# Short-Run Pain, Long-Run Gain: Financial Liberalization and Stock Market Cycles

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**Abstract**

The views on financial liberalization are quite conflictive. Many argue that it triggers financial bubbles and crises. Others claim that financial liberalization allows markets to function properly and capital to move to its most profitable destination. The empirical evidence on these effects is not robust. This paper constructs a new comprehensive chronology of financial liberalization and shows that a key reason for the inconclusive evidence is that the effects of liberalization are time-varying. Financial liberalization is followed by large booms and busts only in the short run. In the long run, institutions improve and financial markets tend to stabilize.

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## 1. Introduction

The crises of the 1990s in Asia, Europe, and Latin America have re-ignited the debate on the effects of financial liberalization. Many argue that the deregulation of financial markets was the main trigger of many of the crises observed since the 1970s. The evidence supports this claim. For example, Kaminsky and Reinhart (1999) find that the likelihood of banking crises increases by 40 percent following the deregulation of the domestic banking sector. They also find that crises are preceded by a sharp increase in the bank credit-to-GDP ratio and by a boom-bust cycle in stock prices, about 50 percent higher than those observed in non-crisis times. A variety of models have been proposed to explain this link. For example, Allen and Gale (1999, 2000), Hellman et al. (2000), and Schneider and Tornell (2004), among others, show that financial liberalization leads to risky behavior by banks. Moreover, Tornell and Westermann (2005) argue that financial liberalization triggers lending boom-bust cycles in economies with credit restrictions and overall imperfections in financial markets. Allen and Gale (2000) further show that these lending booms can feed into stock market bubbles because agency problems generate an incentive for borrowers to use bank loans to buy risky assets, with these bubbles ending up in banking crises and recessions. Overall, these models rest on the idea that market failures and distortions pervade capital markets and are the sources of the boom-bust patterns.[1]

Other authors, in contrast, highlight the benefits of financial liberalization. They claim that financial liberalization allows capital to move to its most attractive destination, increasing productivity and growth and fostering a better functioning of financial markets. For example, Bekaert et al. (2005a, b) find that liberalization leads to a one-percentage point increase in annual

[1] For other explanations, see Bachetta and van Wincoop (2000), Krugman (1995, 1998), McKinnon and Pill (1997), and Stulz (2005), among others, as well as the more detailed discussion summarized in Section III.

economic growth as well as to a decline in output volatility. Also, Henry (2000a, b) finds that liberalization triggers an increase in the investment rate and a substantial revaluation of equity prices in a large number of countries. Traditional neoclassical models provide the theoretical support for these findings. In these models, financial liberalization reduces the cost of capital and fuels a significant boom in lending and stock market prices, but does not trigger a financial crash.

While the empirical research on the effects of financial liberalization has grown significantly during the last two decades, the evidence overall is still quite inconclusive, with some studies supporting the link between liberalization and crises and others backing the traditional neoclassical view. In our view, these seemingly conflicting findings can still be consistent with one another if financial deregulation triggers forces that favor more efficient financial markets over the long run, such as improvements in institutions and accountability of investors. In this case, financial liberalization eventually promotes more stable financial markets and growth. On impact, however, financial liberation may still trigger short-run financial booms and busts and output collapses in economies with distortions in capital markets as protected domestic financial institutions obtain access to new funds.

In this paper, we study the effects of financial liberalization in a varied group of countries. Since the quality of government institutions and general distortions in capital markets are at the core of the conflicting views on the effects of financial liberalization, we cast our net wide and include economies with different degrees of institutional and economic development. Our sample comprises twenty-eight emerging- and mature-market economies. We classify the sample into four (mostly regional) country groupings: the G-7 countries, which are comprised of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States; the Asian region, which includes Hong Kong, Indonesia, Malaysia, the Philippines, (South) Korea, Taiwan,

and Thailand; the European group, which excludes those countries that are part of the G-7, and includes Denmark, Finland, Ireland, Norway, Portugal, Spain, and Sweden; and the Latin American sample, which consists of the largest economies in the region, Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela.

Since the chronologies of financial liberalization are still quite fragmented, we construct a new database that captures the main aspects of liberalization (deregulation of the domestic banking industry, removal of controls on international capital flows, and the liberalization of the domestic stock market) for the twenty-eight countries in our sample between 1973 and 2005. This sample gives us the opportunity to study 63 episodes of liberalization of the banking industry, 67 episodes of opening up of the capital account, and 49 episodes of deregulation of the stock market. By itself, this new chronology is an important contribution of this paper.

As suggested by the various families of models in the literature, a natural point of departure of any empirical research on financial liberalization should be capital markets. This is also our focus. Since the research on currency and banking crises indicates that crisis episodes are preceded by booms and crashes in stock markets, we first examine whether stock prices follow in fact boom-bust patterns by using an algorithm that replicates the NBER methodology to identify business cycles. Our results indicate that cycles characterize the behavior of stock prices in our sample. We then look at the magnitude of the upturns and downturns, with particular attention to the possibility that the characteristics of the cycles have changed over time. This sets the groundwork for examining the effects of financial liberalization.

We compare the behavior of financial cycles during repression, in the aftermath of financial liberalization, and (if liberalization persists) in the long run following liberalization. Our results for emerging markets indicate that there is a quite pronounced time-varying relation

between liberalization and financial market cycles. We find that liberalization is followed by substantially more pronounced booms and crashes in the short run, which supports the models in which financial liberalization triggers risky behavior and excesses in financial markets. In contrast, we find that in the long run, financial cycles become less pronounced, perhaps because capital market distortions become less widespread. These results are robust to controls suggested by theory. Our findings for mature markets support the view that liberalization leads to an increase in the value of the firms, but not to larger crashes even in the immediate aftermath of financial liberalization.

Our results on the time-varying pattern on stock market cycles in emerging economies suggest that government reforms may not predate financial liberalization. To examine this issue, we collect data on the quality of government institutions as well as on the laws governing the proper functioning of financial systems and examine the timing of financial liberalization and institutional reforms. Interestingly, we find that government reforms mostly occur following, not before, financial liberalization, suggesting that liberalization sets in motion the reforms needed for markets to operate efficiently, as indicated in Mishkin (2003) and Stultz (2005). Moreover, our results suggest that financial cycles become less pronounced after improvements in property rights, transparency, and overall contractual environment.

The rest of the paper is organized as follows. Section 2 describes the new chronology on financial liberalization for the twenty-eight countries in our sample for the period 1973-2005. Section 3 identifies stock price cycles and studies the relation between financial liberalization and the time-varying behavior of financial cycles. Section 4 examines the dynamics between financial liberalization and institutional reforms. Section 5 concludes.

## 2. The Evolution of Global Financial Liberalization

One of the most prolific areas of empirical research in international economics and finance has been the analysis of the effects of capital controls and overall financial liberalization on financial markets, investment, and growth. In spite of the great interest of several disciplines on the effects of deregulation of financial markets, the information on the evolution of financial regulations is still fragmented.

Information on capital account controls is mostly based on indicators published by the International Monetary Fund in *Exchange Arrangements and Exchange Restrictions*. This indicator does not distinguish between controls on capital inflows and controls on capital outflows and only identifies two capital account regimes: a "no controls" regime, which includes episodes with full liberalization of the capital account, and a "controls" regime, which includes episodes with minor restrictions to the free flow of capital as well as episodes with outright prohibition of all capital account transactions.[2] Quinn and Inclan (1997) and Quinn and Toyoda (2003) have improved over the IMF classification creating an index that allows for different intensities of capital account liberalization.

Information on regulations of the domestic financial sector is even more fragmented. There is no institution compiling systematic cross-country information over time and researchers have constructed their own liberalization chronology. For example, Williamson and Mahar

[2] Only in 1996 did the IMF begin to publish a more comprehensive report on capital account controls, which still does not capture the intensity of controls The new indicators evaluate restrictions on 11 types of capital account transactions: (1) capital market securities, (2) money market instruments, (3) collective investment securities, (4) derivatives and other instruments, (5) commercial credits, (6) financial credits, (7) guarantees, sureties, and financial

(1998) date liberalization based on the existence of credit controls, controls on interest rates, entry barriers to the banking industry, government regulation of the banking sector, and importance of government-owned banks in the financial system. Other efforts include those of Demirguc-Kunt and Detragiache (1999), who date liberalization for fifty-three countries since 1980. In that study, liberalization of the domestic financial sector is interpreted as liberalization of domestic interest rates. More recently, Laeven (2003) constructs an index of domestic financial sector liberalization for 13 developing countries covering the period 1988-1998.

Information on the liberalization of domestic stock markets is also still partial. The International Financial Corporation (IFC) provides this information just for emerging markets. Again, this index only captures two regimes: a "liberalization" regime and a "restricted" regime. The liberalization dates are determined based on whether foreigners are allowed to purchase shares of listed companies in the domestic stock exchange and whether there is free repatriation of capital and remittance of dividends and capital gains. Bekaert and Harvey (2000) improve over the IFC measure by also including other indicators of deregulation of the stock market, such as the establishment of new investment vehicles like country funds and depositary receipts.[3]

Our chronology complements in various ways the previous studies on the evolution of financial liberalization. First, it includes deregulation episodes in both developed and developing countries. Most previous studies focus on emerging markets, perhaps because most concerns are associated with liberalization episodes in those countries, with even the most averse critics of

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backup facilities, (8) direct investment, (9) liquidation of direct investment, (10) real estate transactions, and (11) personal capital movements.

[3] There is a very large related literature that studies the extent of *de facto* financial and economic integration from observable economic variables, not from *de jure* government regulations. See, for example, Bekaert et al. (2002), Frankel (2000), Obstfeld and Rogoff (2000), and Obstfeld and Taylor (2004).

capital account liberalization still supporting financial deregulation in mature markets. Second, our chronology deals with the deregulation in the capital account, the domestic financial sector, and stock markets. Most previous studies have tended to focus on the elimination of regulations in just one particular financial sector. This focus on the opening of only one financial market may give an incomplete picture of the effects of regulation because controls in one sector can also affect the behavior of other parts of the financial system, which may or may not be directly under any type of restrictions.[4] Third, our database captures the intensity of financial liberalization. Most chronologies do not tend to distinguish between different intensities of liberalization/repression.[5] Since deregulation usually changes slowly, valuable information might be lost when the indicators try to assess only whether or not the liberalization has occurred. Finally, our database captures reversals of financial liberalization. Most previous chronologies analyze financial liberalization episodes as if they were permanent. Still, many countries have undergone several liberalization reversals, particularly following currency crises.

[4] This problem may be particularly important because the complete deregulation of financial systems is not accomplished in just one round and the time span between the deregulation of one market and the elimination of controls across the board takes, in most cases, several years, as we examine below.

[5] Quinn (1997) and Quinn and Toyoda (2003) are clear exceptions. These authors construct an index of current account and capital account restrictions that allows for different intensities of repression for 83 countries from 1947 to 1999. Relative to that index, our measure is based on a clearly defined indicator for each type of transaction, allowing us to compare experiences of partial liberalization across countries and time. For example, we classify international borrowing by banks and corporations as partially liberalized when banks and corporations are allowed to borrow abroad but subject to the following restrictions: reserve requirements on foreign loans are between 10 and 50 percent or the required minimum maturity of the loan is between two and five years. Another exception is Edison and Warnock (2003), who measure the degree of stock market integration by estimating the availability of domestic equities to foreigners.

## 2.1 NEW MEASURES OF FINANCIAL LIBERALIZATION

To construct the various measures of financial liberalization, we use a wide range of sources, including information provided by both international and domestic institutions. The information comes not only from cross-country reports but also from large number of country studies. Regarding international institutions, we use data from publications of the Bank for International Settlements, the International Finance Corporation, the International Monetary Fund, the Organization for Economic Cooperation and Development, and the World Bank. On the domestic side, we obtain data from annual reports of central banks, finance ministries, and stock exchanges of all the countries in our sample. We also use reports by The Economist's Intelligence Unit. Our new chronology includes information on the regulations of the capital account, the domestic banking sector, and the stock market for the twenty-eight countries in our sample and extends from 1973 until 2005.[6]

To capture the liberalization of the capital account, we evaluate the regulations on offshore borrowing by domestic financial institutions, offshore borrowing by non-financial corporations, multiple exchange rate markets, and controls on capital outflows. The first two

[6] We work with these countries because of the availability of rich data covering their processes of financial liberalization and because those countries have a relatively long history of functioning stock markets. We chose a set of countries that allow us to cover different regions of the world. We also chose the largest countries in each region and the ones that have gone through periods of repression and liberalization, to have enough variability in the data (the latter led us to exclude countries like China and India). Due to the large amount of work needed in the data collection, we limit the number of countries. We do not include countries in Africa, Central Asia, Eastern Europe, and the Middle East for lack of long time series. We use the G-7 countries as a benchmark. Of course, we leave out countries that would have been interesting to study, most notably Australia, Israel, New Zealand, South Africa, and Turkey. But we believe that no particular bias was introduced in the selection process.

indicators reflect restrictions on capital inflows. Restrictions on capital inflows can take various forms, with the most extreme restriction being an outright prohibition to borrow overseas. Milder controls include restrictions of minimum maturity on capital inflows and non-interest reserve requirements on foreign borrowing.

