Emerging Stock Market Liberalization And Currency Crises

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Abstract

The liberalization of emerging stock markets in Latin America and East Asia in the late 1980s and early 1990s was expected to make these equity markets more efficient and more integrated in world financial markets. However, large capital inflows in the first half of the 1990s were followed by sudden and huge capital outflows in the second half of the 1990s, which ultimately provoked severe currency and economic crises. It is possible that emerging stock markets remained inefficient despite their liberalization, and allowed speculative bubbles to develop and eventually burst. The main objective of this paper is therefore to test the efficiency of Latin American and East Asian equity markets before and after their liberalization. We also examine the integration of these emerging stock markets in world financial markets, and investigate the relationships between stock returns and currency crises over these two periods.

1.   Introduction

Many developing countries lost access to external funding for their borrowing needs during the world debt crisis of the 1980s. Consequently, a dozen nations in Latin America and South-East Asia decided to liberalize their emerging stock markets in the late 1980s and early 1990s and allow foreign capital to finance again their development. This liberalization resulted to an initial wave of capital inflows in the first half of the 1990s, which abruptly

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stopped and unexpectedly reversed in the second half of the 1990s. Most of the twelve countries selected in this study became victims of financial and economic crises (e.g., Venezuela, Mexico and Argentina in 1994–1995, Indonesia, Korea, Malaysia, the Philippines, Taiwan and Thailand in 1997–98, Brazil in 1999). Should we interpret these crises as the outcomes of bursting speculative bubbles in emerging equity markets that are still immature and inefficient, or as the reactions of efficient markets to misguided policies and economic imbalances? The answer to this question lies in the efficiency or lack thereof in these emerging stock markets.

The main goal of this paper is therefore to test the efficiency of twelve Latin American and East Asian emerging stock markets (ESM) before and after their liberalization. Financial theory states that equity markets should become more integrated with world financial markets following their liberalization. We also estimate the evolution of the degree of integration of these ESMs over these two periods. Since major currency crises appear to have closely preceded or followed equity market collapses, we then investigate the relationships between stock returns and currency crises to see if ESMs have some capabilities to predict speculative attacks on local currencies.

In Section II, we examine the various theories and empirical conclusions related to the benefits and risks of capital account liberalization. In Section III, we discuss the effects of the financial liberalization of the early 1990s on the twelve emerging stock markets and currencies selected in this study. In Section IV, we present the methodology and interpret the empirical results. Finally, we offer some conclusions in Section V.

2.   Benefits and Risks of Capital Account Liberalization

Many studies have initially investigated the beneficial effects of capital account liberalization on economic growth. However, recent

crises have caused researchers to evaluate the risks due to financial vulnerabilities of developing countries.

First, classical theory shows that free movements of capital leads to an efficient global allocation of financial resources (saving and investment), as Ortiz (1997) points out. In particular, developing nations should benefit from capital account liberalization since their capital-scarce economies receive foreign investment to improve their welfare. International investors also gain from the opportunities of portfolio diversification, as Ghosh and Ortiz (1998) show. The International Monetary Fund [henceforth IMF] (1995a,b,c) highlights the benefits of capital account liberalization, but also the financial vulnerabilities in Latin America and Asia. Fischer et alii (1998) argue about the pros and cons of capital account convertibility. Indeed, recent theories, described by the IMF (1998) emphasize the negative effects of asymmetric information (adverse selection, moral hazard, herding behavior) and domestic distortions on financial market efficiency. Crockett (1997) provides various reasons for financial market failures and instability (irrational speculation, inappropriate macroeconomic policies, internal market dynamics) and stresses the need for policy responses. Williamson and Mahar (1998) survey the literature on financial liberalization and conclude that there is some evidence of favorable effects of liberalization on economic growth, financial deepening, investment efficiency, but not on saving; however, the authors also point out that the danger of financial crises should be alleviated with macroeconomic stabilization and improved supervision, but also with "mild financial repression" (ceiling on deposit interest rates) and limits on capital account convertibility, at least on a temporary basis. Stiglitz (1999) also stresses the need for "global public goods" because of international market failures. Interestingly, Willett (2000) argues that "the popular extremes of both fully efficient farsighted markets and wildly irrational markets are inconsistent with the available evidence", and that financial markets

tend to operate according to the "too much, too late" hypothesis (i.e., markets fail to provide early warnings of potential impending crises, and then overreact when crises hit). Fernàndez–Arias and Hausman (2000) also present evidence of serious distortions in international financial markets.

Empirically, Bekaert and Harvey (2000), Henry (2000b) find that financial liberalization reduces the cost of capital. Henry (2000a), Bekaert, Harvey and Lundblad (2001) conclude that it also boosts investment and economic growth. Fry (1997), Kahn and Sendhadji (2000) review the literature and find new evidence in favor of a positive effect of financial development on growth. However, Arestis and Demetriades (1997) argue that the empirical evidence is inconclusive due to "the over–simplified nature of results obtained from cross–country regressions". Moreover, Bacchetta and Van WinCoop (1998) demonstrate that financial liberalization usually lead to an initial period of asset price overshooting, before a crisis occurs. Papaioannou and Duke (1998) also show that emerging capital markets exhibits high volatility (e.g., bubbles) in the early stages before they are supposed to achieve efficiency. In particular, Sarno and Taylor (1999) find statistical evidence of bubbles in the East Asian stock markets. Kawakatsu and Morey (1999) use a battery of tests to conclude that financial liberalization did not appear to have improved efficiency of emerging stock markets, but rather that these markets were already efficient before their liberalization. It appears likely that the wide range of conclusions regarding the effects of financial liberalization on the efficiency of emerging stock markets is due to the choice of methodology and sample, which would or not include recent and sudden reversals of capital flows (e.g. Asian crisis).

It is also interesting to note that this financial liberalization took place at about the same time in Latin America (1989–91) and in South–East Asia (1987–91), despite drastically different economic experiences in the 1980s. Another common characteristic is the

large capital inflows that these two regions accumulated in the early 1990s following their financial liberalization: the IMF (1998) calculates that net capital inflows to developing countries increased from $40 billion in 1983–88 to about $110 billion in 1989–93 and almost $180 billion in 1994–97. A final common trait is the ultimate, sudden and sharp reversal of these capital flows and the subsequent currency, banking and economic crises (Mexican Peso crisis and its Tequila effect on Argentina in 1995, Asian currency crisis in 1997–98, followed by the Brazilian crisis in 1999).

Eichengreen and Fishlow (1998) compare the capital "boom-bust" episodes of the 1920s and the 1990s and highlight their differences (global vs. selective crises, laissez-faire vs. IMF intervention, trade vs. monetary adjustments). Reinhart and Reinhart (1998) draw some lessons from the various policy responses to the "mixed blessing of capital inflows" in the 1990s, and conclude that a combination of conservative fiscal policy, strong supervision of the domestic financial sector and greater exchange rate flexibility are desirable, although "event the best policy mix cannot altogether avoid the eventual reversal of capital flows".

