

# Financial Liberalization and Stock Market Behaviour in Emerging Countries

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*Received November 18, 2013; Revised January 17, 2014; Accepted January 24, 2014*

**Abstract** In this paper, we analyze the behaviour of the stock market cycles in emerging countries in the region of Latin America (Argentina, Brazil, Chile Colombia and Mexico) and Asia (Philippines, Korea, Taiwan and Thailand) and we compare their characteristics with those of the United States between 1975 and 2005. We make a distinction between the pre and post-financial reform periods to study the effects of financial liberalization over time. We use the uni and multivariate unobserved components structural time series models. We find that the amplitude and volatility of American Latin countries have declined substantially after the date of financial liberalization to achieve less than those detected during the financial repression. The cycle's synchronization with the United States has also grown considerably to around 70%. For the Asian countries, the positive effects of financial liberalization on the cyclical characteristics are not yet clear in medium term. The amplitude and volatility cycles of the Asian countries have been strengthened following the implementation of financial liberalization. But in recent years, there is a downward trend in the amplitude and volatility with improved synchronization of market cycles with those of the United States.

**Keywords:** *business cycle, emerging stock market, financial liberalization, structural unobserved components, cycle synchronisation*

**Cite This Article:** Mnif Trabelsi Afef, "Financial Liberalization and Stock Market Behaviour in Emerging CountriesX." *Journal of Behavioural Economics, Finance, Entrepreneurship, Accounting and Transport*, vol. 2, no. 1 (2014): 8-17. doi: 10.12691/jbe-2-1-2.

## 1. Introduction

The liberalization process initiated by the emerging countries is motivated mostly by the desire to develop their domestic financial market, the integration of their economies into the world economy and diversification opportunities that are much more beneficial. However, the observation of synchronous and violent fluctuations of many stock markets poses a problem to the financial theory. In fact, the beneficial effect of liberalization on the collective prosperity depends on the importance of information asymmetry and severity of adverse selection, moral hazard and market inefficiency.

Financial liberalization allows more efficient allocation of savings and resources. Therefore, it offers investors a better portfolio diversification and therefore opportunities for sharing risk. This opportunity for diversification can improve the stability of market cycles. However, rapid liberalization can lead to fragility of the financial system and the problem of asymmetric information. These two problems are the main causes of the amplification and the instability of market cycles can spread to the entire economic system.

L. Miotti and D. Plihon [26] consider the changes in the financial environment; in a context of financial liberalization are the main cause of amplification of

market cycles and the recent financial crises. Cyclic changes in the price of credit risk involved largely in the pronunciation of the phases of market cycles and volatility. G. Kaminsky and C. Reinhart [18], consider that the credit boom, following financial liberalization, the amplification factor of market cycles. The Asian crisis of 1998 provides a recent example of this mechanism. In general, the credit market can play a significant role in the formation of speculative bubbles with funds that can be mobilized for the purchase of shares. Financial liberalization can be a source of weakness in the banking system and gives banks more freedom to take more risk, which amplifies and increases the volatility of stock market cycles. This problem of amplification and instability of the stock market cycles can be transmitted to the real economy and financial sphere. Kaminsky and Reinhart [16], find that the propensity to crises increases in the aftermath of financial liberalization. On the contrary, Aggarwal. R [1] and Berkaert. G [4] claim that financial liberalization promotes transparency and accountability, reduces adverse selection and moral hazard in financial markets. Bekaert and Harvey [3], De Santis and Imrohorglu [10], Huang and Yang [15] Kim and Singal [22], Kaminsky and Schmuckler [20] and Edwards and al. [21] studied the behaviour of the stock market cycles in emerging countries taking into consideration the time variation of financial liberalization. They found that emerging market cycles are very pronounced during the first years of

financial liberalization, but in the long term, cycles are more stable and comparable to those of developed countries. For Artus [2], synchronization market cycles in developed countries with emerging ones is explained by financial liberalization which led to a rapid opening of emerging financial markets. Therefore, there is recently a strong correlation between confidence indicators and contagion effects between these indices, which justified the idea that trust could be new support economic interdependencies.

