

**Are Emerging Market Countries Learning to Float?**

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**Abstract**

For a group of 25 emerging market (EM) countries, the paper finds that exchange rate flexibility increased over the past decade. The paper examines the hypothesis that stronger monetary and financial policy frameworks can facilitate the introduction of greater exchange rate flexibility by directly addressing the key vulnerabilities that give rise to the “fear of floating.” The analysis suggests that the increase in exchange rate flexibility in the EM countries was associated with a “learning to float”, i.e. a strengthening of monetary and financial policy frameworks. The analysis also suggests that not all policy frameworks have to be in place for countries to make a transition to a more flexible regime.

Keywords: Learning to float, emerging market countries, monetary and financial policy frameworks

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Recent work has underscored that the benefits of more flexible exchange rate regimes increase as economies develop and become more integrated in global financial markets (Rogoff and others, 2003 and 2004, and Husain and others, 2004). For emerging market (EM) economies, moving toward more flexible regimes can help to mitigate the risk from currency crises that have characterized pegged exchange rate regimes. Moreover, in industrial countries, flexible exchange rate regimes have conferred macroeconomic benefits in terms of better growth and inflation performance.

Although several EM countries have moved to more flexible exchange rate regimes, others have exhibited a “fear of floating” (Calvo and Reinhart, 2002, and Hausmann, Panizza, and Stein, 2001). The fear of floating derives from the actual or perceived costs of exchange rate volatility. For instance, currency fluctuations may cause a ratcheting up of inflation (exchange rate pass-through) and adversely affect balance sheets and debt-servicing burdens by raising the domestic-currency value of foreign-currency denominated debt. Because of these costs, some policymakers in EM countries feel that the room to pursue an independent monetary policy and increase exchange rate flexibility is, in practice, limited at best.

Against this background, stronger monetary and financial policy frameworks facilitate the introduction of greater exchange rate flexibility by directly addressing the key vulnerabilities that give rise to the fear of floating (Calvo and Mishkin, 2003). For instance, an independent central bank that has price stability as its main objective can help to reduce

exchange rate pass-through (Campa and Goldberg, 2001, Choudhri and Hakura, 2001, and Gagnon and Ihrig, 2001). Similarly, strong financial sector supervision helps to reduce currency mismatches on banks' balance sheets (Goldstein and Turner, 2004).

The association between macroeconomic outcomes and policy frameworks and moves toward greater exchange rate flexibility has so far not been examined empirically. This paper attempts to fill this void. Specifically, it will address the following questions about the experience of a group of 25 emerging market economies' with exchange rate regimes since the early 1990s:<sup>2</sup>

- How have exchange rate regimes in emerging market economies changed since the early 1990s? Have exchange rate regime transitions in emerging market economies since the early 1990s generally been toward greater flexibility or greater fixity? To what extent have the transitions been driven by crises?
- How have macroeconomic outcomes been associated with changes in exchange rate regimes? Have voluntary transitions been associated with an increase in macroeconomic instability?

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<sup>2</sup>Emerging market economies are defined in the paper as countries in the Morgan Stanley Capital International index (MSCI), which includes Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, the Philippines, Poland, Russia, South Africa, Thailand, Turkey, and Venezuela.

- How have countries “learned to float”? Specifically, how have changes in policy frameworks been associated with changes in exchange rate regimes? Have changes in policy frameworks tended to precede or follow moves to more flexible exchange rates? Is the association different for crisis-driven transitions?

In addition to addressing these questions, the paper will investigate whether differences in the strength of countries’ policy frameworks can explain differences in the way they float.

Building on the traditional argument in favor of flexible exchange rate regimes, i.e. that it allows the pursuit independent monetary policy, the paper will empirically examine the importance of strong monetary and financial policy frameworks for allowing independent monetary policy as proxied by the sensitivity of domestic interest rates to foreign interest rates.

### **How Have Exchange Rate Regimes Evolved?**

Exchange rate regimes are classified in this paper using methodologies that rely in part or in whole on the actual behavior of the exchange rate (*de facto* classification systems).<sup>3</sup> There are a number of *de facto* classification systems, including IMF (1999), Reinhart and Rogoff (2004), Levy-Yeyati and Sturzenegger (2002 and 2003), and Ghosh et al. (1997). This section examines the evolution of exchange rate regimes in EM economies over the past

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<sup>3</sup> Alternatively, exchange rate regimes can be classified based on official notifications to the IMF (*de jure* classification system).

decade using mainly the IMF's *de facto* classification system, and checking robustness with the "Natural classification" system developed by Reinhart and Rogoff (2004).<sup>4</sup>

The IMF's *de facto* system classifies exchange rate regimes based on the behavior of nominal bilateral exchange rates and reserves in combination with information on countries' exchange rate and monetary policy frameworks and policy intentions obtained during bilateral discussions between IMF staff and country authorities (see Bubula and Ötoker-Robe, 2002). By contrast, the Reinhart-Rogoff classification system relies entirely on an examination of the behavior of official or parallel market exchange rates vis-à-vis the currency to which the national currency is permanently or occasionally pegged. There are merits to having a classification system that incorporates a wider set of information, because the behavior of the exchange rate on its own does not always give an accurate picture of exchange rate policy. For example, in an EM country with a free float, high exchange rate pass-through, and inflation targeting, exchange rate depreciation (as a leading indicator of inflation) may prompt an increase in interest rates, which in turn will tend to dampen the exchange rate depreciation.<sup>5</sup> Thus, moving to a float does not necessarily mean that key nominal bilateral exchange rates have to fluctuate very much (see also Genberg and Swoboda, 2004).

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<sup>4</sup> The paper extends the Reinhart-Rogoff classification system from 2001 to 2003.

<sup>5</sup> This argument suggests that a classification system that relies solely on exchange rate data would be more likely to classify EM countries as having a managed rather than a free float. It also provides an explanation for why the Reinhart-Rogoff classification, for example, does not appear to provide much support for the "bipolar hypothesis", i.e. that over time countries move to the polar extremes of exchange rate flexibility; that is they either adopt freely floating regimes or move to hard pegs.