Before these crises had occurred, Claessens (1995) had suggested that financial liberalization would make capital markets more efficient and more integrated with world financial markets. On the other hand, Pomerleano and Zhang (1999) infer that emerging stock markets suffer from inefficiencies, and allowed speculative bubbles to develop and ultimately burst. Furthermore, the Asian crisis revealed that even stock markets in healthy emerging economies could be the victims of financial contagion, as Baig and Goldfajn (1999), Cartapanis, Dropsy and Mametz (2002) show in their empirical study. Both views can be somewhat reconciled by arguing that both economic weaknesses and unstable financial systems share the responsibility for the crisis, as Cooper (1999) and the IMF (1999b) suggest. Often, financial and economic crises

begin with a speculative attack on the currency. As a result, the causes of currency crises have been studied in details and explained by either first-generation and/or second-generation models. Firstgeneration models are based on the Mundell-Fleming conclusion that a country with a fixed exchange rate and capital mobility cannot pursue an excessive monetary policy: currency crises are the result of inconsistent policies (fundamental disequilibrium). Second-generation models are related to self-fulfilling expectations, multiple equilibria, contagion and do not necessitate bad policies: currency crises can simply occur as a result of financial weaknesses (vulnerability). The IMF (1999a) and numerous others have tried to find leading indicators of balance of payments crises, that would take into account these two types of causes, but the timing of a crisis is very difficult to forecast when it is the result of unpredictable changes in self-fulfilling expectations. Some countries have used capital controls to increase monetary policy effectiveness while fixing exchange rates and minimize the potentially destabilizing effects of short-term capital flows (i.e., to avoid first- and second-generation types of crises), but the IMF (2000) shows that such capital controls have often unintended and sometimes perverse consequences.

In summary, although financial liberalization should improve the efficiency of emerging stock markets according to economic theory, it has often been followed by an apparent speculative bubble (capital inflows) and a financial collapse (currency crisis) for most of the twelve countries selected in this study. Before empirically investigating the efficiency of these twelve emerging stock markets before and after their liberalization, as well as the relationships between these equity and currency markets, it is important to examine their individual backgrounds.

3.   Financail Liberalization in Latin America and South–EeastAsia

Table 1 illustrates the tremendous growth of stock market capitalization from the official dates of financial liberalization (cf. Bekaert and Harvey, 2000) to 1999 for the twelve nations selected for this study: Argentina, Brazil, Chile, Colombia, Mexico, Venezuela (Latin America), Indonesia, South Korea, Malaysia, the Philippines, Taiwan, Thailand (South-East Asia). Even after taking into account the severe downturn of these markets following recent financial crises, market capitalization (in US$) managed to increase at a four-digit growth rate in Latin America (except for Chile, who had previously, but prudently opened its equity markets with short-term capital controls, and for Venezuela, whose stock markets collapsed twice in a decade), while GDP (also expressed in US$) grew only by 60% to 310%. In South-East Asia, the ratio of market capitalization to GDP more than doubled in the six countries studied, even after the Asian crisis had severely depressed the local stock markets in 1997-98.

Figures 1 through 12 show the local and world stock market price (index expressed in U.S. Dollars) and the real currency value (index) for each of the six Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Venezuela) and six South-East Asian countries (Indonesia, South Korea, Malaysia, the Philippines, Taiwan, Thailand) selected for this study. Both stock market and real exchange rate indexes are based on a value of 100 at the end of the month preceding the official liberalization (cf. Bekaert and Harvey, 2000), indicated by the first arrow on the graphs. The second arrow represents the timing of the first major subsequent currency crisis, identified with the index of speculative pressure (cf. Cartapanis, Dropsy and Mametz, 2002).

Latin America

Latin American equity markets only played a minor role in the 1980s, before their liberalization. The external debt crisis that

started in 1982 compelled most local governments to abandon their protectionist policies and open their stock markets to foreign investors by the end of the "lost decade". Chile is somewhat an exception, since it had already proceeded with two waves of structural adjustment in the 1970s (trade) and the 1980s (finance): as a result, its stock market capitalization was already 81% of GDP just before its liberalization in early 1992. In any case, Latin American equity prices suddenly shot up for a few years following the financial liberalization of the early 1990s. However, it appears that the large capital inflows responsible for these rises had also created speculative bubbles that ultimately burst, notably with the Tequila crisis of 1994–95. It is useful to take a closer look at the individual experiences of the six Latin American countries.

Argentina began to deregulate its financial markets in November 1989 (official date of liberalization), while hyperinflation and a severe recession were ravaging its economy. However, a return to democracy, the quasi-elimination of inflation with the convertibility plan (currency board), fiscal reform and a wide deregulation program restored investor confidence and caused the stock market to rise by almost 400% (in U.S. Dollar terms) in 1991. Since then, the equity prices have widely fluctuated (+/-30%) around the level reached in early 1992. In particular, the Argentine Bolsa experienced sharp sell-offs during the 1994 Mexican Peso crisis (Tequila effect), the 1997 Asian financial crisis and the 1998 Russian debt crisis (contagion effect). It is also important to note that Argentina suffered several speculative attacks on its currency (after the Mexican and Brazilian crises): the first and most important of those (March 1995) was identified as the Argentine currency crisis for the purpose of empirical tests later in this paper. Yet, the Dollar exchange rate of its Peso remained fixed thanks to the strength of its currency board. However, recent developments about the potential default on the Argentine external debt tend to cast some doubts

about the sustainability of this currency board: as a result, stock prices have plunged again.

Brazil, which had experienced triple-digit inflation during most of the eighties and hyperinflation in the early nineties, started to open its stock market to foreign investors in May 1991 (official date of liberalization), after the failure of the Collor Plan (freeze on almost all assets to eliminate hyperinflation). Stock prices only began to take off when fiscal and currency reforms started being implemented in 1993. The success of the Real Plan caused stock prices to almost quadruple until the Asian crisis began in July 1997, even though the Tequila effect of the Mexican Peso crisis had temporarily deflated these stock prices by almost 40% in early 1995. However, the Brazilian Bolsa lost more than half of its value (in U.S. Dollars) as a result of the Asian and Russian crisis of 1997-98. Although Brazil had obtained an emergency credit line of $41.5 billion from the IMF to fight speculative attacks on its currency in late 1998, it was forced to let the Real fall by 40% in January 1999 (date of the currency crisis in the empirical section below). The appointment of a new Central Banker, who previously worked in Wall Street, and the rapid turnaround of the Brazilian economy not only stopped the decline of stock prices, but also helped fuel their steep rebound later in 1999.

Chile can be considered a special case in Latin America: under the advice of the "Chicago boys" (University of Chicago professors), it had implemented a program of trade liberalization in the seventies and financial liberalization in the eighties. As a result, the ratio of its stock market capitalization to GDP had already reached 81% just before regulations on foreign investment and repatriation of capital were eased in January 1992 (official date of liberalization). However, it is important to recognize that Chile also began in 1991 to discourage short-term capital flows with a variety of policies (implicit tax through reserve requirements as well as a type of Tobin tax). Nevertheless, further free-market reforms (e.g., liberaliz-

ation of pension funds) helped stock prices double until the 1995 Tequila effect of the Mexican Peso crisis caused some speculative attacks on the Chilean Peso (October 1995 identified as the date of the currency crisis). The Bolsa also began to retreat and ultimately lose half of its value (in U.S. Dollars) during the 1997–98 Asian crisis.

Colombia started to free trade ("apertura" policy) and foreign investment in February 1991 (official date of liberalization), and stock prices surged following the further deregulation of the foreign exchange market in October 1991. The death of Pablo Escobar, leader of the Medellin drug cartel, in December 1993 gave the Bolsa and the Peso another big boost in early 1994, but then lost these stock market gains in the midst of speculative pressure on the Colombian currency related to higher world interest rates. Although the equity market later rebounded, it collapsed again in 1998, presumably under the contagious influence of the Asian and Russian crisis, and never recovered. The Colombian Peso was also subject to speculative attacks and devaluations in September 1997 (identified as the date of the first currency crisis) and August 1998, and the Central Bank ultimately abandoned its defense of the currency band in September 1999.