The goal of this paper is to present the role of financial liberalization in the behaviour of stock market cycles of emerging countries and their synchronization with those of developed countries. In this paper we analyze the characteristics of the stock market cycles of two emerging regions (Asian and American Latin countries) and compared with those of the United States during the period of financial liberalization (1975-2005). We try to answer the following questions: What are the characteristics of the stock market cycles in emerging countries? Are they differ by region? And are they comparable to those of the United States?

What are the effects of financial liberalization on the characteristics of market cycles? Have they changed over time?

Is there a stock market cycles synchronization between emerging countries and the United States? Have they changed over time?

The structure of the paper is as follows: In a second section, we present a review of literature is interested in the behaviour of market cycles in emerging markets during the years of financial liberalization. In a third section, we present the data and the model chosen for the estimation. The fourth section shows the uni-and multivariate state-space structural models. The fifth section showcases the estimated results. Finally, the sixth section presents a conclusion.

## 2. Literature Review

Several recent studies have interested the behaviour of emerging market cycles taking into consideration the variation in time of financial liberalization.

Bekaert and Harvey [3], De Santis and Imrohorglu [10] and Bekaert and al. [9] found that the volatility of emerging market cycles decreased after financial liberalization.

Huang and Yang [15] (using the dates of financial liberalization from De Santis and Imrohorglu [10] found mixed results. The stock market volatility has increased for South Korea, Mexico and Turkey countries; conversely, it decreased to other countries (Argentina, Chile, Malaysia and the Philippines).

Sebastian Edwards, Javier Gomez Biscarri and Fernando Perez de Gracia [11] studied the medium-term effects of financial liberalization on stock market cycles of six emerging countries, Argentina, Brazil, Chile, Mexico, Korea and Thailand during the period December 1975 to January 2001 using the algorithm of Bry and Boschan. In addition they studied their synchronization with the United States using a non-parametric method to detect peaks and troughs. They find that after financial liberalization Latin American stock markets have behaved

more similarly to stock markets in developed countries. However, Asian countries have become more dissimilar.

Graciela Laura, Kaminsky and Sergio Schmukler [18,19,20,21], studied the effects of short-term, medium-term and long-term financial liberalization in emerging market cycles and compared their characteristics with the stock markets of developed countries using the non-parametric model. They found that the time variation has a crucial role in the change of behaviour of market cycles. In the short term cycles are unstable but long term, they are more stable.

Our contribution in this paper is to analyze the behaviour of emerging market cycles using the unobserved component structural models.

In fact, two methods are available to study business cycles: descriptive methods and econometric statistical methods. Descriptive methods forecasters do not use statistical models and software, based on rules to identify turning points. These econometric statistics have the advantage of more descriptive methods, be subject to estimation and testing. They lend themselves to interpretive economic. These methods are all based on a decomposition of the components observed in two series: trend and cycle. In our paper we retain the unobserved component structural models based on the use of state-space model and Kalman filter. It has the advantage of exploiting the specific component of the series stochastic characteristics, without making any assumptions about a correlation relationship between the cycle and the trend.

## 3. Description of Data and Methodologies

In this paper, we study the behavior of the stock market cycles in the countries of Latin America (Argentina, Brazil, Chile Colombia and Mexico) and Asia (Philippines, Korea, Taiwan and Thailand) by comparing it with that of the United States between 1975 and 2005. To study the effects of financial liberalization over time, we make a distinction between the pre and post-financial reform periods. The post financial reform is devised on two periods: short effect and long effect of financial liberalization. Short run effect: include the four years after the date of liberalization. Long run effect: include the fifth year after the date of liberalization. The year thereafter, conditional on the deregulation is not being reserved.