To measure the liberalization of the domestic financial system, we analyze the regulations on deposit interest rates, lending interest rates, allocation of credit, and foreign currency deposits. Since monetary authorities in emerging economies often use changes in reserve requirements to control bank credit, we also collect data on reserve requirements as additional information to evaluate the degree of restrictions imposed on the banking sector. To set the liberalization dates, we focus mainly on the first two variables, the price indicators. However, we complement that information with the regulations on the last three variables, those on quantities, to have a better grasp of the degree of repression of the domestic financial sector. Finally, to track the liberalization of stock markets, we study the evolution of regulations on the acquisition of shares in the domestic stock market by foreigners, repatriation of capital, and repatriation of interest and dividends. Part of these regulations on stock market indicators have already been documented by Bekaert and Harvey (2000) for some of the countries in our sample.

For each sector, our chronology identifies three regimes: “fully liberalized,” “partially liberalized,” and “repressed.” The criteria used to determine whether the capital account, the domestic financial sector, and the stock market are fully or partially liberalized or repressed are described in detail in the Appendix Table I. We established these criteria after collecting all the regulations and studying the range of restrictions implemented in all the countries in the sample since 1973. These criteria seem to characterize well the degrees of financial liberalization. The

chronology of restrictions compiled for each country and sector and the complete list of references used to construct it are detailed in the working paper version of this paper.

Table I reports the dates of partial and full financial liberalization for all the countries in the sample. For each country, the first three columns display the dates of liberalization of the capital account, the domestic financial sector, and the stock market. The last column reports dates of liberalization taking into account the three sectors analyzed. A country is considered to be fully liberalized when at least two sectors are fully liberalized and the third one is partially liberalized. A country is classified as partially liberalized when at least two sectors are partially liberalized.

## 2.2 PACE AND DYNAMICS OF LIBERALIZATION

Figures 1 and 2 and Table II summarize the information in Table I. Figure 1 reports separately the average liberalization index for emerging and mature economies. For each country, the liberalization index is equal to 1 when the economy is fully liberalized, equal to 2 when the economy is partially liberalized, and equal to 3 when the capital account, the domestic banking sector, and the stock market are all repressed. As expected, mature economies are on average less regulated. The index for mature economies averages 1.5, while for emerging economies averages 2.0. Across all regions there was a gradual lifting of restrictions, with the index of liberalization declining from an initial value of 2.6 for mature markets and 2.9 for emerging economies to 1.0 and 1.2, respectively, toward the end of the sample. As shown in this figure, the dynamics of liberalization are different across emerging and mature economies. While the pace of liberalization in mature economies is uninterrupted, reforms in emerging markets suffer a pronounced liberalization reversal in the early 1980s following the debt crisis and other less pronounced reversals following the crises of the late 1990s and early 2000s.

Figure 2 examines separately the ordering of liberalization of the capital account, the domestic financial sector, and the stock market for both emerging and mature markets. Stock markets in developed countries were liberalized earlier, with the index for this sector oscillating around 1.5 in the early 1970s. In contrast, both the domestic financial sector and the capital account tended to be severely repressed until the early 1980s. The indexes for both sectors are on average above 2.5 for the early 1970s. Financial markets across the board were heavily repressed in developing countries in the early 1970s. But in the mid and late 1970s, many emerging economies liberalized the domestic sector and the capital account. The liberalization reform was short-lived. Controls were re-imposed in the aftermath of the 1982 debt crisis. Overall, restrictions in stock markets remained in place until the late 1980s, when a liberalization wave occurred in Asia and Latin America.

Table II examines further the ordering and duration of the liberalization process separately for Asia, Europe, the G-7, and Latin America. The top two panels show the proportion of episodes in which the capital account, the domestic financial sector, or the stock market is liberalized first. The top panel focuses on partial liberalization episodes; the panel below examines full liberalization episodes. The bottom two panels display the duration of liberalization episodes; they report the number of months from the time the first market is deregulated until liberalization is implemented in all markets. The top two panels reveal that the paths toward financial reform differ across regions. Basically all the G-7 countries deregulated the stock market first. European countries implemented a somewhat mixed strategy toward deregulation, with 25 percent of the countries liberalizing the domestic financial sector first and the rest deregulating the stock market first. On the other hand, Latin American countries overwhelmingly adopted liberalization of the domestic financial sector first, while Asian

countries followed a mixed strategy, with some countries opting for deregulating the domestic sector first and some others focusing on the stock market first. Capital account liberalization in all Asian countries was mostly introduced at a later stage.

The bottom panels in Table II show that liberalization reforms take a long time to be completed. On average, 82 months elapse from the time the first market is liberalized until all markets are deregulated. The time to completion of the liberalization reform was far longer in Asia than in Latin America. Finally, liberalization episodes that are first implemented in the stock market are the ones that become completed the fastest. The variety of experiences in financial reforms allows us to examine not only the effects of financial liberalization across all markets but also the effects of the ordering of deregulation.

## 3. Stock Market Cycles and Financial Liberalization

As shown above, during the last three decades, countries around the world have liberalized their financial systems. This financial liberalization has been linked to lending booms (e.g., Gourinchas et al., 2001). These lending booms are not intrinsically undesirable; they may just reflect easier access to capital markets, overall lower cost of capital, and higher growth. Despite these potential benefits, there is a large literature that relates financial liberalization to lending booms, bubbles in asset prices, and crises. We briefly review this literature below to show why studying financial cycles is relevant to understanding the effects of financial liberalization.

While the presence of stock market cycles is consistent with prices reflecting fundamental values accurately and markets being efficient, most of the theoretical work that explains the dynamics of liberalization and boom-bust cycles in financial markets incorporates

some type of market imperfection.[7] For example, Allen and Gorton (1993) develop a model where bubbles can appear if there are agency problems between investors and portfolio managers while Allen et al. (1993) show that absence of common knowledge can lead to bubbles in asset prices.[8]

Other papers emphasize the relation between financial liberalization, the banking system, boom-bust cycles, and financial crises. For example, Hellman et al. (2000) show that financial liberalization fuels competition and reduces bank profits, eroding banks' franchise value, while at the same time it allows banks to take more risk. Since governments cannot commit not to provide bailouts in case of crises, banks have incentives to gamble for resurrection, reaping the benefits in case of success and passing the losses to the government in times of crises. From a different angle, Tornell and Westerman (2005) argue that the boom-bust cycles in lending that occur in middle-income economies following financial liberalization are generated by the interaction of two features of these economies: asymmetric financing opportunities across non-tradable and tradable sectors and systemic bailout guarantees. In these countries, the mostly large firms in the tradable sector have access to world capital markets while the smaller firms in the non-tradable sector are heavily dependent on bank credit. In this model, the interaction of systemic bailout guarantees and credit market imperfections can generate a boom-bust cycle phenomenon. When liberalization occurs, capital inflows trigger a real appreciation that reduces

[7] For models where cycles reflect fundamental values see Basu and Vinod (1994), Cecchetti et al. (1990), and Lucas (1978), among others.

[8] Whether it is possible to profit from cycles depends on the underlying model. In the class of models where prices always reflect fundamental values, it is not possible to profit from stock market cycles. However, in several models with heterogeneous agents, such as Abreu and Brunnermeier (2003) and DeLong et al. (1990), sophisticated investors could profit relative to other investors.

the debt burden of the non-tradable sector and relaxes existing credit constraints, leading to more lending, further appreciation, fast growth in these sectors, and further relaxation of credit constraints. Since financial liberalization eliminates regulatory barriers that prevent agents from taking risks, it further fuels borrowing booms and borrowing in foreign currency. When a crisis occurs, the devaluation worsens the balance sheet of the non-tradable sector and generates a recession. With banks heavily exposed to the non-tradable sector, the recession in the non-tradable sector leads to a long-lasting credit crunch that is shown to outlive the recession.

While boom-bust financial cycles are mostly triggered in models with a banking sector and explicit or implicit government guarantees (as in Krugman, 1998 and McKinnon and Pill, 1997), Allen and Gale (2000) show that the possibility of bailouts is not necessary for asset price bubbles to appear. They show that it is uncertainty about the future course of credit creation in the economy and its interaction with agency problems that is crucial for determining the extent of asset price bubbles following financial liberalization. In their model, investors use money borrowed from banks to invest in risky assets, which are relatively attractive because investors can avoid losses in low payoff states by defaulting on their loans. This risk shifting leads investors to bid up the prices of risky assets in fixed supply (such as land and equities) above their fundamental value, creating a bubble. While bubbles can be triggered by real shocks, Allen and Gale (2000) also model bubbles being triggered by events in the financial sector. In particular, they model how financial liberalization (by fueling an expansion of credit) generates bubbles in asset prices. In their model, higher prices are supported by the anticipation of further increases in credit and asset prices. Naturally, a collapse in credit may precipitate a crisis. If the collapse of asset prices were perfectly foreseen, the bubble would not be possible in the first

place. However, the course of financial liberalization and credit expansion is never perfectly foreseen. Thus, the uncertainty about the extent of credit expansion can fuel a bubble.

The models just described can explain the existence of "excessive" financial cycles in economies with asymmetric information, agency problems, and other distortions in asset markets. Naturally, as argued in Tornell and Westermann (2005), these distortions are more prevalent in emerging markets, suggesting that financial liberalization triggers more lending cycles and asset price bubbles in these economies than in mature financial markets.

As discussed in Section 4, there is also a very rich literature suggesting that financial liberalization triggers reforms and thus reduces distortions in financial markets. For example, Mishkin (2003) and Stultz (1999 and 2005) conclude that when investors are not captive of domestic financial markets, there is pressure for governments to introduce reforms. They also point out that when firms in emerging markets start listing in stock markets in mature economies, they become more subject to accountability and transparency, and corporate governance improves as a result. Overall, as liberalization persists, the message of this literature is that distortions become less prevalent, reducing agency problems and the probability of bubbles in asset prices.

While the theoretical debate about the link between liberalization and financial boom-bust patterns has advanced significantly, as evident from the previous discussion, the empirical evidence lags behind. To test the hypotheses discussed in the theoretical literature, we examine the evidence from stock markets in emerging and mature economies. The models described above have specific predictions on financial cycles and asset price bubbles, thus this is also the

focus of our paper.[9] In what follows, we describe the methodology used to identify financial cycles as well as their characteristics.

## 3.1 IDENTIFICATION AND CHARACTERISTICS OF FINANCIAL CYCLES

There are various techniques to extract fluctuations at business cycle frequencies. The most well known are the Hodrick-Prescott (1997) filter, the Baxter and King (1995) band-pass filter, and the NBER methodology, which is associated with the official chronology of expansions and contractions in the United States. In this paper, we use the NBER methodology, which can be replicated using an algorithm that identifies local maxima subject to constraints on the minimum duration of the cycle. This algorithm was first proposed by Bry and Boschan (1971).[10] The first step in the determination of cycles is the identification of cyclical turning points. The technique looks for clearly defined swings in stock market prices in each country. We work with the same order of duration as business cycles, i.e., we use a two-year window to identify local maxima. We work with this window since financial crises are associated with boom-bust cycles in financial markets of an intermediate duration. The algorithm isolates local minima and maxima in the time series, subject to the constraint that the duration of each cycle

[9] Another important strand of the empirical literature, for example, Grabel (1995), Kassimatis (2002), and Spyrou and Kassimatis (1999), examines the effects of financial liberalization on stock market volatility in developing countries, with mixed conclusions. In the future it would also be important to study the links between liberalization, volatility, and the amplitude of asset price cycles.

[10] Pagan and Sossounov (2003) use a similar method to analyze cycles in the U.S. stock market. An alternative methodology is applied by Maheu and McCurdy (2000) who use a Markov switching model.

cannot be less than 12 months. We do not impose any other restrictions such as minimum amplitude or certain duration of cycles.[11]

Naturally, the cycles we identify would be spurious if stock prices followed random walk processes. We thus use Monte Carlo simulations to test that the random walk does not capture the basic properties of our data on stock prices. The description of the methodology and the tests against the random walk hypothesis are described in the working paper version of this article. All our tests reject the random walk hypothesis at all conventional significance levels.[12]

As it is common in the international finance literature, we look at stock prices and returns from the point of view of investors holding assets in various countries. This is why we examine stock prices in one international currency, constant (2000) U.S. dollars. (Appendix Table II reports the indexes used and their sources.) Figure 3 shows the stock prices (in logs) and also identifies the booms and crashes obtained using the algorithm described above. The shaded areas denote expansions. We identify 222 cycles over time and across countries, with an average duration of 42 months.