Mexico was the first country to announce an external debt moratorium in 1982, but also an external debt reduction agreement in May 1989 (official date of liberalization of its stock market), based on a comprehensive package of economic and financial reforms. This program and the North American Free Trade Agreement (signed in late 1993) attracted large amounts of foreign capital and boosted stock prices by more than 600% (in U.S. Dollars) until early 1994, when political unrest (Chiapas uprising, assassination of a presidential candidate) and the Peso crisis (in late 1994 and early 1995) caused a crash of the Bolsa by about two third of its Dollar value (with half of that loss due the Peso depreciation) in three months. The subsequent rebound of the Mexican

stock market was stopped and reversed by the Asian and Russian crisis in 1997–98. The Bolsa strongly recovered in 1999, but the global financial downturn in 2000 have dragged Mexican stock prices down again.

Venezuela opened its stock market to foreign investors in January 1990 (official date of liberalization) and shortly thereafter signed a debt reduction agreement. The same year, oil export revenues rose due to the effect of the Gulf War on petroleum prices, and stock prices increased by seven-fold (in U.S. Dollars). Equity prices spiked in January 1992 (at ten times their preliberalization values) and then collapsed by 50% as a result of two failed coups d'état that year. Political instability, slow economic growth, banking crisis and a currency crisis (fall of the Bolivar by 30% in May 1994) contributed to a further decline of the Bolsa until late 1995. Despite a 60% currency devaluation in early 1996, stock prices then quadrupled in value (in U.S. Dollars) because of optimism about structural reforms and economic growth. However, the contagious Asian crisis sent Venezuelan stock prices tumbling by more than half of their Dollar value in one year. Despite rising oil prices in 1999, equity prices have remained volatile due to political tensions.

South–East Asia

Contrary to Latin America, most Asian countries did not suffer from an external debt crisis in the 1980s. Only the Philippines was part of the "Baker-15" list of most debt-troubled nations. Also, four of the six Asian countries selected had already double-digit market capitalization to GDP ratios before their official liberalization in the late 1980s and early 1990s. Capital inflows then surged until the 1997–98 Asian crisis brutally reversed that trend and caused all stock markets to collapse. However, there are differences in the individual experiences of the six Asian countries.

Indonesia's stock market appeared to have been subject to a speculative bubble following its deregulation in the late 1980s: although the official liberalization date is September 1989, there is evidence that foreign investors began to have access to the Indonesian equity market as early as early 1988. However, the IFC data for Indonesia starts in December 1989 (base=100), when the prices are already equal to 50 times earnings. The bubble burst shortly thereafter and the stock market lost two thirds of its value (in U.S. Dollars) in less than two years (while the Rupiah's real exchange rate remained stable). It then rebounded and doubled in value in 1993 before fluctuating around its pre-liberalization level until the Asian crisis that started in July 1997 (identified as the start of the Indonesian currency crisis) in Thailand and spread to its neighbors in the following months. By the end of 1997, the Indonesian stock market had lost three quarters of its Dollar value while the Rupiah has depreciated by 40% in real terms. While the Indonesian currency was subject to unpredictable swings in 1998, stock prices declined by another two thirds to reach their bottom. The Indonesian stock market recovered in 1999 as a result of positive political developments, but faltered again in 2000, as did many stock markets around the world.

Korea's stock prices had already increased by six-fold from 1985 to a peak in 1989 before declining until mid-1992, when the effect of the financial liberalization (officially dated in January 1992, but limited in scope) began to be felt. The stock market rallied for about two years, but fell again by a third in 1996 as a result of political scandals and weak economic fundamentals. After a brief pause, stock prices plunged again (by two thirds of its Dollar value) in the last three months following October 1997 (identified as the onset of the Korean currency crisis) while the Won lost half of its value as a result of the contagious Asian crisis. By the end of 1999, the Korean stock market had rebounded sharply enough to

reach its pre-crisis level, but it has slid again in 2000, as a result of the decline of the global equity market.

Malaysia's financial liberalization began to take place in December 1988 (official date). Initially, stock prices rose by almost 50%, but then fluctuated without a clear trend for a few years before taking off (doubling in U.S. Dollars) in 1993. Political developments caused the Malaysian stock market to suffer some losses, which it later recovered until the Asian crisis started in July 1997 (identified as the beginning of the Malaysian currency crisis). A panic fueled by the announcement of capital controls caused stock prices to plummet by more than 80% (in U.S. Dollars) in the next 14 months while the Ringgit depreciated by about 40%. The equity market rebounded in 1999 as capital controls were replaced by a repatriation levy in favor of long-term foreign investment. Strangely, despite the strong criticisms and actions of the Malaysian government against foreign speculators, stock market capitalization reached more than 180% of GDP at the end of 1999, the highest ratio amongst the six Asian countries studied.

The Philippines began to liberalize foreign investment in June 1991 (official date), after a year of wide fluctuations of its stock market due to rampant speculation and the negative effects Gulf War on the economy. As a result of the smooth financial liberalization, stock prices more than doubled (in U.S. Dollars) in 1993 before leveling off until the onset of the Asian crisis in July 1997 (identified as the beginning of the Filipino currency crisis). The stock market lost three quarters of its value and the Peso depreciated by a third in the next 14 months due to crisis contagion. Although stock prices later rebounded, they abruptly reversed and fell to their post-crisis bottom.

Taiwan's financial liberalization started in January 1991 (official date), after unbridled speculation caused stock prices to quadruple in 1988–89 and crash in 1990. Political uncertainty, and financial scandals created volatility around the upward trend of the stock

market that followed its opening to foreign investment. However, the 1997 Asian crisis (more specifically in Korea, a strong competitor to Taiwanese exports) resulted in a currency crisis (20% depreciation in October 1997) and in the fall of Taiwanese share prices by half (in U.S. Dollars). The Taiwanese stock market surged more than 50% in 1999, but declined again in 2000 in concert with world markets.

Thailand liberalized its financial markets in September 1987 (official date) and benefited from a quintupling of its stock prices (despite a 40% decline in late 1990 due to the Gulf War) until 1994-95 when they leveled off, but remained volatile. In 1996-97, before the Asian crisis erupted (in July 1997, first in Thailand), the Thai stock market lost two thirds of its Dollar value as a result of a loss in confidence in economic performance and policies. During the first six months of the Asian crisis, share prices lost another two thirds while the Baht depreciated by about 40%. The Thai equity market later rebounded, but it was still 50% (in Dollars) below its liberalization level.

4.   Methodology and Empirical Results

The Efficient Market Hypothesis (EMH) states that market prices always fully reflect available information. Its weak version is based on an information set that includes only the history of prices themselves. It also implies that stock returns should not be forecastable based only on their past values. Campbell, Lo and MacKinlay (1997) suggest a series of econometric procedures to ascertain the predictability of asset returns based on their past values (as well as on other variables in other EMH versions, as we will discuss later). To test weak efficiency, we apply Wald tests for autocorrelation (with six monthly lags) to excess stock returns ER, which are defined as the monthly percentage change in stock prices, denominated in U.S dollars (to take into account the point of view of a world investor

and to avoid inflationary biases in the local price data), minus the world interest rate (one-month LIBOR):

$$ER_t = \alpha_0 + \alpha_1{}^{ERt-1} + \alpha_2 ER_{t-2} + \ldots + \alpha_6 ER_{t-6} \qquad (1)$$

Weak efficiency tests are easy to implement, but they do not take into account risk exposure. The International Capital Asset Pricing Model (CAPM) provides a measure, known as "beta", of the risk of a portfolio relative to the risk of a diversified portfolio (i.e., the world portfolio). We can also interpret the value and statistical significance of the world market beta as a measure and test of stock market integration. If ESMs are integrated, we can again apply serial correlation tests to evaluate the degree of efficiency of these markets.

