adequate disclosures.
8. Stress Testing Framework At present banks are not required to undertake any specific mandated stress tests on their portfolios. In the Annual Policy Statement in	With a view to sustain the impact of lumpy and unpredictable inflows and outflows in the new environment which will be routed through the banking	While the stress testing framework proposed to be introduced by the RBI now will be addressed at the entire banking system, the focus under a FCAC regime would be:

Present Position	Issues	Proposed Measures
April 2006, Reserve Bank has mentioned that stress tests would enable banks to assess risks more accurately and, thereby, facilitate planning for appropriate capital requirements. This stress testing would also form a part of preparedness for Pillar 2 of the Basel II framework. Against this backdrop, RBI is in the process of advising banks to undertake sound stress testing practices.	system it is necessary not only to strengthen the risk management systems in banks, but should also be suitably supported by appropriate stress test frameworks.	(a) to assess the robustness of the frameworks put in place by banks to ensure that they meet the minimum requirements prescribed for the entire system; (b) to ensure that banks are using the findings of their stress tests as an active ingredient of their risk management systems; (c) to consider encouraging banks, which are exposed to greater risks or greater complexities of risk, to have a more scientific stress testing framework in place.
9. Level of Computerisation and Branch Interconnectivity At present the new private sector banks and the foreign banks are largely computerised and networked. This equips them to address MIS and risk management issues effectively. Due to the lack of equally efficient systems, many of the public sector banks and the old private sector banks are lagging in adoption of real time (or near real time) MIS for business decisions and risk management. Some of these banks are attempting to achieve this through the core banking solutions model which will be adapted to meet the other MIS/ risk management requirements	Going forward, level of computerisation and branch interconnectivity will be of significant importance to banks. The quality of MIS will make a significant difference to banks' capabilities	Banks should have the following IT infrastructure: A few banks are attempting to achieve this through their core banking solutions. Whatever be the mode banks should strive to achieve: (a) On-line connectivity to all major branches (75 per cent of business within 3 years and 90 per cent within 5 years and 100 per cent within 7 years). (b) MIS content should support the risk management requirements and supervisory reporting requirements. With a view to reduce the time lag, the supervisory reports should be system generated with appropriate authentication and submitted to the RBI using the IT medium.
10. Need for Prudential Limits on Off- Balance Sheet (OBS) items Banks' activities are distributed between onbalance sheet business and off-balance sheet business. Though there are no specific norms in terms of the size of these two broad business categories, it is observed that in some banks the size of off-balance sheet business is becoming disproportionate to the on-balance sheet business	With the increasing use of off-balance sheet products for meeting customer requirements, the pace at which banks use these instruments and the customer demand for these are expected to grow at an increasing pace under an open regime. In the absence of advanced risk management systems in banks, the risks that are assumed by them through the derivatives book	RBI should study the composition of the off-balance sheet business of banks and consider issuing prudential norms establishing a linkage between the off-balance sheet business of banks and their risk management systems. They may also take into account the international practices in this regard.

Present Position	Issues	Proposed Measures
	can be cause for worry.	
11. Off-balance sheet Exposures – comfort Letters While assessing the risks to which banks are exposed the focus should be on balance sheet items, off-balance sheet items and also other items through which resident entities might have assumed risks – in the form of comfort letters issued to non residents. This will also include the comfort letters issued by head offices of banks to the host regulators while establishing some of their foreign operations and comfort letters issued to other banks on behalf of their clients.	While the capital outflows may be triggered due to various reasons, the commitments undertaken through off-balance sheet items in the form of comfort letters are not reckoned at times. This might pose an additional threat	Banks issue comfort letters in two situations: (i) covering operations of their subsidiaries to the Regulators in the host country; and (ii) comfort letters on behalf of their customers. Banks should reckon exposures assumed through such comfort letters also and have appropriate strategies in place to – (a) ensure that such contingencies do not arise – by ensuring that the operations for which comfort letters have been issued are always well managed and solvent. (b) have contingency plans in place to ensure that they are able to meet the demands as and when made without any serious disruption of the overall operations. (c) banks should be required to make appropriate disclosures with regard to the nature and extent of comfort letters issued by them.
12. Accounting Standards (a) The Institute of Chartered Accountants of India (ICAI) has issued an Accounting Standard, viz., AS -11: The Effects of changes in foreign exchange rates. The RBI has issued guidelines to banks requiring them to comply with the AS but with the use of certain approximations, viz., weekly or quarterly average rate instead of daily rate. (b) At present India does not have any accounting standards which specifically	(a) Banks will be undertaking a significantly larger number of foreign exchange transactions with growing integration with international markets. Hence, the accounting framework may need to be made more robust	(a) Banks should be encouraged to move towards full compliance with AS–11 without any approximations over a 5 year period. The 'complex' banks should be required to comply with the AS within the next three years and the other banks within the next five years. (b) The ICAI has initiated a move in this regard for issuing corresponding Indian Standards assimilating the principles of IAS 39 on Financial Instruments: Recognition and Measurement, IAS 32 : Financial Instruments : Disclosure and Presentation and IAS 30 : Disclosures in financial statements of banks and similar financial institutions. This would ensure accounting of financial instruments, including derivatives, in a uniform and consistent manner.