The IMF *de facto* classification system suggests that there has been a trend towards greater exchange rate flexibility in EM countries since the early 1990s (Figure 1).<sup>6</sup> In 1991, about two-thirds of EM countries were classified as having exchange rate pegs or limited flexibility, and there were no free floats. By 2003, more than two-thirds were classified as managed floats and free floats, of which more than half were free floats. Although the proportions are slightly different, the Reinhart-Rogoff classification picks up the same trends, particularly of a marked increase in the number of countries classified as free floaters.<sup>7</sup> To keep the analysis manageable, the remainder of the paper distinguishes only three categories of exchange rate regimes: pegs, intermediate regimes (which combine limited flexibility and managed floats), and free floats. At this broader level, exchange rate regimes are classified in the same way by the IMF *de facto* system and the Reinhart-Rogoff system nearly two-thirds of the time.

There have been 20 transitions to more flexible exchange rate regimes over the past decade and only eight to less flexible. A transition is defined as a change from one exchange rate category, in which a country has been for at least two years, to another, in which a country

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<sup>6</sup> Both classification systems include the following categories: hard peg, other peg, limited flexibility, managed float, and free float. The Reinhart-Rogoff classification system also includes a free fall category, which captures periods of macroeconomic instability that are characterized by high inflation and which may therefore be incompatible with any particular exchange rate regime.

<sup>7</sup> The updated Reinhart-Rogoff classification identifies seven free floats in 2003, compared to ten under the IMF *de facto* system.

remains for at least one year or is followed by another shift in the same direction. The transitions to more flexible exchange rates are broadly evenly distributed across all regions—Asia and Latin America, among others—and across the sample period (Table 1). No EM country moved directly from a peg to a free float during the sample period. Transitions to greater flexibility can be characterized as crisis-driven or voluntary: a crisis-driven transition is defined as one that is associated with a depreciation vis-à-vis the U.S. dollar of more than 20 percent, at least a doubling in the depreciation rate compared to the previous year, with a depreciation in that year of less than 40 percent (following Milesi-Ferretti and Razin (2000)). Crisis-driven and voluntary transitions are both nearly evenly split between transitions from pegs to intermediate floats and transitions from intermediate floats to free floats.

Table 1. Emerging Market Countries Transitions to More Flexible Regimes, 1992–2002  
*IMF De Facto Classification*

Transition Type	Voluntary	Crisis driven
Peg to Intermediate	Czech Republic, 1996 Egypt, 1999 Hungary, 1994 India, 1995 Pakistan, 2000	Argentina, 2001 Philippines, 1997 Thailand, 1997 Venezuela, 1996
Intermediate to Free Float	Chile, 1999 Peru, 1999 Philippines, 2000 Poland, 2000 South Africa, 1997 Turkey, 2001	Brazil, 1999 Colombia, 1999 Indonesia, 1997 Korea, 1997 Mexico, 1994

## How Have Macroeconomic Outcomes Changed?

This section examines the association between transitions to more flexible regimes and macroeconomic outcomes. In contrast to earlier work that has analyzed voluntary and crisis-driven transitions together (Eichengreen and others, 1998 and 1999), the focus here is

on voluntary transitions. The key questions are under what macroeconomic conditions have countries made voluntary transitions and whether voluntary transitions have been associated with an increase in macroeconomic instability.

In view of the limited number of transitions identified in the previous section, the analysis is mainly descriptive. Following standard event-study methodology, the paths of key macroeconomic variables in countries making transitions are compared to average values in countries not making transitions (the control group).<sup>8</sup> The analysis yields four key results regarding voluntary transitions.

- Voluntary transitions have been made in a macroeconomic environment not significantly different from that in the control group (Figure 2). Pre-transition levels of indicators such as growth, the primary fiscal balance, and the current account balance, were, on average, broadly similar.<sup>9</sup>
- Voluntary transitions were mostly orderly in the sense that growth, inflation, and the primary fiscal balance, among other variables, were on average little affected by the transition. Indeed, voluntary transitions appear to have been associated on average with a sustained decline in inflation, which begins in the years preceding the

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<sup>8</sup>See Appendix 1 for data definitions and sources.

<sup>9</sup>In addition, the ratio of reserves to imports in countries making voluntary transitions were, on average, similar to the control group.

transition and that continues after the transition.<sup>10</sup> This finding may reflect in part sample selection bias: the countries that decided to transition may have done so with the expectation that the move would not be disruptive.

- Voluntary transitions were not associated on average with previously over- or undervalued exchange rates, unlike crisis-driven transitions that in most cases occurred against the backdrop of an overvalued exchange rate (Figure 3). Correspondingly, the levels of the nominal and real effective exchange rates did not on average change much immediately after the transition, though this reflects some cases where the rate appreciated and others where the rate depreciated.
- The volatility of real and nominal effective exchange rates increased somewhat in the period immediately after a voluntary transition and returned to pre-transition levels soon thereafter (Figure 4).<sup>11</sup>

Not surprisingly, voluntary transitions were associated with lower vulnerabilities and far less macroeconomic disruption than crisis-driven transactions, consistent with the findings of earlier work. In the years immediately preceding transitions, the private sector external debt to exports ratio was higher, on average, by 100 percentage points in countries

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<sup>10</sup>Forecasts of year-ahead inflation from surveys by *Consensus Forecasts* also suggest that voluntary transitions have on average been associated with a fall in inflation expectations.

<sup>11</sup>This finding does not imply a problem with the post-transition exchange rate regime classification, because the classification is based on the volatility of a bilateral exchange rate as well as other factors.

which experienced a crisis-driven transition (Figure 5). This is consistent with the hypothesis that, other things equal, extensive liability dollarization is associated with a greater reluctance on the part of the monetary authorities to float the exchange rate, inducing more liability dollarization and creating a situation from which it is hard to exit in an orderly manner (Eichengreen and others, 1998 and 1999).<sup>12</sup> In addition, compared to crisis-driven transitions, voluntary transitions have been associated with higher growth, and lower inflation and exchange rate volatility in the years immediately after the transition.