The international CAPM also needs to include a measure of foreign exchange risk, unless purchasing power parity holds. The two-factor model states that local excess stock returns ER are proportional to world excess returns ERw and on a crisis index CRISIS defined in Cartapanis, Dropsy and Mametz (2001) as an average of real currency appreciation rates (against the U.S. Dollar) and percentage changes in foreign exchange reserves, respectively weighted by their inverse standard deviation. A currency crisis is therefore characterized by a large negative crisis index, which is expected to correlate positively with local excess stock returns. We also use Wald tests (with six monthly lags) to investigate the significance of past currency crises on current local excess returns and test another form of efficiency:

$$ER_t = \alpha_0 + \alpha_1 ER_{t-1} + \alpha_2 ER_{t-2} + \ldots + \alpha_6 ER_{t-6} + \beta_0{}^*ER^w{}_t + \qquad (2)$$

$$+\delta_0{}^*CRISIS_t + \delta_1{}^*CRISIS_{t-1} + \delta_2{}^*CRISIS_{t-3} + \ldots + \delta_6{}^*CRISIS_{t-6}$$

The empirical study is conducted on a panel of twelve ESMs (Argentina, Brazil, Chile, Colombia, Mexico Venezuela for Latin America, and Indonesia, Korea, Malaysia, Philippines, Taiwan, Thailand for Asia), and on two sub-samples: from January 1976 (or first date available) to the month prior to the official liberalization date (cf.

Bekaert and Harvey (2000) and Table 2), and from the liberalization date to June 2000. The data on emerging stock dollar–denominated price indices (IFCG) is obtained from the Standard & Poor's Emerging Stock Markets Factbook, while the world stock (gross) price index is extracted from Morgan Stanley Capital International. The crisis index is calculated using data from the International Monetary Fund's International Financial Statistics. Preliminary unit root tests indicate that all variables are stationary.

Tables 2a and 2b present descriptive statistics relative to the excess returns in the twelve nations investigated as well as tests of stability for the means and variances between the pre- and post-liberalization periods. Whereas the mean excess returns do not appear to be different (except for the Philippines), the variances are significantly different (lower) for nine (five) emerging stock markets as a result of their liberalization. Except for Argentina and Brazil, all markets also exhibit a decrease in kurtosis, although still pronounced after their liberalization. This is likely to be caused by conditional heteroskedasticity, which is taken into account with an asymmetric GARCH structure included in all the remaining models below (although estimates are not shown, due to space constraints).

Weak efficiency test results, presented in Table 3, reveal that only three of ESMs (Argentina, Chile and Mexico) became more efficient after their liberalization, whereas Korea and Malaysia lost their efficiency following their liberalization, and the Philippines and Thailand remained weakly inefficient before and after their liberalization, according to the Wald tests of autocorrelation at a 10% significance level.

The empirical results of the augmented International CAPM equation (2), presented in Tables 4a and 4b, show that the world market beta (β_0) became significant for ten of the twelve nations (except Colombia and Venezuela), indicating that their stock markets have become integrated in the world financial system.

However, inefficiencies (i.e., significant autocorrelation or lagged effects crisis indexes) are still found in four of the six East Asia stock markets after their financial liberalization, but not in Latin America. Since nine of the twelve nations exhibit significant contemporaneous effects of currency crises on excess returns, it is logical to assume that these inefficiencies are related to the explosive characters (overshooting) and the selffulfilling and contagious nature of financial crises, as was especially observed in Asia in 1997.

Finally, Granger–causality tests running from excess stock returns to crisis indexes, in Table 5, provide evidence that equity markets (after their liberalization) could anticipate some of the Latin American exchange rate crises, but were not able to forecast the Asian currency crisis (except for the Philippines, which was the least affected country by the crisis in our sample).

5.   Conclusions

The main objective of this study was to examine the effect of capital account liberalization and currency crises on the efficiency of twelve emerging stock markets. Empirical results revealed that financial liberalization only improved the efficiency of some Latin American equity markets, but none of the East Asian stock markets. When the analysis is refined to take into account contemporaneous effects of world stock markets and currency crises, this conclusion is not only strengthened, but also justified. Despite strong evidence of increasing integration in world financial markets, emerging stock markets appear to become inefficient as a result of selffulfilling and contagious currency crises such as in Asia. Furthermore, these equity markets were able to provide a warning of impeding currency crises in Latin America, but not East Asia.

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Figure 1: Stock Prices (in U.S. Dollars) and Real Currency Values in Argentina

Liberalization   Currency Crisis (Tequila Effect)