Our study is based on stock indexes monthly S & P / IFCG (S & P / IFC Global Index) denominated in domestic currency (Standad and Poor / Global International Finance Corporation) for emerging markets and the S & P 500 for the U.S. We use the uni and multivariate unobserved components structural time series models. We used the application STAMP 7.0 (Structural Time Series Analyser, Modeller and Predictor, 2006) that has been designed especially to deal with unobserved components models [23].

The dates of liberalization (Table 1) are finding by G. L. Kaminsky and S. Schmukler [21]. Most of studies focus on the elimination of controls on just one particular financial sector, be it the capital account, the domestic financial sector and the stock market. Kaminsky and Schmukler find a chronology deals with the regulations in three sectors.

**Table 1. The dates of financial liberalization**

Asian countries		Latin American countries	
Philippines	01/94	Argentina	01/90
Korea	01/96	Brazil	03/95
Taiwan	01/97	Chile	01/92
Thailand	01/98	Colombia	09/98
		Mexico	11/91

For each region, our study is based on two components: On abroad, we study the characteristics (Duration, amplitude and volatility) of the stock market cycles of emerging countries one by one, and we compare them with that of the United States. Then we study the degree of synchronization of cycles emerging, with the United States.

#### 4. Uni-and Multivariate State-Space Structural Models

We use the uni and multivariate unobserved components structural time series models<sup>1</sup> proposed by the statistician Andrew Harvey for the study of stock market cycles in emerging countries. A model is called "structural" when it contains unobserved components can be a direct interpretation. The extraction of unobservable components: trend, cycle and irregular, is using the technique of Kalman filter, once written in its state-space model form. This method has the advantage over more descriptive methods to be subjected to an estimate. The model correctly reproduces the irregularities and deformations of actual trading activity.

The model used in this study may be written as:

$$y_t = T_t + C_t + \varepsilon_t, \quad t = 1, \dots, H \quad (1)$$

Where  $y_t$  is the logarithm of the observed price series,  $T_t$  is the trend,  $C_t$  is the cyclical component and  $\varepsilon_t$  is the irregular component.

The trend, which represents the long-run movement in a series, is assumed to be stochastic and linear. This component can be represented by the equation:

$$T_t = T_{t-1} + \beta_{t-1} + \eta_t \quad (2)$$

$$\beta_t = \beta_{t-1} + \zeta_t \quad (3)$$

$\eta_t$  and  $\zeta_t$  are orthogonal white noises, they allows the level of the trend to fluctuate while  $\zeta_t$  tilts the slope. The stochastic nature of the trend is determined by the magnitude of the variances of these two noises. The model offers four types of trends:

The extreme model is deterministic linear trend ( $\sigma_\eta^2 = \sigma_\zeta^2 = 0$ ), local linear trend, slowly moving smooth trend ( $\sigma_\eta^2 = 0$ ) and random walk with drift ( $\sigma_\zeta^2 = 0$ ).

With:  $\sigma_\varepsilon^2$  is Standard error of irregular component,  $\sigma_\eta^2$  is Standard error of innovations shocking the level of

trend and  $\sigma_\zeta^2$  is Standard error of innovations shocking the slope of trend.

The cyclical component may be represented by:

$$\begin{bmatrix} C_t \\ C_t^* \end{bmatrix} = \rho \begin{bmatrix} \cos \lambda & \sin \lambda \\ -\sin \lambda & \cos \lambda \end{bmatrix} \begin{bmatrix} C_{t-1} \\ C_{t-1}^* \end{bmatrix} + \begin{bmatrix} \kappa_t \\ \kappa_t^* \end{bmatrix} \quad (4)$$

$C_t^*$  where appears by construction while  $\kappa_t$  and  $\kappa_t^*$  are uncorrelated white noise disturbances with variances  $\sigma\kappa^2$ , which corresponds to the volatility of the cycle. The parameters  $0 < \lambda < \pi$  and  $0 < \rho < 1$  are respectively the frequency of the cycle and the damping factor on the amplitude. The period of the cycle is equal to  $2\pi/\lambda$  (expressed for example in the number of months if there is of a monthly series like our study), represents the time required for a complete oscillation cycle occurs after an initial shock. The cycle is a stationary ARMA (2, 1) process when the coefficient  $\rho$  is strictly inferior to one.