Figure 4 shows the characteristics of the typical cycle in Asia, Europe, the G-7, and Latin America. The top panel reports the mean amplitude and duration of booms and crashes in the

[11] The algorithm dates contractions and expansions using each country's stock price series, rather than the de-trended series. Therefore, busts correspond to sequences of absolute declines in stock prices rather than periods of slow growth relative to the trend.

[12] For other evidence against the hypothesis that stock markets follow a random, see among others Fama and French (1988), Frennberg and Hansson (1993), Hatgioannides and Mesomeris (2005), Lo and MacKinlay (1988 and 1999), Lunde and Timmermann (2004), and Poterba and Summers (1988).

four regions, while the bottom panel plots the typical cycle in each region.[13] The horizontal axis in the bottom panel shows the number of months before and after the peak of the cycle. The horizontal axis contains 25 months for expansions and 15 months for contractions. The vertical axis reports the value of the stock index. To obtain the typical cycle, the value of the stock index in each cycle is normalized to 100 at the peak. Each line in this panel represents the average value of the stock index during the 40 months around the peaks of the four regions. Cycles are more pronounced in Latin America. On average, the amplitude of cycles in this region is about twice as large as the amplitude of cycles in the G-7 countries. As expected, the most developed countries, the G-7, have milder stock market cycles, with the Asian and the other European stock market cycles being of intermediate magnitudes.

To examine the effects of financial liberalization on financial cycles, we compare the characteristics of financial cycles in the short and long run following the deregulation of financial markets. Our first approach is in the event study tradition, analyzing the behavior of stock markets in the aftermath of liberalization relative to their functioning in repression times, those years before deregulation occurs. We then report regression results that control for other factors and also examine whether the ordering of the liberalization matters.

## 3.2 EVENT STUDIES

Figure 5 examines the characteristics of financial cycles around the partial liberalization of financial markets, that is, when at least two sectors are partially liberalized. We classify

[13] In all figures and tables, the depth of the contraction is measured as the change between the peak and the following trough, as a percent of the mid value of the peak and trough. Similarly, the height of an expansion is measured using the change between the trough and the following peak, as a percent of the mid value of the trough and the following peak. This measure makes the amplitude of expansions and contractions comparable.

financial cycles in three categories, those that occur during repression times, those that occur in the short run after liberalization, and those that occur in the long run following liberalization. The short run is defined as the period of four years after liberalization. The long run includes the fifth year after liberalization and the years thereafter, conditional on the deregulation not being reversed.[14] The top panel in Figure 5 shows the average amplitude of booms and crashes for all countries in our sample during repression times (the striped bars), in the short run following liberalization (the white bars), and in the long run after liberalization (the gray bars). It also reports the characteristics of cycles separately for emerging and mature markets to account for possible heterogeneity in the evidence. The bottom panel examines whether the differences of amplitudes across regimes are statistically significant.

The evidence for the twenty-eight countries in the sample indicates that the amplitude of booms substantially increases in the immediate aftermath of liberalization (about 25 percent higher than during repression times). But equity markets stabilize in the long run if liberalization persists, with the amplitude of booms about 20 percent smaller than in repression times. Similarly, the amplitude of crashes increases in the immediate aftermath of liberalization (about 13 percent higher than during repression times), but declines to about 80 percent of its size during repression times if liberalization persists in the long run. As shown in the bottom panel, basically all these differences are statistically significant at conventional levels.

The evidence for the twenty-eight countries, however, obscures important differences across emerging and mature markets. The short-run effects of liberalization in emerging markets are very pronounced, with booms and crashes in the immediate aftermath of liberalization

[14] Since the choice of the short-run window is ad-hoc, we also examine the robustness of the results to different definitions of window size. The results for three- and six-year windows are quite similar.

increasing by about 35 percent over their size during repression. Still, if liberalization persists, financial cycles become less pronounced, with booms about 20 percent smaller than during repression times and crashes declining to pre-liberalization levels.[15] On the other hand, the evidence from mature markets indicates that liberalization does not trigger more volatile stock markets in the short run, with booms increasing very little and crashes becoming less pronounced even in the short run. Furthermore, liberalization also generates more stable financial markets in mature economies in the long run too, with crashes averaging only about 70 percent of their size in repression times.

### 3.3 ACCOUNTING FOR DOMESTIC AND EXTERNAL SHOCKS

While the evidence in Figure 5 suggests that financial liberalization influences the size of expansions and contractions in financial markets, stock price fluctuations also reflect changes in other market fundamentals. For example, stock prices respond to expansions and recessions in the domestic economy. They also react to world economic conditions.[16] The omission of these variables may bias our results, especially since the timing of liberalization may also be affected by these factors. In fact, Latin American countries reintroduced controls on domestic interest rates and credit and re-imposed controls on capital flows following the hikes in interest rates in industrial countries in the early 1980s. Also, many emerging markets liberalized their financial markets in times of abundance of international capital flows, as in the early 1990s. Insofar as

[15] The episode of long-run liberalization includes the crashes during the global collapse of stock market in 2000-01. If we exclude those stock market crashes, the amplitude of the downturns in emerging markets declines to about 93 percent of the amplitude of crashes during repression times.

[16] For example, Calvo et al. (1993) argue that decreases in U.S. interest rates trigger large capital flows to emerging markets, which in turn fuel increases in asset prices.

countries react to "bad times" by adopting capital controls and to "good times" by relaxing them, there is a danger that we may ascribe the increase in the size of booms to liberalization and the amplification of crashes to capital controls, when in fact stock prices are just responding to changes in world market conditions.

To account for domestic and external factors, the event study analysis is complemented with regressions that control for growth in domestic and world economic activity and changes in world real interest rates. We estimate the following equation by least squares with heteroskedastic-consistent standard errors,

$$amplitude_i = \boldsymbol{\alpha}' \mathbf{X}_i + \rho_1 d_i^r + \beta_1 d_i^{sr} + \lambda_1 d_i^{lr} + \varepsilon_i, \qquad (1)$$

where $amplitude_i$ is the amplitude of expansion (contraction) $i$; $\mathbf{X}_i$ is a matrix of control variables that includes an external factors index and the change in domestic output during each expansion (contraction), $d_i^r$ is a dummy variable equal to one if the cycle occurs during "repression" times and zero otherwise, $d_i^{sr}$ is a "short-run liberalization" dummy variable equal to one if the cycle occurs in the immediate aftermath of financial liberalization (four-year window) and zero otherwise, $d_i^{lr}$ is a "long-run liberalization" dummy variable equal to one if the cycle occurs after four years have elapsed from the time of financial liberalization and zero otherwise.

In the spirit of the currency crisis empirical literature, we capture world market conditions by using a composite index of world output and interest rates. The index is the weighted average of world output growth and the decline in the world average real interest rate, with the weights on world output and interest rates inversely related to the volatility of the series. Since world output enters with a positive sign and the interest rate with a negative sign, an increase in this index reflects better global economic conditions and is expected to fuel larger

booms and smaller crashes. The world average real interest rate is the average of the U.S. federal funds real interest rate, and Japan's and the United Kingdom's real money market rates. World output is captured by the evolution of industrial production in the G-3 countries. Finally, domestic output is captured by the index of industrial production in the domestic economy. All data come from the International Financial Statistics published by the International Monetary Fund.

Table III shows the estimation results. As in Figure 5, the table examines the effects of overall partial financial liberalization (when at least two sectors have been partially liberalized). As expected, an improvement in world market conditions leads to larger booms and smaller crashes. For example, a one-standard deviation increase in the external factors index results in a 10 (11) percentage point increase in the average amplitude of stock market expansions (crashes) across all countries in the sample.[17] Similarly, booms and crashes in stock markets are also related to upturns and recessions in the domestic economy. Even after accounting for these other determinants of fluctuations in stock prices, financial liberalization still matters. Financial liberalization is followed by larger cycles in the short run, while markets stabilize in the long run. For example, in the immediate aftermath of liberalization, booms increase by about 35 percent in emerging markets and by 20 percent in mature markets relative to repression times. Similarly, crashes in emerging markets increase by 30 percent in the immediate aftermath of liberalization vis-à-vis repression times.

Note that the results in Table III suggest two different patterns in the aftermath of liberalization. While larger booms follow liberalization in both emerging and mature markets, it

[17] This shock is comparable to a three percentage point decrease of the world average real interest rate or a nine percent growth in the world output during the life of the particular phase of the stock market cycle.

is only in emerging markets that crashes are more severe following liberalization. The average short-run experience in emerging markets seems to support the evidence from the crisis literature that concludes that liberalization is associated with excessive financial booms and crashes. Liberalization episodes do not seem to bring (on average) this short-run pain to mature markets. In those economies, larger booms are not followed by larger crashes, suggesting that larger booms may just reflect the reduction in the cost of capital once deregulation takes place, as the neoclassical theory indicates.[18] Still, in the long run, financial liberalization is related to more stable financial markets in both emerging and mature market economies.

## 3.4 ORDERING OF LIBERALIZATION

In this section, we examine whether the order of deregulation matters. To do so, we estimate the following regression,

$$amplitude_i = \boldsymbol{\alpha}' \mathbf{X}_i + \rho_1 d_i^r + \beta_1 d_i^{sr} + \beta_2 d_i^{CA} + \beta_3 d_i^{SM} + \lambda_1 d_i^{lr,2} + \varepsilon_i . \qquad (2)$$

The variables $d_i^{CA}$ and $d_i^{SM}$ capture the possible differential effects on booms and crashes from opening respectively the capital account or the stock market first. These dummy variables are equal to one if the cycle occurs when that particular sector is liberalized first, and zero otherwise. Thus, the average amplitude of booms (crashes) in the short run following liberalization is captured by $\beta_1$ if liberalization starts with the deregulation of the domestic banking industry, by $\beta_1 + \beta_2$ if it starts with the opening of the capital account, and by $\beta_1 + \beta_3$ if it starts with the deregulation of the stock market.

[18] As always, averages may hide exceptions. Denmark, Finland, Norway, and Sweden suffered financial collapses and banking crises in the early 1990s following liberalization.

Table IV shows that in general the ordering of liberalization does not matter. Opening the capital account or the stock market first does not have a different effect than opening the domestic financial sector first. There is only one exception: The amplitude of crashes almost doubles in emerging markets (compared to their size during repression) if the capital account is opened up first. This finding provides some support to the view that the liberalization of the capital account may trigger risky assets to be priced further away from their fundamental value, perhaps due to problems in international capital markets. This result might provide some mild support to the usual claim that the capital account should be opened last.

## 4. The Sequencing of Financial Liberalization and Institutional Reform

The strong links between financial liberalization and crises in emerging markets have prompted an intense debate among academics and practitioners about the benefits of financial deregulation and its optimal sequencing. For example, Rodrik (1998) and Stiglitz (2000) claim that unfettered capital flows are disruptive to financial stability and growth, questioning the benefits of financial globalization and supporting calls for capital controls. Overall, there is consensus that at the core of the link between crises and liberalization is the lack of good public and corporate governance and the existence of weak government policies and institutions. The argument goes then to indicate that governments should sequence reforms, first improving government institutions and better regulating domestic financial institutions and only then deregulating the financial industry and opening the capital account. In fact, Calvo (1998) and Fischer (1998) argue that weaknesses in the domestic financial sector before financial liberalization are important in determining the risks associated with financial liberalization. Prasad et al. (2003) add empirical support to the idea that good institutions, governance, and

macroeconomic fundamentals prior to financial liberalization are crucial to reaping its potential benefits.

Still, the argument that liberalization should be preceded by institutional reforms may be irrelevant if the timing is such that reforms never predate liberalization, with institutional improvements happening mostly as a result of financial deregulation. In other words, governments may have few incentives to promote reforms in countries with repressed financial sectors. For example, Rajan and Zingales (2003a, b) argue that well-established firms (and therefore public officials) may in general oppose reforms that promote financial development because it breeds competition. These firms can even be hurt by financial development and liberalization as they imply better disclosure rules and enforcement (reducing the importance of these firms' collateral and reputation) and permit newcomers to enter and compete away profits. However, opposition to reforms may be weaker in more open economies with abundant trade and cross-border flows. In this case, free access to international capital markets allows the largest and best-known domestic firms to tap foreign markets for funds, with their support for the policies that favor financial development and liberalization becoming stronger.