Figure 2: Stock Prices (in U.S. Dollars) and Real Currency Values in Brazil

Liberalization   Currency Crisis
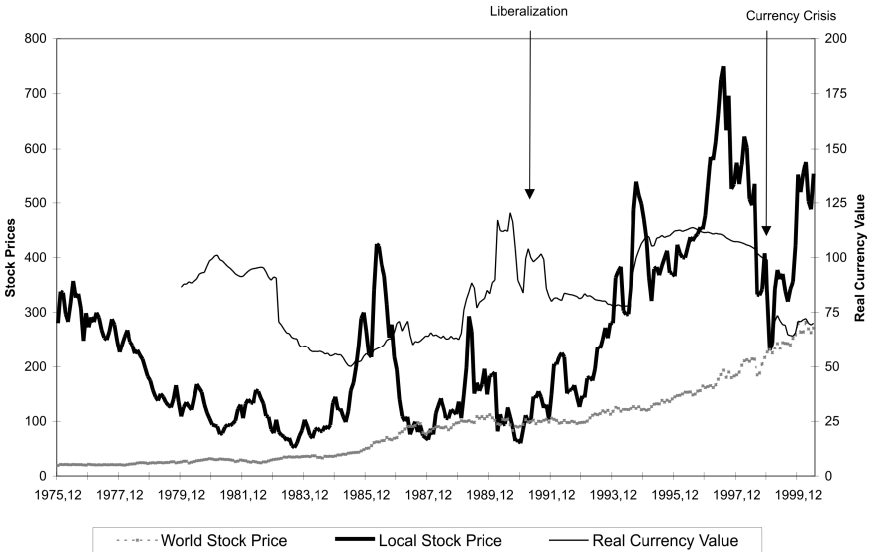
Figure 3: Stock Prices (in U.S. Dollars) and Real Currency Values in Chile
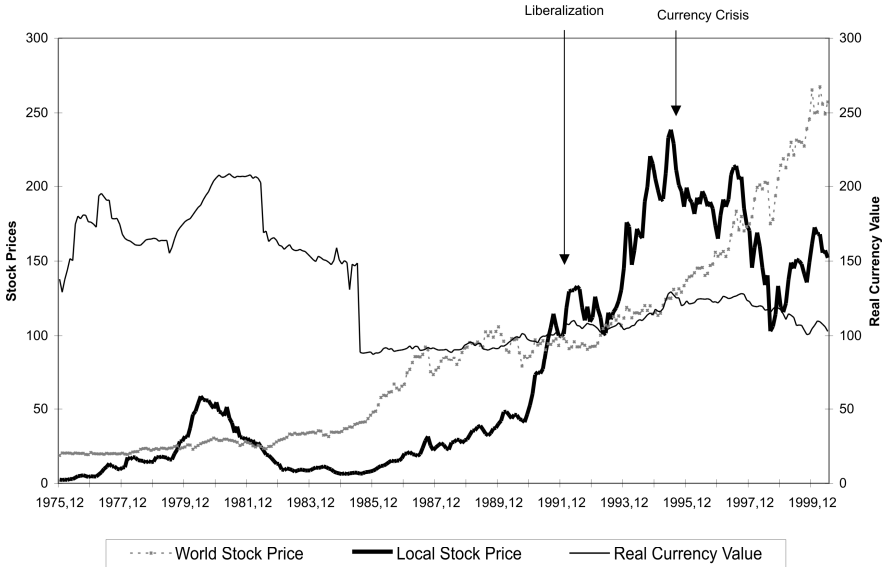
Figure 4: Stock Prices (in U.S. Dollars) and Real Currency Values in Colombia
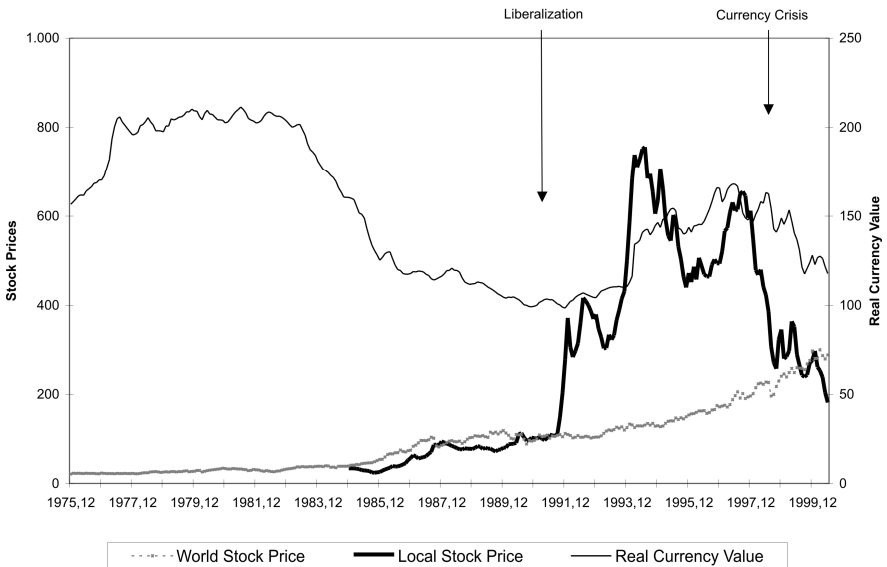
Figure 5: Stock Prices (in U.S. Dollars) and Real Currency Values in Mexico
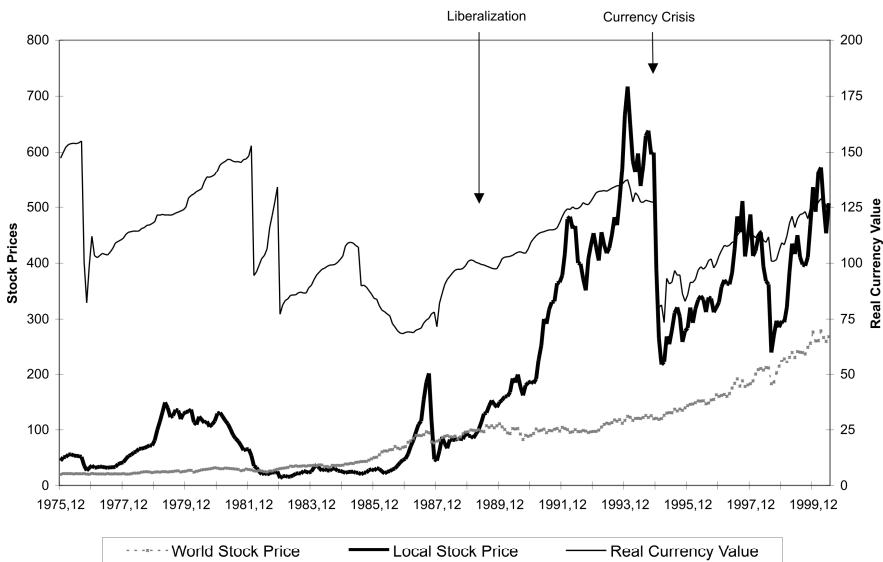
Figure 6: Stock Prices (in U.S. Dollars) and Real Currency Values in Venezuela
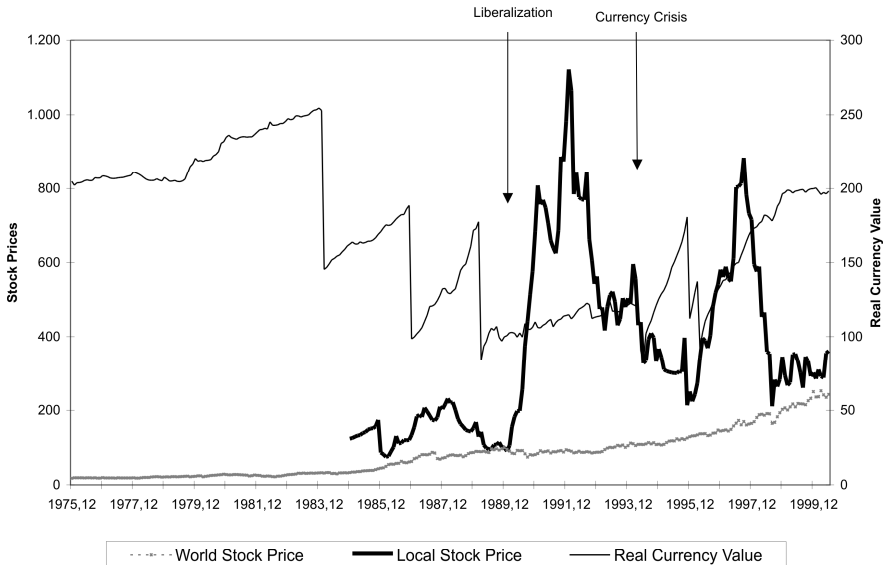
Figure 7: Stock Prices (in U.S. Dollars) and Real Currency Values in Indonesia
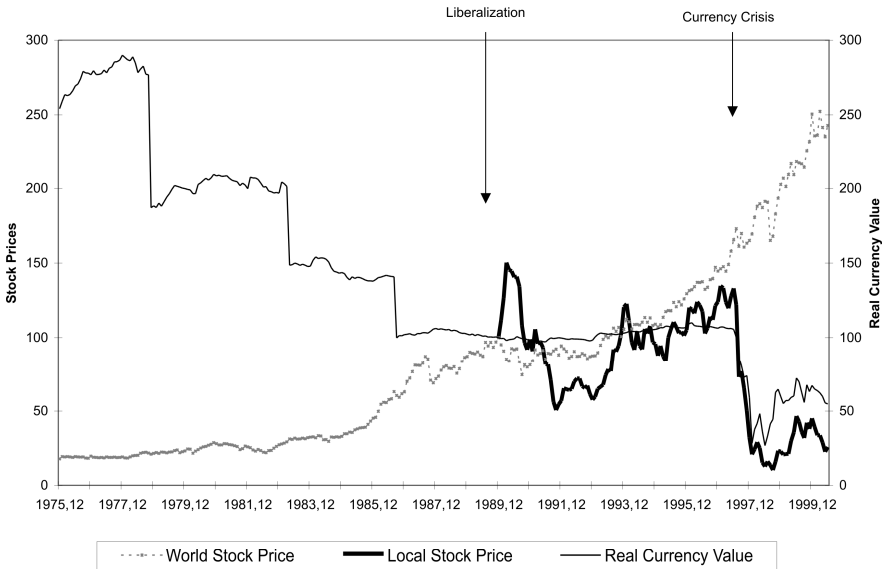
Figure 8: Stock Prices (in U.S. Dollars) and Real Currency Values in Korea