### **From Fixed To Floating: How Do Policy Frameworks Change?**

This section investigates the association between transitions to more flexible exchange rate regimes and changes in monetary and financial policy frameworks. The association with fiscal policy frameworks is not examined because time series data on fiscal institutions is not available for a large sample of EM countries. The main idea is that strong policy frameworks address the key vulnerabilities that underlie the “fear of floating.” The section first explains how the strength of the policy framework supports greater exchange rate flexibility, and then examines how the framework evolved in the years before and after the transitions to more flexible regimes. As in the previous section, the analysis is based on a limited number of transitions and is thus mainly descriptive.

#### ***Monetary Policy Framework***

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<sup>12</sup>Data on total foreign currency denominated debt is not available for most countries.

An independent central bank that has price stability as its main objective is more likely to gain the public's confidence that it can and will control inflation. These attributes help stabilize inflation expectations and lower the pass-through of exchange rate fluctuations to higher prices, directly addressing one of the concerns underlying the "fear of floating". The paper examines two measures of monetary policy frameworks.

- *Central bank independence.* This is measured using an indicator of political and economic independence, where political independence depends inversely on the extent to which the government is involved in the operations of the central bank and economic independence depends inversely on the involvement of the central bank in financing the fiscal deficit and in banking supervision (Grilli, Masciandaro, and Tabellini, 1991, and Arnone and Laurens, 2004). In the early 1990s, EM countries had similar levels of central bank independence, but by 2003 countries with free floats had on average more independent central banks than countries with pegs or intermediate regimes (Figure 6). However, even among countries with free floats, there is considerable variation in the degree of central bank independence.
- *Inflation-targeting.* The explicit announcement of an inflation target and the creation of a monetary policy framework geared toward achieving the inflation target also help to stabilize inflation expectations. In practice, inflation targeting was not a prerequisite for the move to a more flexible exchange rate regime: only one country (Poland) adopted full-fledged inflation targeting before it transited to a free float.

Countries that moved to more flexible regimes introduced inflation targeting on average two years after they made the transition.<sup>13</sup> By 2003, about 90 percent of free floats were associated with inflation targeting, compared with just 40 percent of intermediate regimes.

### ***Financial Sector Supervision and Development***

Strong financial sector supervision helps banks and other financial market participants to better recognize and price risks, thereby reducing currency and maturity mismatches that can give rise to the fear of floating. Similarly, securities market development helps to improve long-term funding and thus reduces maturity mismatches. Both the quality of bank supervision and the degree of securities market development are measured using indicators put together by Abiad and Mody (2003). The indicators take values from 0 to 3, with increasing values indicating stronger bank supervision and greater securities market development. Figure 7 shows the evolution of these indicators in countries making peg-to-intermediate and intermediate-to-free float transitions, distinguished by voluntary and crisis-driven transitions, compared to the relevant control groups.

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<sup>13</sup>Carare and others (2002) provides a review of the initial conditions that can support an inflation-targeting monetary framework.

- *Quality of bank supervision.*<sup>14</sup> Weak balance sheets, especially currency mismatches, amplify the cost of exchange rate volatility and thus tend to constrain the choice of exchange rate regime. Therefore, by strengthening balance sheets, bank supervision can support greater exchange rate flexibility. The countries that made transitions to more flexible regimes had, before the transition, on average better bank supervision than their respective control groups. Also, crisis-driven transitions were associated with improvements in bank supervision around the time of transition.<sup>15</sup>
- *Securities market development.* In many EM countries, banks and nonfinancial firms usually face a shortage of long-term funding. This exposes them to cash flow and liquidity problems, which may constrain the conduct of monetary policy (Mishkin, 1996). The development of longer-term securities markets eases these constraints by lengthening the average maturity of financial instruments in the economy. In fact, countries that moved from intermediate regimes to free floats had above-average securities market development compared with the relevant control group. Again, crisis-driven transitions were associated with further securities market development.

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<sup>14</sup>The indicator for the quality of bank supervision reflects adoption of a capital adequacy regulation, the power and independence of the supervisory agency, and the extent and effectiveness of supervision.

<sup>15</sup>It is possible that the improvements in the quality of banking supervision in the countries that had crisis-driven transitions were a reaction to large costs of cleaning up the banking sector following the crisis, and not a reaction to the adoption of a floating rate per se.

The latest available data (for 2002) suggest that financial sector supervision and development in countries with free floats are on average stronger than those of countries with pegs or intermediate regimes (Figure 8). However, even among free floats there is substantial variation in the quality of bank supervision. Moreover, financial sector supervision and development in countries with intermediate regimes are not significantly stronger than those in countries with pegs.

### ***Financial Sector Liberalization***

When financial sector supervision is strong and financial institutions are healthy, gradual liberalization generally supports growth (IMF, 2001). However, if financial sector supervision is weak, then it may be desirable to maintain financial controls, even while moving ahead with exchange rate flexibility. The extent of liberalization is measured using indicators from Abiad and Mody, with increasing values showing greater liberalization.

- *Domestic financial liberalization* that is not supported by good bank supervision can allow risky behavior that weakens balance sheets and thus curtails the central bank's ability to stabilize inflation (Eichengreen and others, 1998). Liberalization may allow insolvent financial institutions to engage in potentially lucrative but risky projects, using expensive funding to “gamble for redemption.” Also, by granting banks access to more complex financial instruments, evaluating bank balance sheets may become more difficult. It appears that countries that experienced crisis-driven transitions from pegs to intermediate regimes had, at the time of the transition, on average more liberalized domestic financial systems than countries that made voluntary transitions and than countries in the control group (Figure 9).<sup>16</sup>
- *External financial liberalization.* As with domestic financial liberalization, if external financial liberalization is not supported by strong financial sector supervision, it can increase risks, such as the potential for sudden reversals of capital inflows. Indeed, countries that made voluntary transitions from pegs to intermediate regimes had, prior to the transition, on average less external financial liberalization than countries that experienced crisis-driven transitions and than countries in the control group.<sup>17</sup> By

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<sup>16</sup>The degree of domestic financial liberalization is measured by a composite index that assesses the extent to which direct credit controls, reserve requirements, and interest rate controls have been abolished, entry barriers against foreign banks eliminated, and the banking system has been privatized.