Once financial liberalization occurs, it can have a positive impact on domestic institutions. For example, Alessandria and Qian (2005) develop a general equilibrium model that endogenizes the efficiency of financial intermediaries after financial liberalization and show that removing restrictions on international capital flows may change the efficiency of intermediaries. Similarly, Gourinchas and Jeanne (2005) present a model in which international capital mobility can enhance the incentives to reform in two ways: (i) capital inflows increase the benefits of reform by expanding the domestic capital base and (ii) the threat of capital flight may dissuade the domestic government from deviating from good policies. Also, Stulz (2005) shows that

international financial integration can improve the functioning of the domestic financial sector by alleviating the "twin agency problems," that is the incentive of governments and corporate insiders to expropriate outside investors.

To shed some new light on this debate, we compare the timing of financial liberalization and institutional reforms.[19] To do so, we collect data on the quality of institutions as well as on the laws governing the proper functioning of financial systems. The information on the quality of institutions is captured by the index of law and order. This index is published in the International Country Risk Guide (ICRG). The law sub-index assesses the strength and impartiality of the legal system, while the order sub-index assesses the popular observance of the law. Each index can take values from one to three, with lower scores for less tradition for law and order. To better assess the functioning of the financial system, we use information on the existence and enforcement of insider trading laws constructed by Bhattacharya and Daouk (2002). Appendix Table III reports the time of improvement in the index of law and order as well as the time in which the insider trading law is passed and the time in which insider trading starts to be prosecuted. We define an improvement in the quality of government institutions when the index of law and order increases by one unit and this change is at least maintained for two years.

The top panel in Table V examines the sequencing of liberalization and reform in our sample of twenty-eight countries. It shows the probabilities that financial liberalization occurs conditional on reforms having already been implemented. In particular, we look at whether reforms to institutions occur prior to the *partial* or *full* liberalization of the financial sector. If governments improve the quality of institutions prior to start deregulating the financial sector,

[19] Chinn and Ito (2005) and Tornell et al. (2003) study the relation between capital account liberalization and trade liberalization and find that the latter precedes the former.

one would expect the probability of *partial* liberalization conditional on improvements in institutions to be close to one. In contrast, if liberalization triggers reforms, those probabilities would be close to zero. In this case, we would also expect the probabilities of *full* liberalization conditional on reforms to institutions to be close to one since *full* liberalization on average occurs after five and a half years following the start of financial deregulation.

Table V suggests that the dynamics between reforms and financial liberalization in emerging and mature economies differ. In the case of emerging markets, reforms to institutions occur mostly after financial liberalization starts. Institutions that protect property rights, as captured by the index of law and order, only improve in 18 percent of the cases prior to the partial liberalization of financial markets. Similarly, institutions that facilitate contracting between citizens, as captured by insider trading prosecution laws, seem to improve also after financial liberalization starts. For example, while in 62 percent of the cases laws prosecuting insider trading exist prior to the start of financial liberalization, insider trading starts to be prosecuted in only 11 percent of the cases. Interestingly, both the institutions that protect property rights and those that regulate contracting improve substantially following the partial liberalization of financial markets. By the time the financial sector becomes fully liberalized (on average about five and a half years from the beginning of the deregulation episode), law and order have improved in 64 percent of the cases and insider trading prosecution is enforced in 44 percent of the cases. This evidence casts doubts on the notion that governments in emerging markets tend to implement institutional reforms before they start deregulating the financial sector. On the contrary, the evidence suggests that liberalization fuels institutional reforms, as argued by Mishkin (2003) and Stulz (1999 and 2005).

The dynamics between reforms and financial liberalization is different in mature economies. By the time that financial liberalization starts, institutions that protect property rights are already in place in 44 percent of the cases. In contrast, reforms that regulate contracting between citizens are not in place when liberalization begins. In only 17 percent of the cases is prosecution of insider trading implemented prior to the partial liberalization of the financial sector. In statistical terms, financial liberalization does not seem to lead to further improvements in institutions in those countries still lacking good property rights protection or prosecution of insider trading.

These varied intrinsic dynamics between institutional reform and financial liberalization in developed and developing countries may be the key to explaining our findings on financial cycles following financial liberalization. As financial liberalization predates improvements in institutions in emerging markets, it may trigger excessive booms and busts in financial markets (in the short run) due to a variety of distortions that pervade these markets. But liberalization triggers reforms, with capital markets becoming more stable in the long run. In contrast, distortions in financial markets in developed economies may be less pervasive at the time of liberalization because institutional reforms precede deregulation. With more efficient financial markets, liberalization fuels increases in productivity and in the value of firms, but not financial collapses.[20]

To capture the effects of changes in institutions on financial booms and busts, we estimate the following regression,

[20] Aside from institutional improvements, liberalization could also increase liquidity, which in turn stabilizes stock markets. However, the effects of liberalization (and more generally international financial integration) on liquidity are ambiguous. Liberalization might as well reduce domestic stock market liquidity, exacerbating cycles (Levine and Schmukler, 2006).

$$amplitude_i = \boldsymbol{\alpha}'\mathbf{X}_i + \rho_1 d_i^r + \beta_1 d_i^{sr} + \lambda_1 d_i^{lr} + \tau_1 d_i^{L\&O} + \tau_2 d_i^{ITA} + \tau_2 d_i^{ITE} + \varepsilon_i . \qquad (3)$$

This regression is the same as the one in Equation (1) but also evaluates the possible effects of changes in government institutions. $d_i^{L\&O}$ is a dummy variable equal to one if the boom (crash) occurs when the "law and order" index has improved or is at its highest level and zero otherwise, $d_i^{ITA}$ is a dummy variable equal to one if the boom (crash) occurs following the approval of the "law prosecuting insider trading" and zero otherwise, $d_i^{ITE}$ is a dummy variable equal to one if the boom (crash) occurs when "insider trading prosecution is enforced" and zero otherwise.

The results reported in the bottom panel in Table V indicate that improvements in law and order are indeed associated with more stable financial markets, with the amplitude of booms and crashes declining about 17 and 5 percentage points (respectively) following government reforms.[21] This result suggests one possible explanation to why mature markets, with better government institutions, do not experience the larger crashes observed in emerging markets in the aftermath of liberalization. In contrast, insider trading laws (existence or prosecution) do not seem to have any impact on the amplitude of financial cycles.

## 5. Conclusions

As discussed in the introduction, the views on financial liberalization are quite conflictive, with many arguing that liberalization triggers financial crises and bubbles while others claiming that it allows markets to function properly and capital to move to its best destination. Previous empirical evidence on these effects is not robust. This paper reconciles these apparently contradictory views and empirical findings by studying the time-varying relationship between financial liberalization, government institutions, and financial markets. We

find that financial liberalization in emerging markets only fuels financial instability in the short run while markets stabilize in the long run. At the core of this time-varying relationship is the interaction between financial deregulation and the reform of government institutions. We find that institutions tend to improve following the deregulation of financial markets, not before. Since deregulation takes place in economies with weak institutions, agency problems fuel risky behavior and crises following liberalization: Short-run pain. As liberalization persists and institutions improve, markets start to stabilize: Long-run gain. Another important contribution of the paper is a new chronology of financial liberalization for emerging and mature markets, with indexes capturing the deregulation of the domestic financial sector, opening of the capital account, and opening of stock markets. In contrast to previous chronologies, these indexes clearly identify the intensity of financial liberalization and capture reversals in liberalization attempts. This comprehensive chronology is available to other researchers and might help to further our understanding of the real and financial effects of market deregulation.

While we have made progress in our understanding of financial liberalization, much more theoretical and empirical work is needed. First, although we have constructed a chronology of financial liberalization/repression for twenty-eight countries up to 2005, further evidence is needed for a much larger number of countries. Second, by looking at the evidence starting in the 1970s, we have found that liberalization proceeds smoothly in mature economies but reverses on average in developing economies. But by analyzing evidence starting in the early 1900s, Rajan and Zingales (2003a) find that the development of the financial sector did not improve monotonically over time in the case of mature economies. This raises the question of why the dynamics of financial development and reforms in mature markets seems to have changed. Is it

[21] Still, the effects on financial crashes are more imprecisely estimated than those on financial booms.

due to the development of certain basic institutions? If so, how far are emerging markets from developing them? Third, we have established a time-varying link between financial liberalization and financial markets, but we have left unanswered whether there is also a time-varying link between financial liberalization, economic fluctuations, and growth. Further research should examine whether financial liberalization triggers more pronounced real cycles and crises in the short run while promoting higher growth in the long run. Recent studies suggest that different short- and long-run effects exist when analyzing the relation between financial openness and development and growth (see Fratzscher and Bussiere, 2006 and Loayza and Ranciere, 2004). Last, but not least, the relation between financial liberalization and reforms leaves unanswered the question of whether countries can deregulate financial systems without becoming vulnerable to crises. Since the costs of crises have been quite large, this last question deserves significant attention.

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## Table I

## Periods of Financial Repression (R), Partial Liberalization (PL), and Full Liberalization (FL) - 1973-2005

| Country | Capital Account | | Domestic Financial Sector | | Stock Market | | Liberalization Index | |
|---|---|---|---|---|---|---|---|---|
| **Asia** | | | | | | | | |
| Hong Kong | Jan 73 - | FL | Aug 94 - Jun 01 | PL | Jan 73 - | FL | Jan 73 - Jul 94 | PL |
| | | | Jul 01 - | FL | | | Aug 94 - | FL |
| Indonesia | Jan 78 - Dec 87 | PL | Jan 78 - Dec 82 | PL | Dec 88 - Jul 89 | PL | Jan 83 - Nov 88 | PL |
| | Jan 88 - Jan 91 | FL | Jan 83 - | FL | Aug 89 - | FL | Dec 88 - Jan 91 | FL |
| | Feb 91 - | R | | | | | Feb 91 - | R |
| Korea | Jan 93 - Dec 95 | PL | Jan 88 - Dec 94 | PL | Jan 91 - Apr 98 | PL | Jan 93 - Dec 95 | PL |
| | Jan 96 - | FL | Jan 95 - | FL | May 98 - | FL | Jan 96 - | FL |
| Malaysia | Jun 79 - Nov 93 | PL | Oct 78 - Aug 85 | PL | Jul 73 - Dec 74 | FL | Jun 79 - Jan 91 | PL |
| | Dec 93 - Aug 94 | R | Sep 85 - Jan 91 | R | Jan 75 - Dec 83 | PL | Feb 91 - Nov 93 | FL |
| | Sep 94 - Jul 98 | FL | Feb 91 - Mar 04 | PL | Jan 84 - Nov 97 | FL | Dec 93 - Aug 94 | PL |
| | Aug 98 - Mar 04 | R | Apr 04 - | FL | Dec 97 - Jan 99 | R | Sep 94 - Nov 97 | FL |
| | Apr 04 - | PL | | | Feb 99 - Apr 01 | PL | Dec 97 - Jul 98 | PL |
| | | | | | May 01 - | FL | Aug 98 - Jan 99 | R |
| | | | | | | | Feb 99 - Mar 04 | PL |
| | | | | | | | Apr 04 - | FL |
| Philippines | Jan 76 - Nov 82 | PL | Jul 81 - Nov 82 | PL | Mar 86 - Dec 93 | PL | Mar 86 - Dec 93 | PL |
| | Dec 82 - Dec 93 | R | Dec 82 - | FL | Jan 94 - | FL | Jan 94 - | FL |
| | Jan 94 - | PL | | | | | | |
| Taiwan | Jan 87 - Dec 96 | PL | Sep 84 - Jun 89 | PL | Jan 87 - Mar 98 | PL | Jan 87 - Dec 96 | PL |
| | Jan 97 - | FL | Jul 89 - | FL | Apr 98 - | FL | Jan 97 - | FL |
| Thailand | Jan 79 - Nov 81 | PL | Jun 89 - May 92 | PL | Jan 88 - Dec 89 | PL | Jan 90 - Dec 91 | PL |
| | Dec 81 - Dec 91 | R | Jun 92 - | FL | Jan 90 - | FL | Jan 92 - Mar 97 | FL |
| | Jan 92 - Jul 95 | FL | | | | | Apr 97 - Dec 97 | R |
| | Aug 95 - Mar 97 | PL | | | | | Jan 98 - | FL |
| | Apr 97 - Dec 97 | R | | | | | | |
| | Jan 98 - | FL | | | | | | |
| **Europe** | | | | | | | | |
| Denmark | Oct 88 - | FL | Jan 73 - Dec 74 | PL | Jan 73 - | FL | Jan 73 - Nov 75 | PL |
| | | | Jan 75 - Feb 79 | R | | | Dec 75 - Feb 79 | R |
| | | | Mar 79 - Dec 80 | PL | | | Mar 79 - Sep 88 | PL |
| | | | Jan 81 - | FL | | | Oct 88 - | FL |
| Finland | Jan 87 - May 89 | PL | Jan 86 - Dec 89 | PL | Jan 73 - Dec 89 | PL | Jan 87 - Dec 89 | PL |
| | Jun 89 - | FL | Jan 90 - | FL | Jan 90 - | FL | Jan 90 - | FL |
| Ireland | Jan 79 - Dec 91 | PL | May 85 - Jan 86 | PL | Jan 73 - Dec 91 | PL | May 85 - Dec 91 | PL |
| | Jan 92 - | FL | Feb 86 - | FL | Jan 92 - | FL | Jan 92 - | FL |
| Norway | Jan 80 - Nov 81 | PL | Jan 79 - Nov 79 | FL | Jan 84 - Dec 88 | PL | Sep 85 - Dec 87 | PL |
| | Dec 81 - Dec 84 | R | Dec 79 - Aug 85 | R | Jan 89 - | FL | Jan 88 - | FL |
| | Jan 85 - Dec 87 | PL | Sep 85 - Dec 87 | PL | | | | |
| | Jan 88 - | FL | Jan 88 - | FL | | | | |
| Portugal | Sep 89 - Jul 92 | PL | Jan 84 - Feb 90 | PL | Jan 73 - Nov 75 | FL | Jan 86 - Feb 90 | PL |
| | Aug 92 - | FL | Mar 90 - | FL | Dec 75 - Dec 85 | R | Mar 90 - | FL |
| | | | | | Jan 86 - | FL | | |
| Spain | Jan 75 - Dec 79 | PL | Jan 74 - Dec 80 | PL | Jan 73 - | FL | Jan 74 - Dec 79 | PL |
| | Jan 80 - May 88 | FL | Jan 81 - | FL | | | Jan 80 - | FL |
| | Jun 88 - Nov 92 | PL | | | | | | |
| | Dec 92 - | FL | | | | | | |
| Sweden | Jan 84 - Dec 88 | PL | Jan 78 - Dec 84 | PL | Jan 73 - Dec 79 | PL | Jan 80 - Dec 84 | PL |
| | Jan 89 - | FL | Jan 85 - | FL | Jan 80 - | FL | Jan 85 - | FL |
| **G-7** | | | | | | | | |
| Canada | Jan 73 - Feb 75 | PL | Jan 73 - | FL | Jan 73 - | FL | Jan 73 - | FL |
| | Mar 75 - | FL | | | | | | |
| France | Jun 85 - Dec 89 | PL | Jan 85 - | FL | Jan 73 - | FL | Jan 85 - | FL |
| | Jan 90 - | FL | | | | | | |
| Germany | Jan 73 - Feb 81 | PL | Jan 73 - | FL | Jan 73 - | FL | Jan 73 - | FL |
| | Mar 81 - | FL | | | | | | |