Figure 9: Stock Prices (in U.S. Dollars) and Real Currency Values in Malaysia

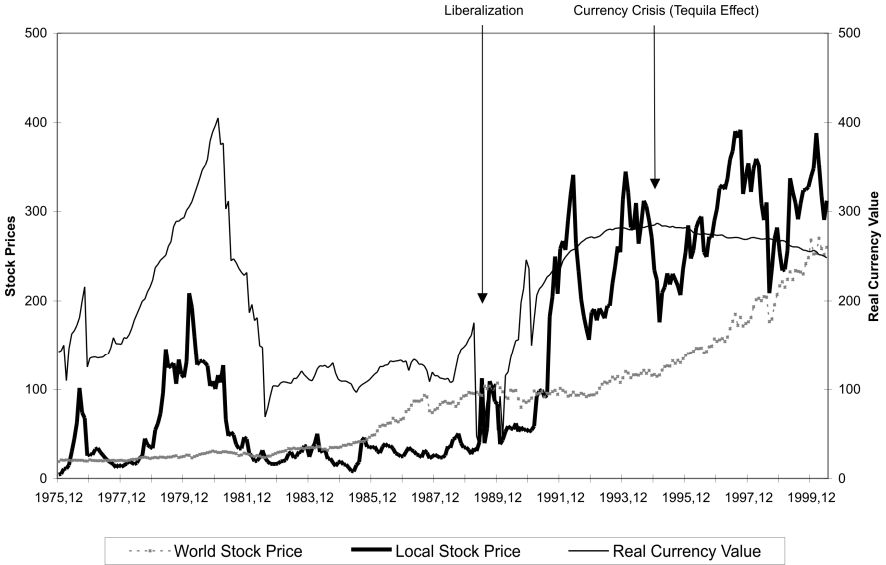**Figure 10: Stock Prices (in U.S. Dollars) and Real Currency Values in the Philippines**

Figure 11: Stock Prices (in U.S. Dollars) and Real Currency Values in Taiwan
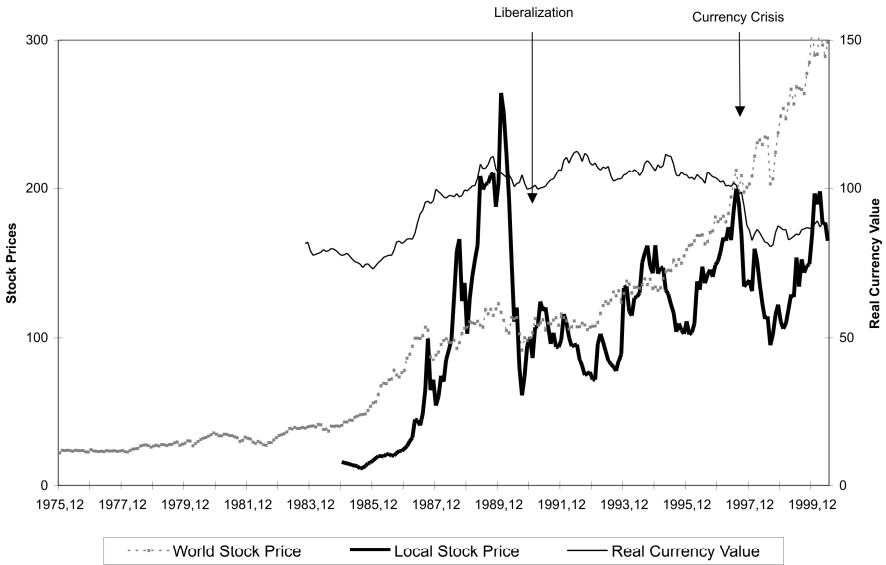
Figure 12: Stock Prices (in U.S. Dollars) and Real Currency Values in Thailand
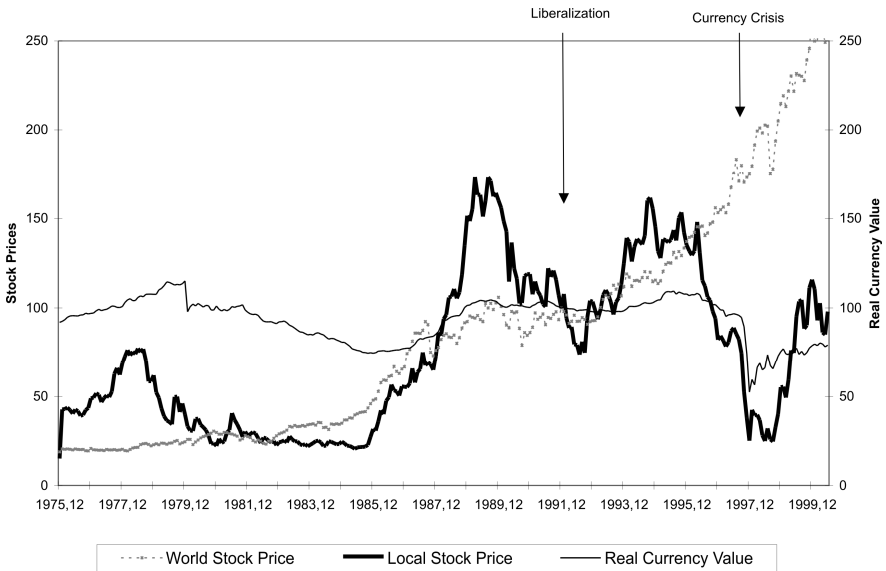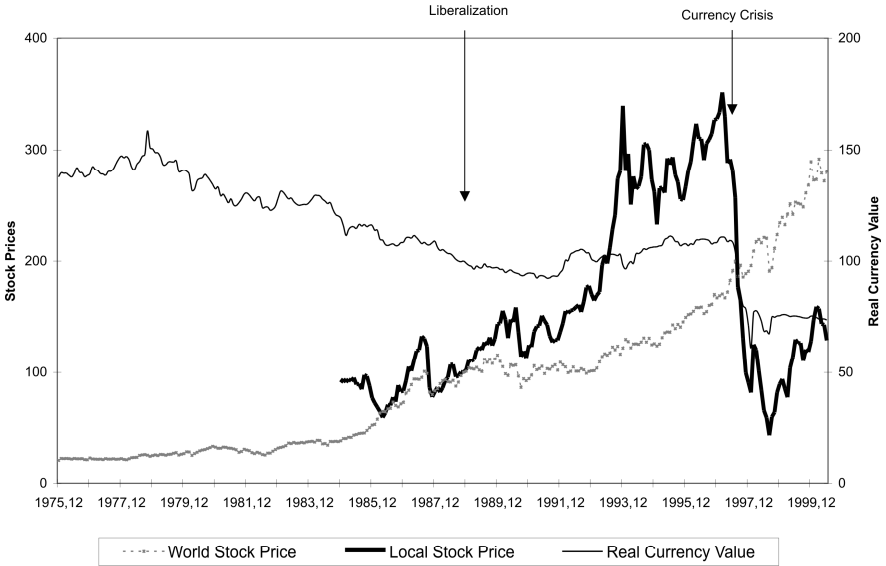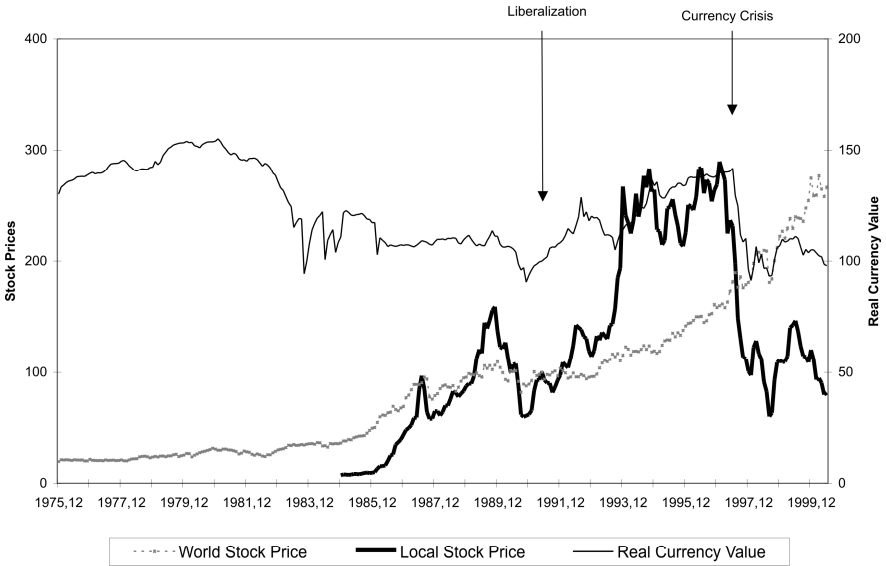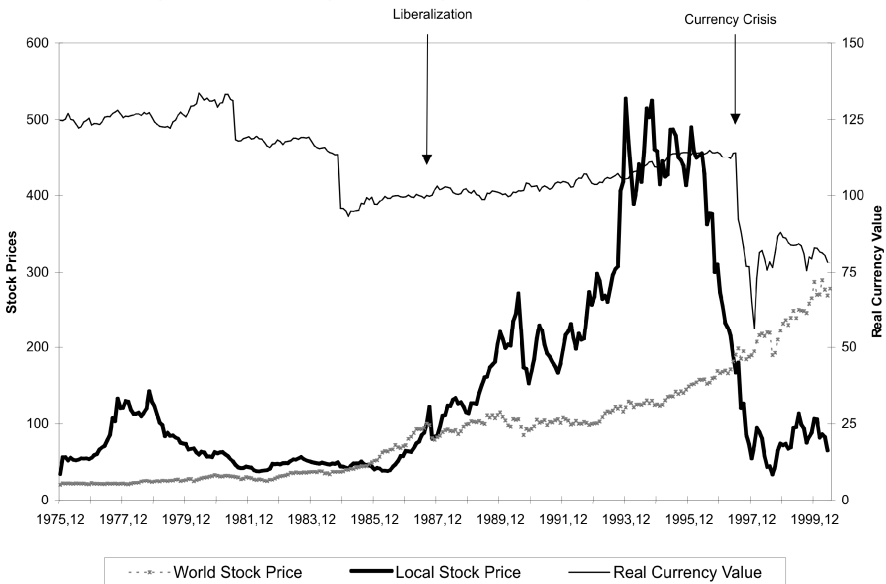
Table 1:   *Stock Market Capitalization and Gross Domestic Product*