<sup>17</sup>External financial liberalization is measured by a composite rules-based index which captures whether there are restrictions on capital inflows and outflows, and whether the

(continued)

contrast, voluntary transitions from intermediate regimes to free floats were associated with a higher degree of external financial liberalization than in the control group, reflecting in part the higher levels of bank supervision and securities market development than in the control group.

The latest available data (for 2002) suggest that countries with free floats have more liberalized financial systems than countries with pegs or intermediate regimes, consistent with the fact that—in countries with less flexible exchange rates—external financial liberalization reduces the room to pursue independent monetary policy.

### **Policy Frameworks, Exchange Rate Flexibility, and Monetary Independence**

In addition to the analysis above, the paper will build on the traditional argument in favor of flexible exchange rate regimes as allowing countries to pursue an independent monetary policy, and will empirically examine the extent to which differences in the strength of monetary and financial policy frameworks across countries and periods explain differences in the degree of monetary independence for the periods where the countries are classified as floaters. This can be done by ordinary least squares regressions of estimates of monetary independence on the average values of the indicators of monetary and financial policy

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exchange rate system is unified. The main drawback of rules-based measures of capital controls is that they aim to capture restrictions irrespective of their effectiveness. However, using the outcome-based measure of capital controls constructed by Edison and Warnock (2002) yields similar results.

frameworks over the relevant periods.<sup>18</sup> Estimates of monetary policy independence can be obtained following the methodologies in Frankel, Schmukler, and Servén (2002) and Shambaugh (2004).

## **TO BE COMPLETED**

### **Concluding Remarks**

Exchange rate flexibility in emerging market countries has increased substantially over the past decade. The share of EM countries with free floats rose from virtually zero in the early 1990s to more than one-third in recent years. While there have been some transitions toward less flexible regimes, most have been toward greater flexibility. The numbers of peg-to-intermediate and intermediate-to-free float transitions were broadly similar, and both were nearly evenly split between voluntary and crisis-driven transitions. There were no transitions from pegs to free floats in the sample. Moreover, the transitions were broadly evenly distributed across regions.

Voluntary transitions were generally not associated with an increase in macroeconomic instability. Although the results are based on a small sample and could

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<sup>18</sup> These regressions can be estimated separately for the periods in which countries have a ‘managed float’ and a ‘free float’ as well as for both combined. The specific hypothesis that will be tested is that the stronger are the monetary and financial policy frameworks, the smaller is the response of domestic to international interest rates.

reflect sample selection bias, key indicators such as growth and real exchange rate overvaluation, among others, were on average little affected by the transition. Indeed, inflation performance continued to improve after the transitions, and, while exchange rate volatility increased a little immediately after the transitions, it soon returned to a level similar to that in the pre-transition period.

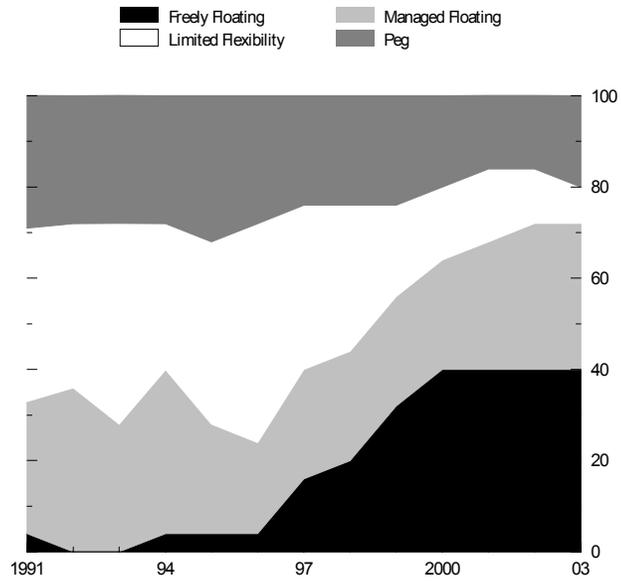
Transitions to greater exchange rate flexibility were generally associated with a strengthening of monetary and financial policy frameworks, consistent with the idea that such moves can be facilitated by investing in “learning to float.” Compared with the average behavior in the relevant control group, transitions to greater exchange rate flexibility over the past ten years have been associated with increased central bank independence, the adoption of inflation targeting, and—for crisis-driven transitions—improved bank supervision and further securities markets development (in the case of intermediate to free float transitions). However, there clearly remains scope to further strengthen policy frameworks even in countries that already have free floats.

The analysis also suggests that not all policy frameworks have to be in place for countries to make a transition to a more flexible regime. Many countries moved to more flexible exchange rate regimes while still in the process of strengthening their policy frameworks. It is true that, prior to the transition, bank supervision was generally stronger in countries making voluntary transitions than in the control groups, and that securities markets were more developed in countries that made voluntary transitions from intermediate to free floats. By contrast, only one country had introduced full-fledged inflation targeting before