| Country | Capital Account | | Domestic Financial Sector | | Stock Market | | Liberalization Index | |
|---|---|---|---|---|---|---|---|---|
| **G-7 (cont.)** | | | | | | | | |
| Italy | May 87 - Dec 91 | PL | Jan 74 - Nov 74 | FL | Jan 73 - | FL | Jan 74 - Nov 74 | PL |
| | Jan 92 - | FL | Dec 74 - Dec 80 | R | | | Dec 74 - Dec 80 | R |
| | | | Jan 81 - | FL | | | Jan 81 - Apr 87 | PL |
| | | | | | | | May 87 - | FL |
| Japan | Jan 79 - Jun 80 | PL | Jan 79 - Nov 91 | PL | Jan 85 - | FL | Jul 80 - Dec 84 | PL |
| | Jul 80 - | FL | Dec 91 - | FL | | | Jan 85 - | FL |
| United Kingdom | Oct 73 - Sep 79 | PL | Jan 81 - | FL | Jan 73 - | FL | Oct 73 - Dec 80 | PL |
| | Oct 79 - | FL | | | | | Jan 81 - | FL |
| United States | Jul 73 - | FL | Jan 73 - Dec 81 | PL | Jan 73 - | FL | Jan 73 - Jun 73 | PL |
| | | | Jan 82 - | FL | | | Jul 73 - | FL |
| **Latin America** | | | | | | | | |
| Argentina | Apr 76 - Nov 78 | PL | Jan 77 - May 82 | FL | Jan 77 - Feb 82 | PL | Jan 77 - Nov 78 | PL |
| | Dec 78 - Feb 82 | FL | Jun 82 - Sep 87 | R | Mar 82 - Dec 88 | R | Dec 78 - Feb 82 | FL |
| | Mar 82 - Nov 89 | R | Oct 87 - Oct 01 | FL | Jan 89 - Oct 01 | FL | Mar 82 - Dec 88 | R |
| | Dec 89 - Oct 01 | FL | Nov 01 - Nov 02 | R | Nov 01 - Jun 04 | R | Jan 89 - Nov 89 | PL |
| | Nov 01 - Jan 02 | R | Dec 02 - | FL | Jul 04 - | FL | Dec 89 - Oct 01 | FL |
| | Feb 02 - Mar 03 | PL | | | | | Nov 01 - Nov 02 | R |
| | Apr 03 - May 05 | FL | | | | | Dec 02 - Jun 04 | PL |
| | Jun 05 - | PL | | | | | Jul 04 - | FL |
| Brazil | Jan 90 - Nov 93 | PL | Jan 76 - Nov 78 | FL | Jan 73 - May 91 | PL | Jan 76 - Dec 78 | PL |
| | Dec 93 - Feb 95 | R | Dec 78 - Dec 87 | R | Jun 91 - | FL | Jan 79 - Dec 88 | R |
| | Mar 95 - Dec 99 | PL | Jan 88 - Dec 88 | PL | | | Jan 89 - May 91 | PL |
| | Jan 00 - | FL | Jan 89 - | FL | | | Jun 91 - Nov 93 | FL |
| | | | | | | | Dec 93 - Feb 95 | R |
| | | | | | | | Mar 95 - | FL |
| Chile | Jun 79 - Nov 82 | PL | Jan 74 - Apr 75 | PL | Jan 87 - Dec 91 | PL | Jun 79 - Oct 82 | PL |
| | Dec 82 - Mar 90 | R | May 75 - Oct 82 | FL | Jan 92 - | FL | Nov 82 - Dec 86 | R |
| | Apr 90 - May 91 | FL | Nov 82 - Dec 83 | R | | | Jan 87 - Mar 90 | PL |
| | Jun 91 - Aug 98 | PL | Jan 84 - Dec 84 | PL | | | Apr 90 - Apr 91 | FL |
| | Sep 98 - | FL | Jan 85 - | FL | | | May 91 - Dec 91 | R |
| | | | | | | | Jan 92 - | FL |
| Colombia | Jan 91 - Aug 98 | PL | Aug 74 - Aug 80 | PL | Jan 91 - | FL | Jan 91 - Aug 98 | PL |
| | Sep 98 - | FL | Sep 80 - Nov 85 | FL | | | Sep 98 - | FL |
| | | | Dec 85 - Jun 86 | R | | | | |
| | | | Jul 86 - | FL | | | | |
| Mexico | Jan 73 - Jun 82 | FL | Jan 74 - Jul 82 | PL | Jan 89 - Dec 90 | PL | Jan 74 - Jun 82 | PL |
| | Jul 82 - Oct 91 | R | Aug 82 - Sep 88 | R | Jan 91 - | FL | Jul 82 - Mar 89 | R |
| | Nov 91 - | FL | Oct 88 - Mar 89 | PL | | | Apr 89 - Oct 91 | PL |
| | | | Apr 89 - | FL | | | Nov 91 - | FL |
| Peru | Jan 73 - Nov 86 | PL | Jan 73 - Nov 81 | PL | Jan 92 - | FL | Jan 91 - Dec 91 | PL |
| | Dec 86 - Dec 90 | R | Dec 81 - Dec 90 | R | | | Jan 92 - | FL |
| | Jan 91 - | FL | Jan 91 - | FL | | | | |
| Venezuela | Jan 73 - Dec 82 | FL | Aug 81 - Dec 83 | FL | Jan 77 - Nov 87 | FL | Jan 77 - Jul 81 | PL |
| | Jan 83 - Feb 89 | R | Jan 84 - Dec 88 | R | Dec 87 - Dec 89 | R | Aug 81 - Dec 82 | FL |
| | Mar 89 - Nov 93 | FL | Jan 89 - Jul 94 | FL | Jan 90 - May 93 | FL | Jan 83 - Dec 83 | PL |
| | Dec 93 - Mar 96 | R | Aug 94 - Mar 96 | R | Jun 93 - May 95 | R | Jan 84 - Feb 89 | R |
| | Apr 96 - Jan 03 | FL | Apr 96 - Jan 03 | FL | Jun 95 - Jan 03 | FL | Mar 89 - Dec 89 | PL |
| | Feb 03 - | R | Feb 03 - Apr 05 | PL | Feb 03 - | R | Jan 90 - May 93 | FL |
| | | | May 05 - | R | | | Jun 93 - Nov 93 | PL |
| | | | | | | | Dec 93 - Mar 96 | R |
| | | | | | | | Apr 96 - Jan 03 | FL |
| | | | | | | | Feb 03 - | R |

This table reports the dates of repression (R) and partial (PL) and full (FL) liberalization of financial markets. The first three columns of each panel provide information by sector: capital account, domestic financial sector, and the stock market. The last column provides information on the composite index of financial liberalization. The dates are based on the criteria displayed in Appendix Table 1. A country is considered to be fully liberalized when at least two sectors are fully liberalized and the third one is partially liberalized. A country is considered to be partially liberalized if at least two sectors are partially liberalized. Otherwise, the country is considered to be financially repressed. If there is no information about the month of liberalization, we use January (December) if the corresponding report indicates that liberalization is implemented at the beginning (end) of the year. "-" followed by a blank means that it covers the period until December 2005. Jan 73 means that the sector is fully or partially liberalized at that time, not neccessarily implying that any significant measures were taken on that date.

## Table II
## The Process of Liberalization

### Ordering of Liberalization

| Regions | Proportion of Episodes in Which the Following Sector Partially Liberalized First (in percent) | | |
|---|---|---|---|
| | Capital Account | Domestic Financial Sector | Stock Market |
| **Asia** | 33 | 33 | 33 |
| **Europe** | 0 | 25 | 75 |
| **G-7** | 0 | 0 | 100 |
| **Latin America** | 31 | 54 | 15 |

| Regions | Proportion of Episodes in Which the Following Sector Fully Liberalized First (in percent) | | |
|---|---|---|---|
| | Capital Account | Domestic Financial Sector | Stock Market |
| **Asia** | 0 | 50 | 50 |
| **Europe** | 13 | 25 | 63 |
| **G-7** | 20 | 0 | 80 |
| **Latin America** | 14 | 79 | 7 |

### Duration of the Liberalization Reform

| Regions | Number of Months between the Opening of the First Sector and the Third Sector |
|---|---|
| **Asia** | 155 |
| **Europe** | 55 |
| **G-7** | 61 |
| **Latin America** | 62 |
| **All Regions** | 82 |

| First Sector to Open | Number of Months between the Opening of the First Sector and the Third Sector |
|---|---|
| **Capital Account** | 107 |
| **Domestic Financial Sector** | 68 |
| **Stock Market** | 47 |

The bottom panel reports the duration of the liberalization reform measured as the average number of months between the partial opening of the first sector and the partial opening of the third sector.