	Argentina		Brazil		Chile		Colombia		Mexico		Venezuela	
	1989	1999	1990	1999	1991	1999	1990	1999	1988	1999	1989	1999
Market Cap (bn.$)	4.2	228.0	16.4	228.0	28.0	68.2	1.4	11.6	13.8	154.0	1.5	7.5
Change of Mkt Cap		5296%		1294%		144%		719%		1018%		408%
GDP (bn.$)	69.0	283.2	465.0	751.5	34.6	67.5	46.9	86.6	174.2	483.7	38.5	102.2
Change of GDP		310%		62%		95%		85%		178%		166%
Mkt Cap/GDP (%)	6%	81%	4%	30%	81%	101%	3%	13%	8%	32%	4%	7%

	Indonesia		Korea		Malaysia		Philippines		Taiwan		Thailand	
	1988	1999	1991	1999	1988	1999	1990	1999	1990	1999	1986	1999
Market Cap (bn.$)	0.3	64.1	96.4	305.5	23.3	145.4	5.9	48.1	100.7	376.0	2.9	58.4
Change of Mkt Cap		25231%		217%		524%		712%		273%		928%
GDP (bn.$)	84.3	142.5	295.2	406.9	34.8	79.0	44.3	76.6	160.2	275.0	41.7	124.4
Change of GDP		69%		38%		127%		73%		72%		199%
Mkt Cap/GDP (%)	0.3%	45%	33%	75%	67%	184%	13%	63%	63%	137%	7%	47%

(The first date corresponds to the year before the official financial liberalization)

Table 2a: *Excess Returns Statistics*

	Argentina		Brazil		Chile		Colombia		Mexico		Venezuela	
Sample begins:	76.01	89.11	76.01	91.05	76.01	92.01	85.01	91.02	96.01	89.05	85.01	90.01
Sample ends:	89.10	00.06	91.04	00.06	91.12	00.06	91.01	00.06	89.04	00.06	90.00	00.06
Mean	5.0%	1.5%	0.1%	2.1%	1.8%	0.3%	1.0%	0.6%	0.8%	1.3%	0.2%	1.7%
Standard Deviation	31.4%	14.6%	17.0%	13.9%	11.6%	7.4%	4.0%	10.3%	14.2	9.8	6.9%	14.6%
Skewness	1.9	1.9	0.5	0.5	0.9	-0.1	1.5	1.2	-0.7	-1.0	-2.2	0.2
Kurtosis	9.8	16.8	4.1	5.0	6.0	4.0	10.6	5.5	5.7	5.0	22.7	4.4
F-Test: Prob (Equality of Mean)	23.6%		28.9%		24.0%		77.8%		75.5%		37.6%	
F-Test: Prob (Equality of Mean)	0.0%*		3.9%*		0.0%*		0.0%*		0.0%*		1.6%*	

(The left column corresponds to the sub–sample until the official financial liberalization)
(The right column corresponds to the sub–sample from the official financial liberalization on)
*A star * means that the null hypothesis is rejected at a 10% significance level)*

Table 2b: *Excess Returns Statistics*

	Indonesia		Korea		Malaysia		Philippines		Taiwan		Thailand	
Sample begins :	**76.01**	**89.09**	**76.01**	**92.01**	**85.01**	**88.12**	**85.01**	**91.06**	**76.01**	**89.09**	**76.01**	**92.01**
Sample ends:	**89.08**	**00.06**	**91.12**	**00.06**	**88.11**	**00.06**	**91.05**	**00.06**	**89.08**	**00.06**	**91.12**	**00.06**
Mean	#N/A	0.4%	1.0%	0.5%	0.0%	0.3%	3.5%	0.1%	3.3%	0.5%	0.2%	0.1%
Standard Deviation	#N/A	14.1%	16.1%	13.6%	4.9%	10.8%	7.6%	10.3	10.5	10.02	8.4%	12.5%
Skewness	#N/A	0.46	7.68	1.32	-0.99	0.86	0.56	1.06	0.09	1.40	3.39	0.23
Kurtosis	#N/A	5.55	86.12	8.28	15.79	7.92	11.54	7.26	9.06	7.06	24.33	4.75
F-Test: Prob **(Equality of Mean)**	#N/A		76.8%		87.0%		3.2%*		16.5%		88.7%	
F-Test: Prob **(Equality of Mean)**	#N/A		10.3%		6.5%*		32.8%		0.0%*		0.0%*	

(The left column corresponds to the sub–sample until the official financial liberalization)
(The right column corresponds to the sub–sample from the official financial liberalization on)
*(A star * means that the null hypothesis is rejected at a 10% significance level)*