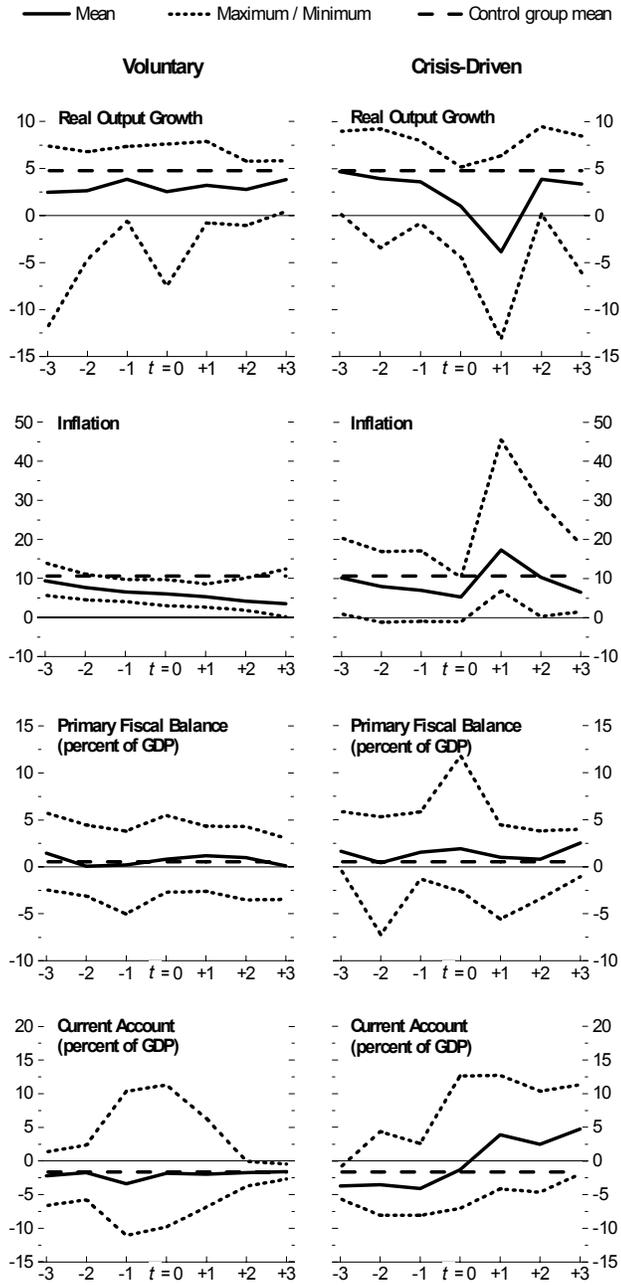
moving to a free float. Also, countries making a voluntary first step toward exchange rate flexibility had on average less financial liberalization than the control group.

**Figure 1. Increasing Exchange Rate Flexibility in Emerging Markets**

*(Percent of annual observations)*

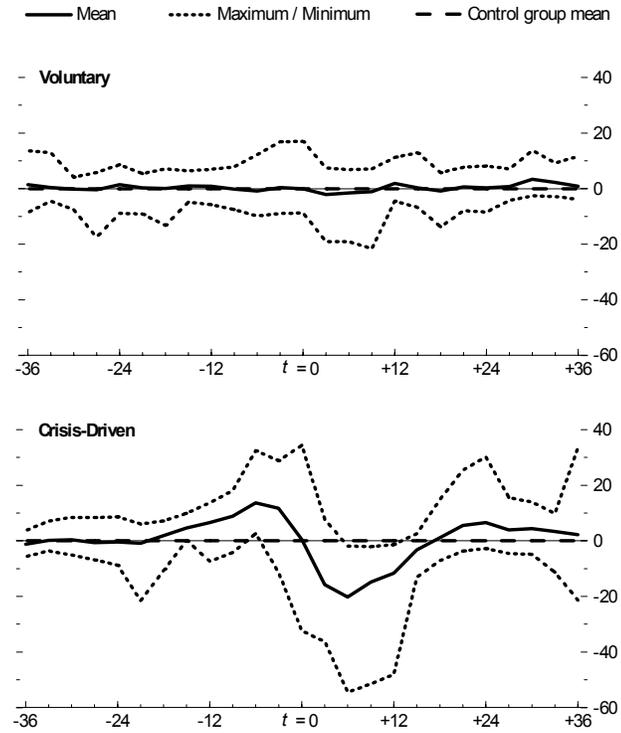


**Figure 2. Macroeconomic Indicators<sup>1</sup>**  
*(Percent unless otherwise noted; t = 0 is year of transition)*



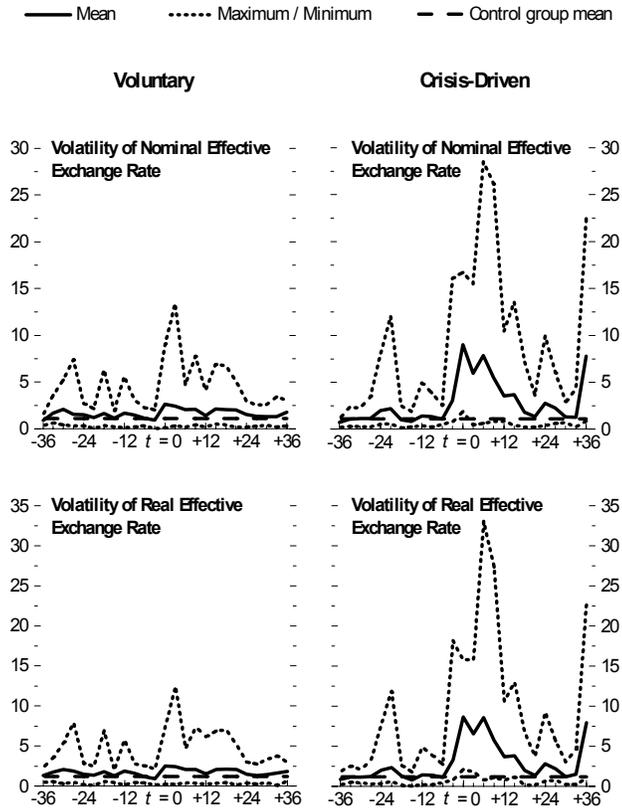
<sup>1</sup>The control group represents countries whose exchange rate regimes are the same as the starting regimes of transitioning countries in periods that are not within three years of a transition. Outliers are excluded from the panel for inflation.