## Table III
## Effects of Financial Liberalization on Booms and Crashes

| Independent Variables | Amplitude | | | | | |
|---|---|---|---|---|---|---|
| | All Markets | | Emerging Markets | | Mature Markets | |
| | Booms | Crashes | Booms | Crashes | Booms | Crashes |
| External Factors Index | 8.10 | -5.19 | 13.36 | -8.68 | 6.78 | -2.56 |
| | [2.10] *** | [2.33] ** | [3.38] *** | [4.85] * | [2.41] *** | [2.04] |
| Domestic Output Growth | 0.72 | -0.01 | 0.51 | -0.24 | 0.68 | 0.08 |
| | [0.18] *** | [0.28] | [0.26] * | [0.43] | [0.24] *** | [0.29] |
| Repression | 68.39 | 62.08 | 81.34 | 70.11 | 49.01 | 54.56 |
| | [5.87] *** | [6.73] *** | [7.48] *** | [9.52] *** | [8.43] *** | [7.72] *** |
| Short-Run Liberalization | 87.69 | 74.59 | 108.72 | 92.94 | 57.75 | 43.64 |
| | [6.88] *** | [7.51] *** | [9.36] *** | [11.30] *** | [9.56] *** | [8.06] *** |
| Long-Run Liberalization | 52.04 | 52.55 | 55.53 | 69.24 | 50.68 | 41.61 |
| | [3.52] *** | [3.82] *** | [5.94] *** | [7.32] *** | [3.91] *** | [3.29] *** |
| Observations | 185 | 177 | 85 | 83 | 100 | 94 |
| R-squared | 0.83 | 0.72 | 0.88 | 0.78 | 0.82 | 0.76 |

| Hypothesis Tests | P-Value | | | | | |
|---|---|---|---|---|---|---|
| | All Markets | | Emerging Markets | | Mature Markets | |
| | Booms | Crashes | Booms | Crashes | Booms | Crashes |
| Repression < Short-Run Liberalization | 0.01 | 0.10 | 0.01 | 0.05 | 0.24 | 0.84 |
| Repression > Long-Run Liberalization | 0.01 | 0.10 | 0.00 | 0.47 | 0.58 | 0.06 |
| Short-Run Liberalization > Long-Run Liberalization | 0.00 | 0.00 | 0.00 | 0.03 | 0.24 | 0.41 |

The top panel shows regressions of the amplitude of booms (crashes) in stock markets on changes in the external factors index, domestic output growth, and three indicator variables identifying "repression" episodes, "short-run liberalization" episodes, and "long-run liberalization" episodes. A country is considered to be (partially) liberalized if at least two sectors are partially liberalized. Otherwise, the country is considered to be financially repressed. The external factors index is the weighted average of world output growth and the decline in the world average real interest rate. The weights are inversely related to the volatility of the series. A positive value of the index indicates more favorable global economic conditions. Growth rates of the output variables and differences in real interest rates are calculated using the values at the beginning and at the end of the corresponding boom or crash. "Repression" is equal to one if the particular phase of the cycle occurs during repression times, and zero otherwise. "Short-run liberalization" is equal to one if the particular phase of the cycle occurs in the immediate aftermath of partial financial liberalization (four-year window), and zero otherwise. "Long-run liberalization" is equal to one if the particular phase of the cycle occurs after four years have elapsed from the time of the partial financial liberalization, and zero otherwise. The bottom panel reports hypothesis tests on the regression coefficients of the indicators of financial repression/liberalization. For example, the top left cell indicates that for all the countries in our sample, we reject the null hypothesis that the boom amplitudes during repression and short-run liberalization are equal, in favor of the one-side alternative hypothesis of the amplitude of booms being larger during the short run following liberalization than during repression, at a one-percent confidence level. Standard errors are in brackets. *, **, *** mean significance at 10, 5, and 1 percent, respectively.

## Table IV
## Effects of Financial Liberalization on Booms and Crashes
### The Ordering of Liberalization

| Independent Variables | Amplitude | | | | | |
|---|---|---|---|---|---|---|
| | All Markets | | Emerging Markets | | Mature Markets | |
| | Booms | Crashes | Booms | Crashes | Booms | Crashes |
| External Factors Index | 8.55 | -4.83 | 12.17 | -2.62 | 6.91 | -2.82 |
| | [2.07] *** | [2.47] * | [3.27] *** | [5.73] | [2.44] *** | [2.12] |
| Domestic Output Growth | 0.79 | -0.04 | 0.71 | -0.58 | 0.70 | 0.08 |
| | [0.18] *** | [0.29] | [0.25] *** | [0.46] | [0.23] *** | [0.30] |
| Repression | 60.24 | 65.45 | 71.45 | 79.40 | 44.72 | 53.31 |
| | [6.92] *** | [8.19] *** | [9.03] *** | [11.64] *** | [9.79] *** | [9.14] *** |
| Short-Run Liberalization | 88.12 | 67.96 | 106.20 | 81.44 | 60.06 | 55.40 |
| | [6.04] *** | [7.22] *** | [7.95] *** | [10.40] *** | [8.70] *** | [8.57] *** |
| First Sector to Open: Capital Account | -9.11 | 14.05 | -25.11 | 71.02 | 12.60 | -13.89 |
| | [15.71] | [16.87] | [25.24] | [32.60] ** | [18.30] | [15.93] |
| First Sector to Open: Stock Market | -26.95 | -3.60 | -32.53 | 0.92 | -6.31 | -21.19 |
| | [15.26] * | [17.94] | [19.79] | [26.20] | [22.47] | [20.83] |
| Long-Run Liberalization | 51.37 | 53.31 | 56.59 | 73.00 | 48.46 | 41.10 |
| | [3.53] *** | [4.02] *** | [5.82] *** | [7.55] *** | [4.01] *** | [3.53] *** |
| Observations | 179 | 172 | 84 | 82 | 95 | 90 |
| R-squared | 0.84 | 0.72 | 0.88 | 0.78 | 0.82 | 0.76 |

| Hypothesis Tests | P-Value | | | | | |
|---|---|---|---|---|---|---|
| | All Markets | | Emerging Markets | | Mature Markets | |
| | Booms | Crashes | Booms | Crashes | Booms | Crashes |
| Repression < Short-Run Liberalization | 0.00 | 0.41 | 0.00 | 0.45 | 0.12 | 0.43 |
| First Sector to Open: Capital Account | 0.13 | 0.17 | 0.35 | 0.02 | 0.08 | 0.77 |
| First Sector to Open: Stock Market | 0.48 | 0.52 | 0.46 | 0.46 | 0.35 | 0.82 |
| Repression > Long-Run Liberalization | 0.11 | 0.08 | 0.07 | 0.32 | 0.64 | 0.10 |
| Short-Run Liberalization > Long-Run Liberalization | 0.00 | 0.03 | 0.00 | 0.24 | 0.11 | 0.06 |
| First Sector to Open: Capital Account | 0.04 | 0.04 | 0.16 | 0.01 | 0.09 | 0.49 |
| First Sector to Open: Stock Market | 0.26 | 0.28 | 0.22 | 0.38 | 0.40 | 0.64 |

This table shows whether the short-run effects of liberalization depend on which sector is deregulated first. The top panel shows regressions of the amplitude of booms (crashes) in stock markets on changes in the external factors index, domestic output growth, and five indicator variables identifying "repression" episodes, "short-run liberalization" episodes, episodes in which the capital account is the first sector to open, episodes in which the stock market is the first sector to open, and "long-run liberalization" episodes. The external factors index is the weighted average of world output growth and the decline in the world average real interest rate. The weights are inversely related to the volatility of the series. A positive value of the index indicates more favorable global economic conditions. Growth rates of the output variables and differences in real interest rates are calculated using the values at the beginning and at the end of the corresponding boom or crash. "Repression" is equal to one if the particular phase of a cycle occurs during repression times, and zero otherwise. "Short-run liberalization" is equal to one if the particular phase of a cycle occurs in the immediate aftermath of partial financial liberalization (four-year window), and zero otherwise. "Long-run liberalization" is equal to one if the particular phase of the cycle occurs after four years have elapsed from the time of partial financial liberalization, and zero otherwise. "First sector to open: capital account (stock market)" is equal to one if the first sector to open is the capital account (stock market), and zero otherwise. The coefficient on short-run liberalization captures the average amplitude of booms and crashes in the short-run following liberalization if the banking sector is deregulated first. To estimate the effect on the amplitude of opening the capital account (stock market) first, the coefficients for "Short-run liberalization" and "First sector to open: capital account (stock market)" should be added. The bottom panel reports hypothesis tests on the regression coefficients of the indicators of financial repression/liberalization. "Short-run liberalization (first sector to open: capital account/stock market)" corresponds to the test of the null hypothesis that opening first the domestic financial sector (capital account/stock market) does not trigger larger booms and crashes relative to repression times or long-run liberalization, alternatively. For example, the top left cell indicates that we reject the null hypothesis that the boom amplitude during repression and short-run liberalization (when the domestic financial sector opens first) are equal, in favor of the one-side alternative hypothesis of the amplitude of booms being larger during the short run following liberalization (when the domestic financial sector opens first) than during repression, at a zero-percent confidence level. The cell below indicates that if the liberalization starts with the capital account, we cannot reject the null hypothesis that the amplitude of the booms in the inmediate aftermath of financial liberalization does not depend on whether the domestic financial sector or the capital account open first. The significance level of this test is 13 percent. Standard errors are in brackets. *, **, *** mean significance at 10, 5, and 1 percent, respectively.

## Table V
## Financial Liberalization and Institutional Reforms

### Panel A
### Sequencing

**Mature Markets**

| Type of Financial Liberalization | Probabilities of Liberalization Conditional on | | |
|---|---|---|---|
| | Insider Trading Laws Existence | Insider Trading Laws Enforcement | Improvement in Law and Order |
| Partial Liberalization | 36 ** | 17 | 44 *** |
| Full Liberalization | 64 *** | 25 * | 50 *** |
| Hypothesis Test (P-Value) | | | |
| Partial Liberalization = Full Liberalization | 0.04 | 0.34 | 0.33 |

**Emerging Markets**

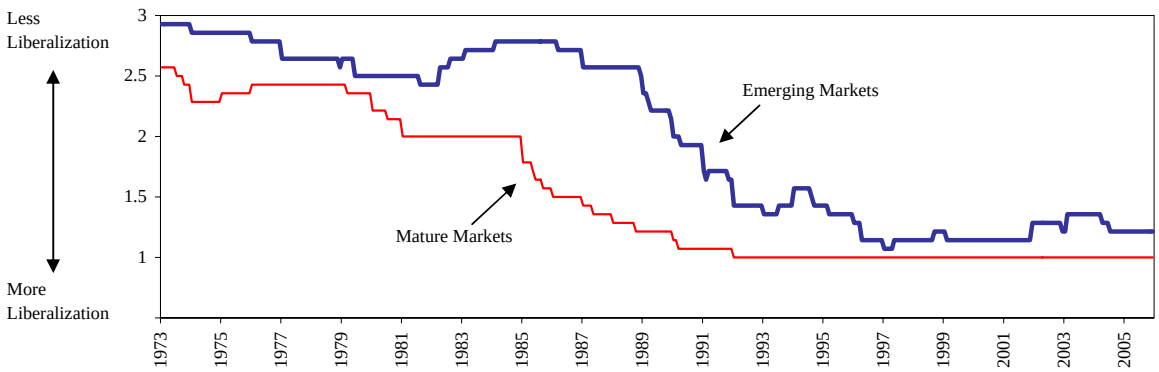
| Type of Financial Liberalization | Probabilities of Liberalization Conditional on | | |
|---|---|---|---|
| | Insider Trading Laws Existence | Insider Trading Laws Enforcement | Improvement in Law and Order |
| Partial Liberalization | 62 *** | 11 | 18 |
| Full Liberalization | 77 *** | 44 ** | 64 *** |
| Hypothesis Test (P-Value) | | | |
| Partial Liberalization = Full Liberalization | 0.17 | 0.08 | 0.02 |

### Panel B
### Effects of Liberalization and Institutional Reforms on Financial Cycles

| Independent Variables | Amplitude | |
|---|---|---|
| | All Markets | |
| | Booms | Crashes |
| External Factors' Index | 8.15 | -5.08 |
| | [2.07] *** | [2.35] ** |
| Domestic Output Growth | 0.74 | 0.04 |
| | [0.18] *** | [0.29] |
| Repression | 73.77 | 61.80 |
| | [6.15] *** | [7.38] *** |
| Short-Run Liberalization | 96.54 | 73.94 |
| | [7.91] *** | [8.80] *** |
| Long-Run Liberalization | 67.54 | 51.79 |
| | [7.01] *** | [8.22] *** |
| Law and Order | -17.17 | -5.49 |
| | [5.70] *** | [6.68] |
| Insider Trading Laws | | |
| Existence | -8.28 | 2.13 |
| | [6.49] | [7.49] |
| Enforcement | 7.41 | 6.30 |
| | [6.32] | [7.50] |
| Observations | 185 | 177 |
| R-squared | 0.84 | 0.73 |