Table 3: *Weak Efficiency Tests*

	Argentina		Brazil		Chile		Colombia		Mexico		Venezuela	
Sample begins:	**76.01**	**89.11**	**76.01**	**91.05**	**76.01**	**92.01**	**85.01**	**91.02**	**76.01**	**89.05**	**85.01**	**90.01**
Sample Ends:	**89.10**	**00.06**	**91.04**	**00.06**	**91.12**	**00.06**	**91.01**	**00.06**	**89.04**	**00.06**	**90.00**	**00.06**
Wald Test: Prob **(AR1=AR2=...=AR6=0)**	**4.8%***	84.0%	75.2%	35.8%	**0.0%***	41.7%	16.1%	19.5%	**0.3%***	82.8%	97.2%	64.2%

	Indonesia		Korea		Malaysia		Philippines		Taiwan		Thailand	
Sample begins:	**76.01**	**89.09**	**76.01**	**92.01**	**85.01**	**88.12**	**85.01**	**91.06**	**85.01**	**91.01**	**76.01**	**87.09**
Sample Ends:	**89.08**	**00.06**	**91.12**	**00.06**	**88.11**	**00.06**	**91.05**	**00.06**	**90.12**	**00.06**	**87.08**	**00.06**
Wald Test: Prob **(AR1=AR2=...=AR6=0)**	#N/A	83.1%	99.8%	**5.9%***	97.6%	**0.4%***	**0.0%***	**3.7%***	99.0%	98.9%	**0.0%***	**1.0%***

(The left column corresponds to the sub–sample until the official financial liberalization)
(The right column corresponds to the sub–sample from the official financial liberalization on)
*(A star * means that the null hypothesis is rejected at a 10% significance level)*

Table 4a: *International CAPM and Financial Liberalization*

	Argentina		Brazil		Chile		Colombia		Mexico		Venezuela	
Sample begins :	**78.01**	**89.11**	**83.01**	**91.05**	**78.01**	**92.01**	**85.01**	**91.02**	**78.01**	**89.05**	**85.01**	**90.01**
Sample ends:	**89.10**	**00.06**	**91.04**	**00.06**	**91.12**	**00.06**	**91.01**	**00.06**	**89.04**	**00.06**	**90.00**	**00.06**
World Excess Returns	0.20	1.14*	0.65	1.34*	0.21	0.70*	0.15	-0.01	0.24	0.82*	-0.07	0.23
	(0.28)	(3.01)	(1.15)	(3.56)	(1.18)	(3.43)	(0.60)	(0.04)	(0.86)	(4.53)	(0.12)	(0.55)
Currency Crisis Index	0.033	-0.002	0.040	0.034*	0.005	0.012*	0.009	0.015*	0.017*	0.020*	-0.017	-0.002
	(1.64)	(0.12)	(1.66)	(4.89)	(0.70)	(2.62)	(0.76)	(2.42)	(2.06)	(5.15)	(0.55)	(0.14)
R2	1.3%	13.8%	16.5%	34.2%	16.8%	24.5%	16.4%	21.1%	14.9%	34.4%	17.8%	8.8%
Pr (Lag1=...=Lag6=0):												
Excess Stock Returns	37.1%	94.2%	63.3%	8.9%	78.7%	68.1%	95.3%	68.8%	81.2%	32.8%	95.9%	53.7%
Crisis Index	84.6%	76.1%	87.2%	81.9%	34.9%	89.4%	86.0%	62.7%	10.2%	28.6%	99.7%	91.5%
Lags of All Variables	65.2%	95.0%	77.3%	30.8%	43.6%	84.8%	87.4%	78.5%	21.3%	24.1%	93.8%	82.5%

(The left column corresponds to the sub–sample until the official financial liberalization)
(The right column corresponds to the sub–sample from the official financial liberalization on)
*(A star * means that the null hypothesis is rejected at a 5% significance level)*

Table 4b: *International CAPM and Financial Liberalization*

	Indonesia		Korea		Malaysia		Philippines		Taiwan		Thailand	
Sample begins :	**78.01**	**89.11**	**83.01**	**91.05**	**78.01**	**92.01**	**85.01**	**91.02**	**78.01**	**89.05**	**85.01**	**90.01**
Sample ends:	**89.10**	**00.06**	**91.04**	**00.06**	**91.12**	**00.06**	**91.01**	**00.06**	**89.04**	**00.06**	**90.00**	**00.06**
World Excess Returns	#N/A	1.20*	0.64*	0.83*	0.46	0.77*	0.85*	1.21*	0.28	0.78*	0.06	1.31*
	#N/A	(5.21)	(4.45)	(2.35)	(0.94)	(4.44)	(2.37)	(5.32)	(0.29)	(2.63)	(0.40)	(7.08)
Currency Crisis Index	#N/A	0.025*	0.0002	0.026*	0.010	0.011*	0.009	0.026*	0.013	0.012*	0.006	-0.003
	#N/A	(4.66)	(0.03)	(3.10)	(0.64)	(2.40)	(0.65)	(3.67)	(0.53)	(1.88)	(1.47)	(0.69)
R2	#N/A	40.8%	4.5%	42.0%	36.9%	31.8%	31.8%	46.7%	41.5%	23.8%	30.6%	28.7%
Pr (Lag1=...=Lag6=0):												
Excess Stock Returns	#N/A	12.0%	0.0%*	8.9%*	56.9%	10.3%	22.5%	1.4%*	46.5%	34.7%	13.7%	0.0%*
Crisis Index	#N/A	15.3%	1.3%*	42.6%	88.3%	23.3%	74.8%	13.6%	63.4%	37.2%	4.3%*	15.8%
Lags of All Variables	#N/A	11.0%	0.0%*	24.4%	64.7%	0.7%*	56.8%	1.1%*	16.9%	16.9%	0.1%*	0.0%*

(The left column corresponds to the sub–sample until the official financial liberalization)
(The right column corresponds to the sub–sample from the official financial liberalization on)
*(A star * means that the null hypothesis is rejected at a 10% significance level)*

Table 5: *Predictive Power of Emerging Stock Markets in terms of Currency Crises*

	Argentina		Brazil		Chile		Colombia		Mexico		Venezuela	
Sample begins:	**78.01**	**89.11**	**83.01**	**91.05**	**78.01**	**92.01**	**85.01**	**91.02**	**78.01**	**89.05**	**85.01**	**90.01**
Sample Ends:	**89.10**	**00.06**	**91.04**	**00.06**	**91.12**	**00.06**	**91.01**	**00.06**	**89.04**	**00.06**	**90.00**	**00.06**
Granger Causality Test (6 lags): Currency Crises	14.8%	**4.4%***	17.1%	**2.1%***	**8.7%***	41.8%	45.5%	**9.9%***	59.2%	**9.8%***	76.5%	**0.6%***

	Indonesia		Korea		Malaysia		Philippines		Taiwan		Thailand	
Sample begins:	**78.01**	**89.09**	**78.01**	**92.01**	**85.01**	**88.12**	**85.01**	**91.06**	**85.01**	**91.01**	**78.01**	**87.09**
Sample Ends:	**89.08**	**00.06**	**91.12**	**00.06**	**88.11**	**00.06**	**91.05**	**00.06**	**91.0**	**00.06**	**87.08**	**00.06**
Granger Causality Test (6 lags): Currency Crises	#N/A	81.7%	22.8%	91.6%	57.1%	68.1%	**32.1%***	**6.6%***	31.4%	61.5%	39.1%	38.2%

(The left column corresponds to the sub–sample until the official financial liberalization)
(The right column corresponds to the sub–sample from the official financial liberalization on)
*(A star * means that the null hypothesis is rejected at a 10% significance level)*