**Figure 3. Real Effective Exchange Rate Overvaluation<sup>1</sup>**  
(Percent deviation from trend;  $t = 0$  is month of transition)



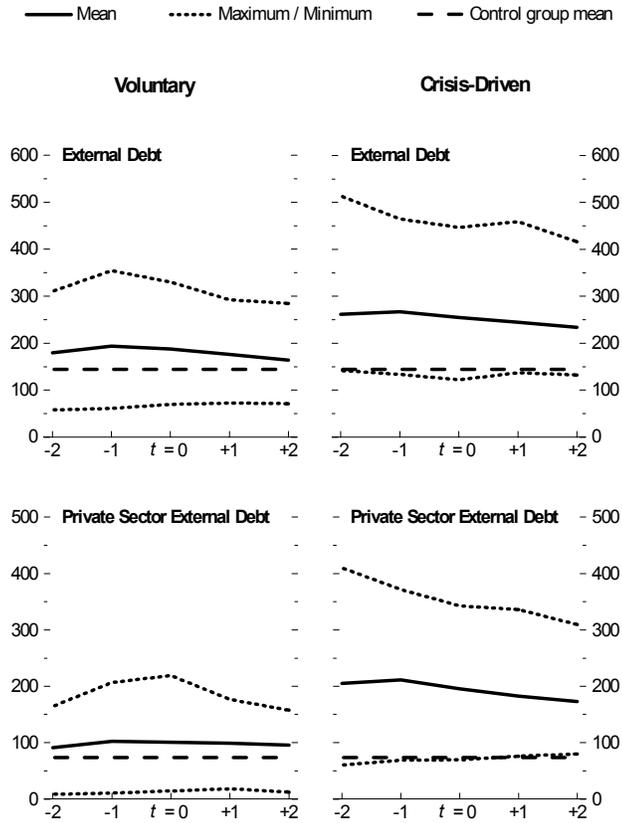
<sup>1</sup>Real exchange rate overvaluation is calculated using the percentage difference between the actual real effective exchange rate (REER) and the Hodrick-Prescott filter of the REER. The control group represents countries whose exchange rate regimes are the same as the starting regimes of transitioning countries in periods that are not within three years of a transition.

**Figure 4. Volatility of Exchange Rate<sup>1</sup>**  
(*t = 0 is month of transition*)



<sup>1</sup>Volatility is measured as the standard deviation of the monthly growth rate of the exchange rate over the last three months, averaged across transition cases. The control group represents countries whose exchange rate regimes are the same as the starting regimes of transitioning countries in periods that are not within three years of a transition.

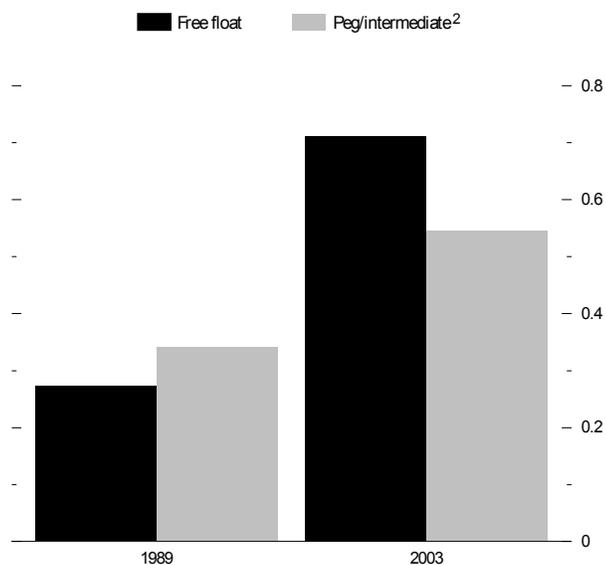
**Figure 5. Indicators of External Debt<sup>1</sup>**  
*(Percent of exports of goods and services; t = 0 is year of transition)*



<sup>1</sup>The control group represents countries whose exchange rate regimes are the same as the starting regimes of transitioning countries in periods that are not within three years of a transition. Only countries with observations for all periods shown around the time of transition are included.

**Figure 6. Central Bank Independence in Emerging Markets<sup>1</sup>**

*(Countries classified according to exchange rate regime in 2003)*

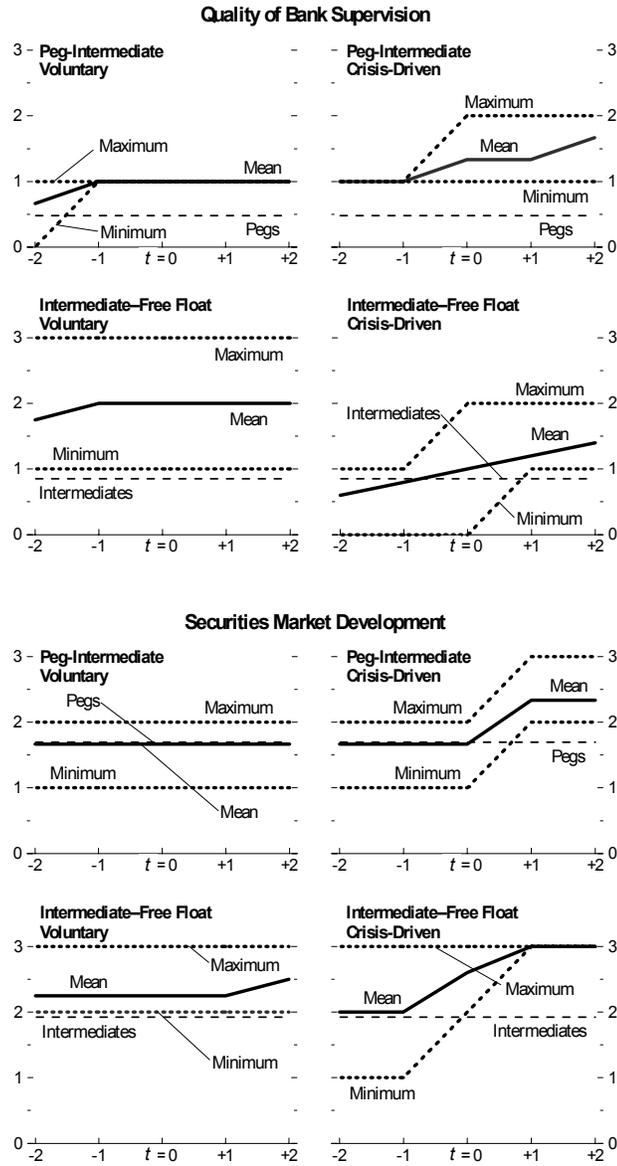


<sup>1</sup>This measures central bank political and economic independence following the definition by Grilli, Masciandaro, and Tabellini (1991). The indicator ranges from 0 to 1, where a higher score indicates a higher level of central bank independence.