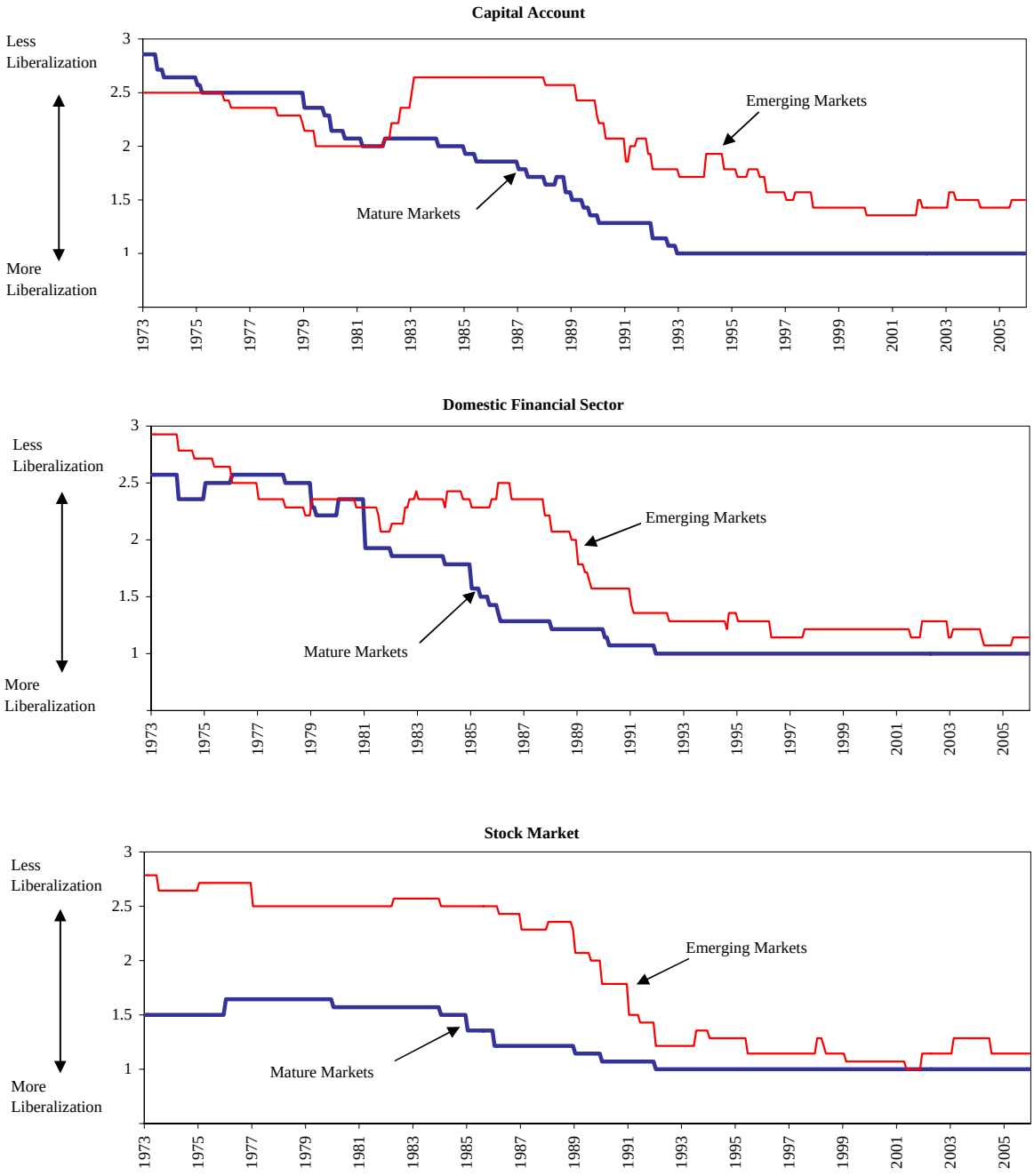
Panel A shows the probability of financial liberalization conditional on the existence and enforcement of insider trading laws and on permanent improvement in law and order. Panel B reports the regression reported in Table 3 with the inclusion of the institutional variables: law and order, existence of insider trading laws, and enforcement of insider trading laws. "Law and Order" is equal to one in periods in which there is a "permanent" improvement in the International Country Risk Guide's index of law and order or the index is at its highest level. The improvement periods in this index are characterized by at least one point increase in the index from its two-year period average, and the maintainance of the index above this average for at least another two years. "Insider Trading Laws" are indicator variables that equal one after the existence or enforcement of those laws. The data come from Bhattacharya and Daouk (2000). See Appendix Table 3. Standard errors are in brackets. *, **, *** mean significance at 10, 5, and 1 percent, respectively.

**Figure 1**
**Index of Financial Liberalization**



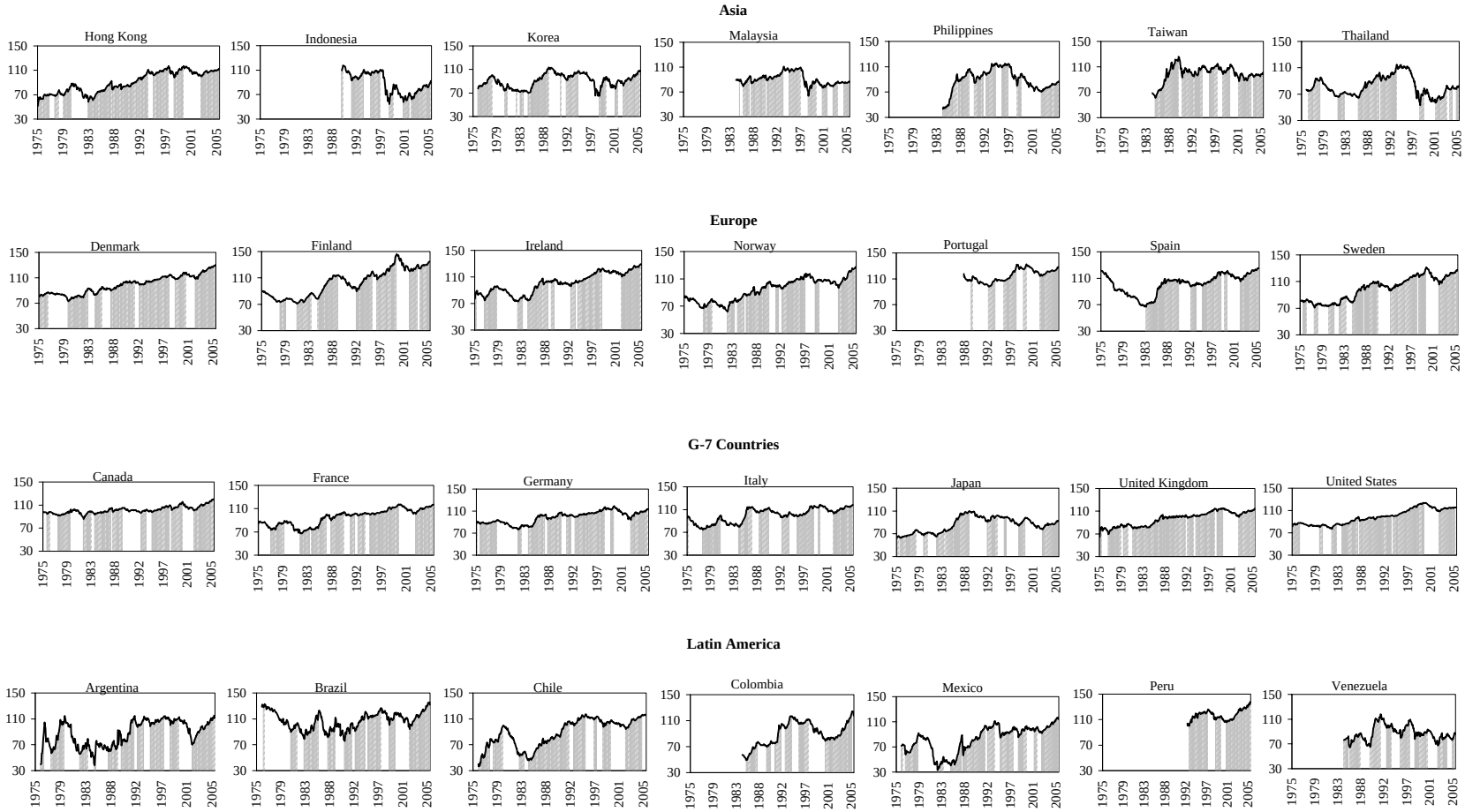

The index of financial liberalization jointly shows the liberalization of the capital account, the domestic financial sector, and the stock market. The value 3 means repression, 2 means partial liberalization, and 1 means full liberalization. The index is a cross-country average. A country is considered to be fully liberalized when at least two sectors are fully liberalized and the third one is partially liberalized. A country is considered to be partially liberalized if at least two sectors are partially liberalized. Mature markets are: Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Norway, Portugal, Spain, Sweden, United Kingdom, and United States. Emerging markets are: Argentina, Brazil, Chile, Colombia, Hong Kong, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Taiwan, Thailand, and Venezuela.

**Figure 2**
**Indexes of Financial Liberalization by Sector**




The three indexes display separately the liberalization of the capital account, the domestic financial sector, and the stock market. The value 3 means repression, 2 means partial liberalization, and 1 means full liberalization. The indexes are a cross-country average. Mature markets are: Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Norway, Portugal, Spain, Sweden, United Kingdom, and United States. Emerging markets are: Argentina, Brazil, Chile, Colombia, Hong Kong, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Taiwan, Thailand, and Venezuela.

**Figure 3**
**Stock Markets Indexes**




Stock market indexes are in constant (2000) U.S. dollars (in logs). The indexes are normalized to be equal to 100 in April 1993. The sample covers the period: January 1975 to December 2005. Peaks are calculated using +/- 12-month windows. The shaded areas mark the identified expansion episodes.

## Figure 4
## Characteristics of Regional Cycles

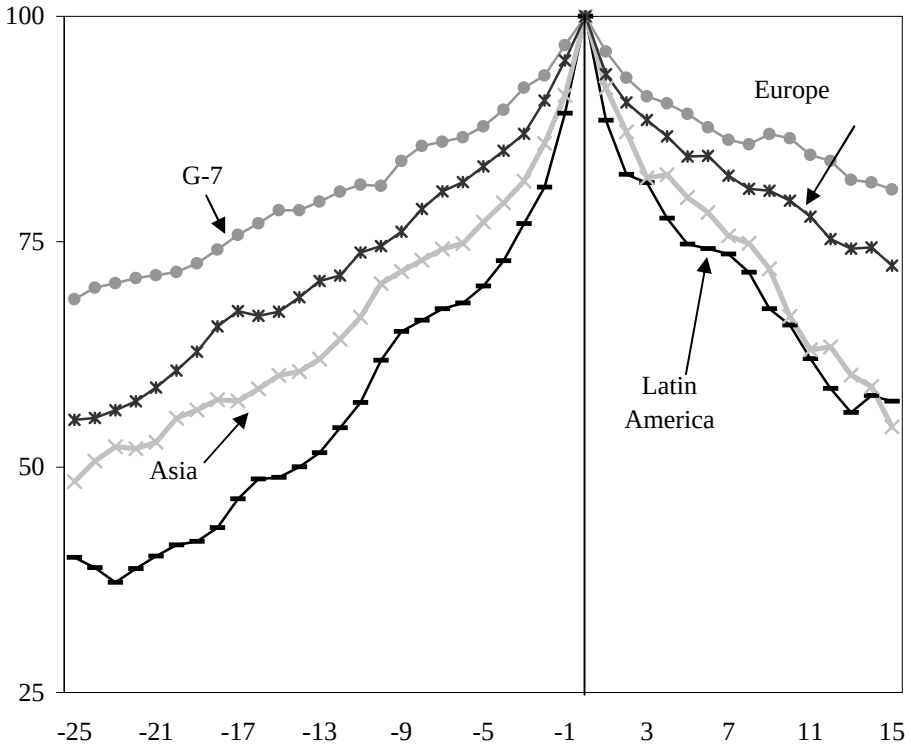
**Emerging Markets**

| Phase | Asia | | Latin America | |
|---|---|---|---|---|
| | Amplitude (in percent) | Duration (in months) | Amplitude (in percent) | Duration (in months) |
| **Booms** | 76 | 23 | 98 | 24 |
| **Crashes** | 70 | 17 | 84 | 17 |

**Mature Markets**

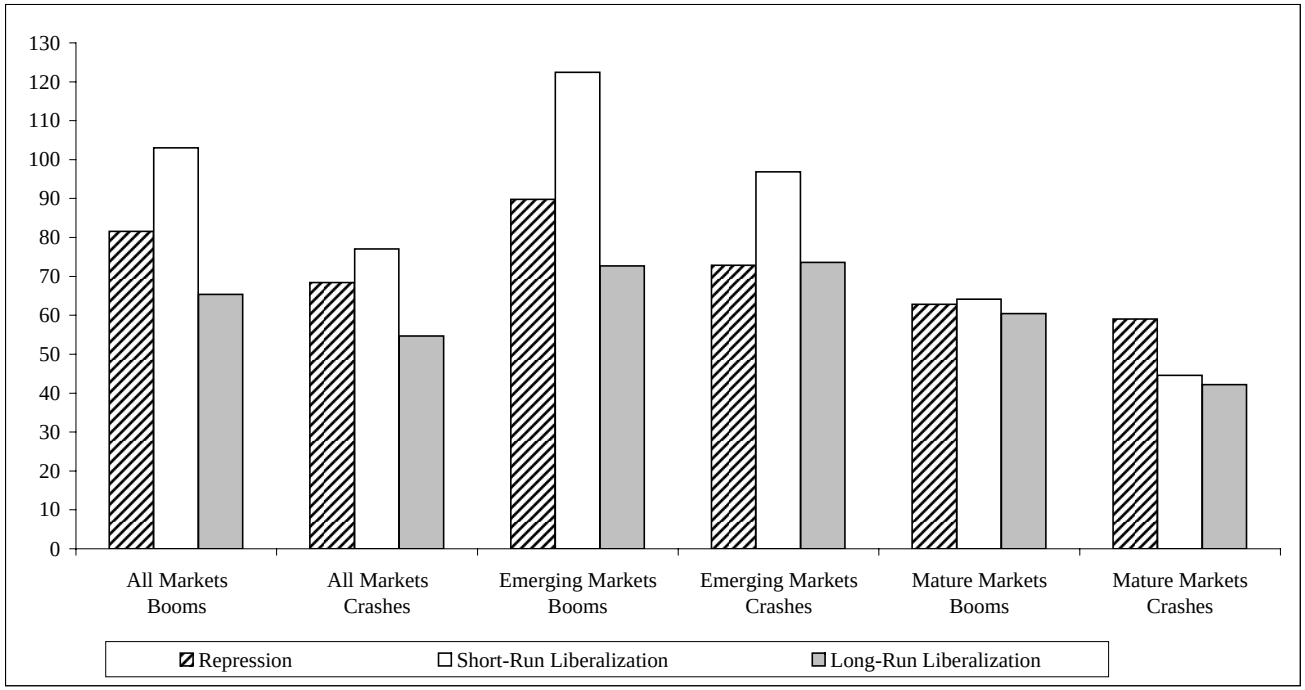
| Phase | Europe | | G-7 | |
|---|---|---|---|---|
| | Amplitude (in percent) | Duration (in months) | Amplitude (in percent) | Duration (in months) |
| **Booms** | 68 | 28 | 55 | 29 |
| **Crashes** | 51 | 22 | 43 | 18 |

### Average Regional Cycles




The table and figure show the average cycle per region. The sample starts in January 1975 and ends in December 2005. The total number of cycles per region is as follows: 53 for Asia, 51 for Europe, 61 for G-7, and 57 for Latin America. In the top panel, duration is expressed in months while amplitude is expressed in percent; it is calculated as a deviation from the mid point between the peak and the trough.