Present Position	Issues	Proposed Measures
13. Disclosures Over a period the RBI has enhanced the disclosure requirements of banks by prescribing additional disclosures in the Notes on accounts to Balance sheets. These disclosures are largely quantitative in nature with a focus on capital adequacy, NPAs, investments, provisions, productivity ratios, maturity pattern of assets and liabilities, risk exposures on account of derivatives, etc. The Basel II framework recognises the importance of public disclosures and the role of market discipline by requiring banks to make greater disclosures. Accordingly, banks in India will be required to make additional disclosures with regard to the following: (a) capital and capital structure; (b) capital requirements for each major risk (credit, market and operational) and the capital adequacy; (c) Qualitative disclosure requirement regarding banks' risk management policies for the three major risks and credit risk mitigation. (d) Geographical and industrial concentrations of credit risk exposures.	For greater transparency and market confidence in the system and to activate the market discipline process, it will be necessary to place more information in the public domain.	The disclosures to be made by banks in future should include the following, in addition to the disclosures required by the Basel II guidelines: (a) Concentration of deposit base. (b) Concentration of borrowings. (c) Extent of dependence on models for risk management and pricing purposes. (d) Framework in place for building and validating models. (e) Disclosure should shift from the position as on the date of balance sheet to the average during the year. (f) Currency-wise maturity pattern of deposits and liabilities where the position exceed a certain percentage of total assets or liabilities. (g) Disclosures on managed assets basis for securitised and assigned assets. (h) Disclosure of top 20 shareholders. (i) Make segment disclosures in greater detail – to include 'corporate', 'retail' and 'priority' sectors, including disclosures pertaining to movement of NPAs in these segments. (j) Greater disclosures on contingent liabilities, including comfort letters. (k) Bank's holding out policy towards their subsidiaries/joint ventures/ associates.
14. Type of Supervision At present the RBI supervises the commercial banking system primarily through two modes, viz.,	The risks that may emerge under FCAC regime are likely to test the strengths of the supervisory mechanism and may expose its weakness.	(a) RBI should consider strengthening its supervisory framework, both off-site and on-site, to effectively capture the revised elements proposed above.

Present Position	Issues	Proposed Measures
off-site and on-site. While the banks' domestic branches are subjected to a periodical on-site inspection (normally annual), the foreign branches are subjected to on-site examinations at a lesser frequency. The present regulatory and supervisory practices of the RBI are largely conventional in nature and approach.	It will be necessary for the supervisor to adopt refined and improved supervisory techniques and fix appropriate priorities. The traditional approach may not be adequate in an environment which is likely to be more dynamic	The scope and focus of the revised supervisory framework may apply equally to both domestic branches and foreign branches. (b) Supervision should be geared to assess the adequacy and effectiveness of the risk management systems in place in banks. The risk management systems in banks may be required to explicitly address all material risks and at the minimum should address the following risks: credit risk; market risks; operational risk; liquidity risk and country/ transfer risks. RBI may monitor the risk profile of banks on an ongoing basis. Towards this, the Capital Adequacy, Asset Quality, Management, Earnings and Liquidity System (CAMELS) approach should be adjusted to accommodate the proposed focus and become Capital Adequacy, Asset Quality, Risk Management, Earnings and Liquidity System (CARMELS) approach. Additionally, RBI may undertake targeted appraisals of 'risk management systems' and 'corporate governance' in all banks at periodical intervals.
15. Licensing Methodology At present Reserve Bank of India issues a full bank license to all applicants who are found suitable	Under FCAC, it may be necessary to discriminate among different players on the role that they may play or the freedom they may have to undertake various types of business. This discrimination should be based on the relevance of the entity to the Indian economy and its risk management and risk bearing capacity.	The B R Act, 1949, allows issue of only one type of banking license, viz., whole banking license, which permits all licensed banks to undertake all banking activities. However, there may be a need for RBI to issue restricted banking licenses to some banking institutions which may not warrant granting of a full banking license. RBI should have a methodology for issuing restricted licenses to entities which the RBI does not deem eligible for a full bank license. For example, this will be relevant to decide on entities that may undertake cross border transactions and those that may not.

Present Position	Issues	Proposed Measures
16. Regulatory Arbitrage Under the current financial regulatory structure, a single financial institution is often supervised by multiple regulators, whose regulatory prescriptions may not be well aligned.	This can lead to regulatory overlaps, the diffusion of regulatory power and the lack of proper accountability, all of which can weaken supervision and increase risks. In this context, the emergence of financial conglomerates poses a new and complex challenge for regulators.	In this context, as a first step, RBI may focus on activity–centric regulation instead of entity-centric regulation to reduce or eliminate the regulatory arbitrage.
17. Inter-agency Cooperation/Coordination and Home - Host Supervisory Cooperation At present there are no formal methodologies for inter agency cooperation/coordination in regulation/supervision of the regulated entities especially where there may be a chance for overlapping of jurisdiction i.e., where the regulated entity performs an activity which may come under the purview of another regulator.	In view of greater complexities of banking business under a FCAC regime the RBI should be establishing a strong formal mechanism for cooperation/coordination with other regulatory/supervisory agencies in India and also with foreign regulators/ supervisors. This is essential for activating appropriate regulatory and supervisory responses to significant developments which may be relevant from the perspective of systemic stability.	The RBI should consider placing the cooperation and coordination with other regulators within the country and with the host regulators/ supervisors in other territories on a more structured and formal platform to enhance the effectiveness of the regulation/supervision of the bank (on a global basis) as well as the banking group (on a consolidated basis).
18. Financial Soundness Indicators (FSI) The Reserve Bank compiles a set of Financial Soundness Indicators at half-yearly intervals. The Financial Soundness Indicators (FSIs) are placed in the public domain through the Bank's publication – Trend & Progress of Banking in India.	There would be a need for improved monitoring.	The utility of FSIs would be enhanced if the information is put in public domain at half yearly intervals. Furthermore, the time lag in preparing the FSIs may also be reduced, in stages, to say two months from the end of the half year.
19. Legislation The current Indian laws do not explicitly recognize bilateral netting and multilateral netting.	Legislative reforms may be Necessary for achieving effective financial sector regulation.	Some of the legislative changes which would be required include legalizing bilateral netting and multilateral netting which will secure the netting arrangements under an insolvency situation