<sup>2</sup>This includes only one country with a peg in 2003.

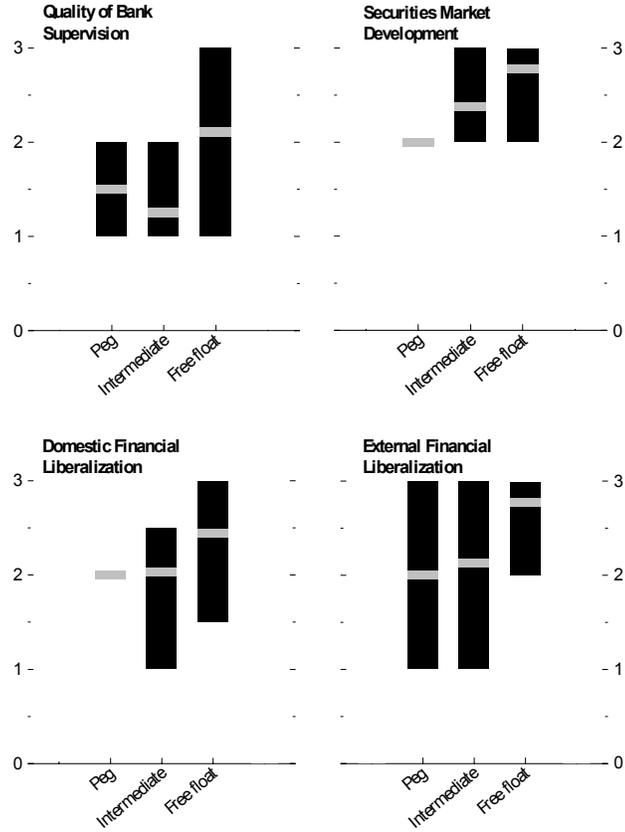
**Figure 7. Indicators of Financial Sector Supervision and Development<sup>1</sup>**

(*t = 0 is year of transition; scale 0 to 3 with 3 representing strongest supervision and development*)



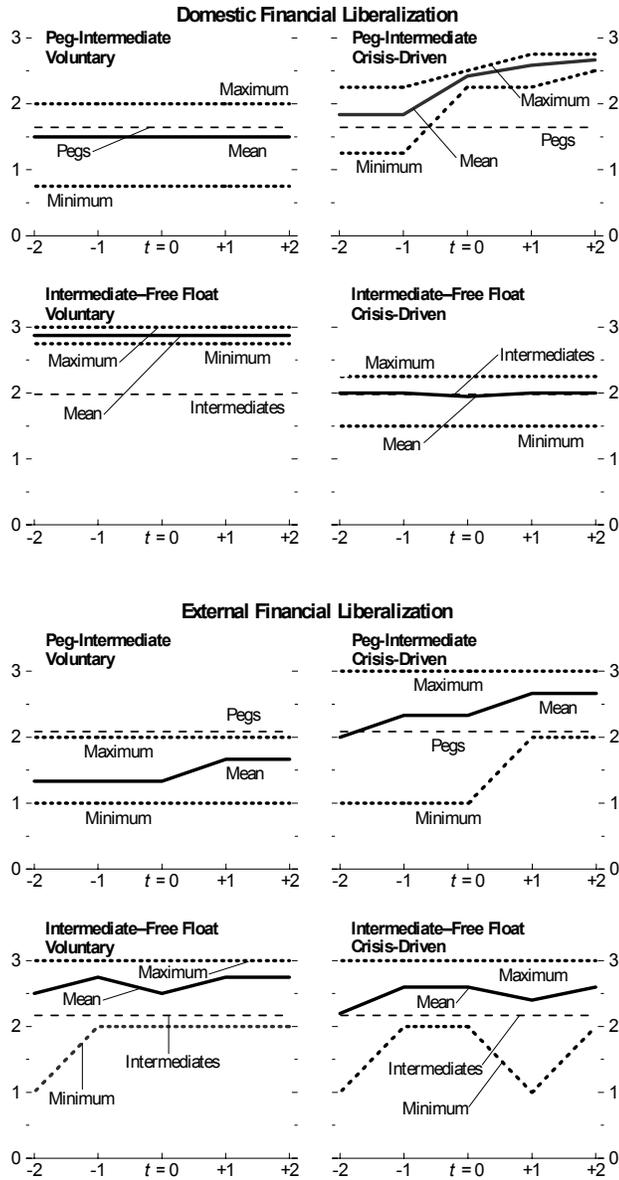
<sup>1</sup>The pegs/intermediates control groups are averages for the countries whose exchange rate regime is the same as the starting regime of transitioning countries in periods that are not within three years of a transition. Only countries with observations for all periods shown around the time of transition are included.

**Figure 8. Financial Policy Frameworks, 2002<sup>1</sup>**  
(Averages across countries by type of exchange rate regime; scale 0 to 3 with 3 representing strongest policy frameworks)



<sup>1</sup>The top of the bar represents the maximum; the grey line represents the mean; and the bottom of the bar represents the minimum value. Peg includes Morocco and Malaysia; intermediate includes Argentina, Egypt, Israel, Thailand, India, Indonesia, Pakistan, and Venezuela; free float includes Brazil, Chile, Colombia, Korea, Mexico, Peru, the Philippines, South Africa, and Turkey.

**Figure 9. Indicators of Financial Sector Liberalization<sup>1</sup>**  
 (t = 0 is year of transition; scale 0 to 3 with 3 representing most liberalized)



<sup>1</sup>The pegs/intermediates control groups are averages for the countries whose exchange rate regime is the same as the starting regime of transitioning countries in periods that are not within three years of a transition. Only countries with observations for all periods shown around the time of transition are included.