**Figure 5**
**Average Amplitude of Booms and Crashes**
**(in percent)**




| Hypothesis Tests | P-Value | | | | | |
|---|---|---|---|---|---|---|
| | All Markets | | Emerging Markets | | Mature Markets | |
| | Booms | Crashes | Booms | Crashes | Booms | Crashes |
| Repression < Short-Run Liberalization | 0.01 | 0.18 | 0.00 | 0.04 | 0.46 | 0.92 |
| Repression > Long-Run Liberalization | 0.01 | 0.02 | 0.03 | 0.53 | 0.41 | 0.01 |
| Short-Run Liberalization > Long-Run Liberalization | 0.00 | 0.00 | 0.00 | 0.03 | 0.37 | 0.39 |

The figure shows the average amplitude of booms and crashes in the different periods of financial liberalization and repression for mature and emerging markets. Repression periods are identified as those periods where less than two sectors are partially liberalized. Short-run liberalization periods are identified as those periods in the immediate aftermath of partial financial liberalization (four-year window). Long-run liberalization periods are identified as those periods in which four years have elapsed from the time of the partial financial liberalization. The table reports hypothesis tests on the regression coefficients of the indicators of financial repression/liberalization. For example, the top left cell indicates that for all the countries in our sample, we reject the null hypothesis that the boom amplitudes during repression and short-run liberalization are equal, in favor of the one-side alternative hypothesi of the amplitude of booms being larger during the short run following liberalization than during repression, at a one-percent confidence level.

## Appendix Table I
## Criteria to Define Liberalization Periods

### Capital Account

| | |
|---|---|
| **Criteria for Full Liberalization** | |
| Borrowing abroad by banks and corporations | Banks and corporations are allowed to borrow abroad mostly freely. They may need to inform the authorities, but the authorization is granted almost automatically. Reserve requirements might be in place but are lower than 10 percent. The required minimum maturity is not longer than two years. |
| | And |
| Multiple exchange rates and other restrictions | There are no special exchange rates for either current account or capital account transactions. There are no restrictions to capital outflows. |
| **Criteria for Partial Liberalization** | |
| Borrowing abroad by banks and corporations | Banks and corporations are allowed to borrow abroad but subject to certain restrictions. Reserve requirements are between 10 and 50 percent. The required minimum maturity might be between two and five years. There might be some caps in borrowing and certain restrictions to specific sectors. |
| | Or |
| Multiple exchange rates and other restrictions | There are special exchange rates for current account and capital account transactions. There might be some restrictions to capital outflows. |
| **Criteria for No Liberalization** | |
| Borrowing abroad by banks and corporations | Banks and corporations are mostly not allowed to borrow abroad. Reserve requirements might be higher than 50 percent. The required minimum maturity might be longer than five years. There might be caps in borrowing and heavy restrictions to certain sectors. |
| | Or |
| Multiple exchange rates and other restrictions | There are special exchange rates for current account and capital account transactions. There are restrictions to capital outflows. |

### Domestic Financial Sector

| | |
|---|---|
| **Criteria for Full Liberalization** | |
| Lending and borrowing interest rates | There are no controls (ceilings and floors) on interest rates. |
| | And |
| Other indicators | There are no credit controls (subsidies to certain sectors or certain credit allocations). Deposits in foreign currencies are likely permitted. |
| **Criteria for Partial Liberalization** | |
| Lending and borrowing interest rates | There might be controls in either lending or borrowing rates (ceilings or floors), but they are less spread out than during repression. |
| | And |
| Other indicators | There might be controls in the allocation of credit controls (subsidies to certain sectors or certain credit allocations). Deposits in foreign currencies might not be permitted. |
| **Criteria for No Liberalization** | |
| Lending and borrowing interest rates | There are controls in lending rates and borrowing rates (ceilings and floors). |
| | Or |
| Other indicators | There are controls in the allocation of credit controls (subsidies to certain sectors or certain credit allocations). Deposits in foreign currencies are likely not permitted. |

### Stock Market

| | |
|---|---|
| **Criteria for Full Liberalization** | |
| Acquisition by foreign investors | Foreign investors are allowed to hold domestic equity without restrictions (except for certain specific sectors). |
| | And |
| Repatriation of capital, dividends, and interest | Capital, dividends, and interest can be repatriated freely within two years of the initial investment. |
| **Criteria for Partial Liberalization** | |
| Acquisition by foreign investors | Foreign investors are allowed to hold up to 49 percent of each company's outstanding equity. There might be restrictions to participate in certain sectors. There might be indirect ways to invest in the stock market, like through country funds. |
| | Or |
| Repatriation of capital, dividends, and interest | Capital, dividends, and interest can be repatriated, but typically not before two-to-five years of the initial investment. |
| **Criteria for No Liberalization** | |
| Acquisition by foreign investors | Foreign investors are not allowed to hold domestic equity. |
| | Or |
| Repatriation of capital, dividends, and interest | Capital, dividends, and interest can be repatriated, but not before five years of the initial investment. |

This table describes the criteria used to determine whether the capital account, the domestic financial sector, and the stock market are fully or partially liberalized.

## Appendix Table II
## Stock Market Indexes and Their Sources

| Countries | Stock Market Indexes | Beginning Date | Ending Date | Data Source |
|---|---|---|---|---|
| **Asia** | | | | |
| Hong Kong | Hang Seng | Jan 75 | Dec 05 | Emerging Markets Database |
| Indonesia | JSE Composite Index | Dec 89 | Dec 05 | Emerging Markets Database |
| Korea | KSE Composite | Dec 75 | Dec 05 | Emerging Markets Database |
| Malaysia | KLSE Composite | Dec 84 | Dec 05 | Emerging Markets Database |
| Phillipines | PSE Composite Index | Dec 84 | Dec 05 | Emerging Markets Database |
| Taiwan | TSE Average Index | Dec 84 | Dec 05 | Emerging Markets Database |
| Thailand | SET Index | Dec 75 | Dec 05 | Emerging Markets Database |
| **Europe** | | | | |
| Denmark | Copenhagen Stock Exchange Index | Jan 75 | Dec 05 | International Finance Statistics |
| Finland | HEX-Index | Jan 75 | Dec 05 | International Finance Statistics |
| Ireland | ISEQ Total Index | Jan 75 | Dec 05 | International Finance Statistics |
| Norway | Oslo Stock Exchange Industrial Index | Jan 75 | Dec 05 | International Finance Statistics |
| Portugal | Banco Totta & Acores | Jan 88 | Dec 05 | Emerging Markets Database |
| Spain | Madrid Stock Exchange Index | Jan 75 | Dec 05 | International Finance Statistics |
| Sweden | Stockholm Exchange | Jan 75 | Dec 05 | International Finance Statistics |
| **G-7** | | | | |
| Canada | TSE-300 | Jan 75 | Dec 05 | International Finance Statistics |
| France | Average of 40 Largest Enterprises | Jan 75 | Dec 05 | International Finance Statistics |
| Germany | CDAX | Jan 75 | Dec 05 | International Finance Statistics |
| Italy | MIB Index | Jan 75 | Dec 05 | International Finance Statistics |
| Japan | NK500 | Jan 75 | Dec 05 | International Finance Statistics |
| United Kingdom | ASX all shares | Jan 75 | Dec 05 | International Finance Statistics |
| United States | S&P 500 Composite | Jan 75 | Dec 05 | International Finance Statistics |
| **Latin America** | | | | |
| Argentina | Bolsa Indice General | Dec 75 | Dec 05 | Emerging Markets Database |
| Brazil | BOVESPA Market Index | Dec 75 | Dec 05 | Emerging Markets Database |
| Chile | IGPA Index | Dec 75 | Dec 05 | Emerging Markets Database |
| Colombia | Bogota Stock Index | Dec 84 | Dec 05 | Emerging Markets Database |
| Mexico | BMV General | Dec 75 | Dec 05 | Emerging Markets Database |
| Peru | Indice General IGBVL | Dec 92 | Dec 05 | Emerging Markets Database |
| Venezuela | Index de Capitalization de la BVC | Dec 84 | Dec 05 | Emerging Markets Database |

The table shows which stock market index is used for each country, its beginning and ending date, and its data source. The "International Finance Statistics" database comes from the International Monetary Fund. The "Emerging Markets Database" (EMDB) comes from Standard & Poor's.

## Appendix Table III
## Institutional Reforms

| Countries | Index of Law and Order (1) | Insider Trading Laws Existence (2) | Insider Trading Laws Enforcement (3) |
|---|---|---|---|
| **Asia** | | | |
| Hong Kong | Apr 94 | 1991 | 1994 |
| Indonesia | Jun 91, May 04 | 1991 | 1996 |
| Korea | Oct 91, Jun 03 | n/a | n/a |
| Malaysia | Apr 93, May 04 | 1973 | 1996 |
| Philippines | Jul 92 | 1982 | No |
| Taiwan | Aug 04 | 1988 | 1989 |
| Thailand | Apr 88, Aug 92 | 1984 | 1993 |
| **Europe** | | | |
| Denmark | Highest Level (whole sample) | 1991 | 1996 |
| Finland | Highest Level (whole sample) | 1989 | 1993 |
| Ireland | Sep 89, Apr 94 | 1990 | No |
| Norway | Highest Level (whole sample) | 1985 | 1990 |
| Portugal | Oct 94 | 1986 | No |
| Spain | Dec 91 | 1994 | 1998 |
| Sweden | Highest Level (whole sample) | 1971 | 1990 |
| **G-7** | | | |
| Canada | Highest Level (whole sample) | 1966 | 1976 |
| France | Jan 92 | 1967 | 1975 |
| Germany | Highest Level (whole sample) | 1994 | 1995 |
| Italy | Aug 95, Jun 04 | 1991 | 1996 |
| Japan | Jul 92 | 1988 | 1990 |
| United Kingdom | Sep 89, Jan92 | 1980 | 1981 |
| United States | Highest Level (whole sample) | 1934 | 1961 |
| **Latin America** | | | |
| Argentina | Dec 92, Apr 04 | 1991 | 1995 |
| Brazil | Jun 04 | 1976 | 1978 |
| Chile | Apr 94 | 1981 | 1996 |
| Colombia | Mar 94 | 1990 | No |
| Mexico | Feb 04 | 1975 | No |
| Peru | Sep 92 | 1991 | 1994 |
| Venezuela | Apr 04 | 1998 | No |

Column (1) reports the dates in which there is a "permanent" improvement in the index of law and order published by the International Country Risk Guide. In this index, law and order are assessed separately, with each sub-component comprising zero to three points. The law sub-component is an assessment of the strength and impartiality of the legal system, while the order sub-component is an assessment of popular observance of the law and order. We identify episodes of improvement in law and order as those periods characterized by at least one point increase in the index from its two-year period average, and the maintainance of the index above this average for at least two more years. This column also shows those countries for which the index of law and order was at its highest level during all the sample. Columns (2) and (3) come from Bhattacharya and Daouk (2000). The columns report, respectively, the dates when insider trading laws are aproved and when the first prosecution under these laws occurs. The authors surveyed stock market participants and national regulators to obtain the answers. "n/a" means not available. "No" means that there is no enforcement of insider trading laws.