## APPENDIX 1. METHODOLOGY AND DATA

This appendix provides further details on the methodology used to characterize emerging market (EM) countries exchange rate regime transitions, and the definition of the variables used in the analysis and their data sources.

### Methodology

The paper uses mainly the IMF *de facto* classification system to classify EM countries' exchange rate regimes over the past decade. The IMF *de facto* system classifies countries exchange rate regimes into eight categories which—for the analysis in the paper—are aggregated into three broad categories: pegs, intermediates, and free floating. The pegs category includes countries with currency board arrangements and conventional pegs. The intermediates category includes countries with limited flexible regimes i.e. pegs within horizontal bands, crawling pegs, and crawling bands, and the managed floats. The free floats are countries classified as independently floating.

An exchange rate regime transition is defined as a shift from one exchange rate category, in which a country has been for at least two years, to another, in which a country remains for at least one year or is followed by another shift in the same direction. A crisis-driven transition is defined as a transition that is associated with an exchange rate depreciation vis-à-vis the dollar of at least 20 percent, at least a doubling in the rate of

depreciation with respect to the previous year and a rate of depreciation the previous year below 40 percent (following Milesi-Ferretti and Razin, 2000).<sup>19</sup>

The paper compares the countries that move to a more flexible exchange rate category with a control group. The control group consists of the countries whose exchange rate regime is the same as the starting regime of transiting countries in periods that are not within three years of a transition. Depending on the availability of data the pegs control group includes in the relevant years: Argentina, China, Colombia, Jordan, Malaysia, Morocco, Thailand. Similarly, the intermediates control group includes in the relevant years: Chile, Colombia, Czech Republic, Hungary, India, Indonesia, Israel, Korea, Russia, South Africa, Thailand, and Turkey.

### **Data Definitions and Sources**

Depending on availability of the data, the variables used in the paper cover the period 1991–2003 for the 25 emerging market countries in the Morgan Stanley Capital International index (MSCI), which includes Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, the Philippines, Poland, Russia, South Africa, Thailand, Turkey, and Venezuela.

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<sup>19</sup> Exchange rate movements that meet these criteria in a three-year window around the exchange regime transition are attributed to the transition.

### ***Macroeconomic Indicators***

*Real output growth* is measured using the annual growth rate of real per capita GDP. The source of the data is the *World Economic Outlook* (WEO) database.

*Inflation* is measured using the growth rate of the Consumer Price Index. The source of the data is the IMF's *International Financial Statistics* (IFS).

*Real and nominal effective exchange rates* are obtained from the IMF's *Information Notice System*. An increase in the index denotes an exchange rate appreciation. The data are monthly.

*Real exchange rate overvaluation* is calculated using the percentage difference between the actual real effective exchange rate (REER, reported in the IMF's Information Notice System) and a Hodrik-Prescott filter of the REER.

*The primary fiscal balance* as a percent of GDP is obtained from Chapter 3 in the *World Economic Outlook* (September, 2003).

*The current account* as a percent of GDP is obtained from the IMF's IFS.

*The ratio of external debt to exports of goods and services* is calculated as the ratio of total external debt outstanding at year-end divided by exports of goods and nonfactor services plus net total transfers minus net official transfers. The source of the data is the WEO database.

*The ratio of private sector external debt to exports of goods and services* is constructed as total external debt outstanding at year-end minus the debt outstanding to official debtors divided by exports of goods and nonfactor services plus net total transfers minus net official transfers. The source of the data is the WEO database.

*International Reserves* in months of imports is obtained from the IMF's IFS.

### ***Indicators of Monetary Policy Frameworks***

*Central bank independence.* This measures central bank political and economic independence following the definition by Grilli, Masciandaro, and Tabellini (GMT, 1991). Political independence measures the extent to which the government is involved in the operations of the central bank, where a lower degree of government involvement implies a higher degree of central bank political independence. Economic independence measures the involvement of the central bank in financing the fiscal deficit and in banking supervision. The smaller the involvement the greater the economic independence. The indicator ranges from 0 to 1, where higher values indicate a higher level of independence. The data, which is

available for only 10 of the EM countries in the sample for 1989 and 2003, is obtained from Arnone and Laurens (2004).

*Dummy for whether a country is inflation targeting or not.* The date of adoption of inflation targeting is obtained from Stone and Roger (2004).

### ***Indicators of Financial Sector Supervision and Development***

*Quality of banking supervision.* This is an aggregate index of the quality of banking supervision which includes (1) banks' adoption of a capital adequacy regulation in line with standards developed by the Bank for International Settlements; (2) the independence of the supervisory agency from the executive's influence and whether it has sufficient legal power and (material) supervisory power; (3) the effectiveness of the supervision; and (4) the extent to which supervision covers all financial institutions.

*The securities market development index* captures whether a country has taken measures to develop a security or bond market and the openness of its equity market to foreign investors. The measures to develop a securities market include the introduction of auctions for government paper and the establishment of a securities commission, the establishment of equity and bond markets, the opening of these markets to foreign participants, and liberalization of portfolio investments for pension funds and other institutional investors.

The data are obtained from Abiad and Mody (2003). The indicators take values from 0 to 3, with increasing values indicating stronger bank supervision and greater securities market development. Data are missing for some of the EM countries in the sample.

### ***Indicators of Financial Sector Liberalization***

The index for *domestic financial liberalization* is constructed as the average of four indicators which measure the extent to which (1) direct credit controls and reserve requirements have been abolished; (2) interest rate controls have been removed; (3) entry barriers against foreign banks have been eliminated; and (4) the banking system has been privatized.

*External financial liberalization* is an aggregate index which captures whether there are restrictions on capital inflows and outflows, and whether the exchange rate system is unified.

The data are obtained from Abiad and Mody (2003). The indicators take values from 0 to 3, with increasing values indicating greater liberalization. Data are missing for some of the EM countries in the sample.

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