The univariate state-space model may be a multivariate generalization where  $y_t$  decompositions own several variables are estimated jointly. Several cycles of different amplitudes and periods may be incorporated into the model to show the oscillatory movements associated with different frequencies. The overall cycle is the sum of the different cyclical components, so it mixes several basic frequencies. The equation has a general form:

$$y_t = T_t + \sum_{j=1}^m C_{jt} + \sum_{k=1}^p \delta_k w_{kt} + \varepsilon_t, \quad t = 1, \dots, H \quad (5)$$

Where  $w_k$  are  $p$  intervention variables.

In the case of trends, this approach is similar to cointegration, which is to test the existence of stationary long-term relationships between different series. In the case of cycles, the multivariate approach allows us to study the similarity and synchronization of cyclical series. Cycles are similar if the estimated series have the same structural characteristics (the damping factor and the period of the cycle), but they are not synchronized because they are not caused by the same shocks. Common cycles are not only similar, but are also associated with shocks perfectly correlated; they are perfectly synchronized (if the unit correlation is positive sign) and differ only in their amplitude. The interest of the multivariate dimension is to calculate the coefficient of synchronization between cycles.

#### 5. Estimation Results

The results of estimating the state vector of equation (1) uses maximum likelihood. The extraction of the unobserved components uses the Kalman filter. A set of diagnoses is available in order to assess the empirical fitness of the model. The goodness of fit and diagnostics of the model include the Prediction Error Variance (PEV), the Bowman-Shenton test for normality of the residuals and a test for the heteroskedasticity  $N_{DH}$ , the Box-Ljung test for serial correlation  $Q(p, q)$ , and the coefficient of determination  $RD^2$ . If  $RD^2$  is positive, the estimated model shown on the historical period, better predictive performance; otherwise the model tested is therefore rejected. Decomposition into two series, before and after

<sup>1</sup> In order to carry out our estimations, we used the application STAMP 7.0 (Structural Time Series Analyser, Modeller and Predictor) that has been designed especially to deal with unobserved components models.

the date of the financial liberalization has been practiced in a univariate framework. The diagnoses of quality statistics are quite satisfactory.

### 5.1. The Asian Stock Market Cycles Compared to US Cycle

The Table 2 shows the results of the univariate decomposition of the monthly S & P 500 during the period of 1975-2005. The model is slowly moving smooth trend accompanied by a stochastic cycle without irregular component. The cycle time is estimated to 37,817 months (over three years), which is a reasonable time; the volatility rises to 0.002 and amplitude to 0.003. The stock market cycles are volatile in the eighties.

**Table 2. Trend-cycle split of US stock market**

Diagnosis	
PEV	0.002
RD <sup>2</sup>	0.048
N <sub>DH</sub>	1.144
Q (p, q)	8.5365; (p = 17, q = 12)
Parameters	
σ <sup>2</sup> <sub>ε</sub> (Standard error of irregular component)	0.000
σ <sup>2</sup> <sub>η</sub> (Standard error of innovations shocking the level of trend)	0.000
σ <sup>2</sup> <sub>ζ</sub> (Standard error of innovations shocking the slope of trend)	0,036
Characteristics	
Volatility	0.002
Amplitude	0.003
ρ (damping factor)	0.927
Period of the cycle (months)	37.817
Frequency	0.166

The Table 3 and Table 4 shows the characteristics of stock market cycles in Asian countries (Philippines, Korea, Taiwan and Thailand) during 1975–2005. We classify

financial cycles in two categories, those that occur during recession times and those that occur after liberalization.

**Table 3. Trend split of Asian stock market cycles in repressed and liberalized period**

	Philippines		Korea		Taiwan		Thailand	
	Repressed	Liberalized	repressed	liberalized	Repressed	Liberalized	repressed	Liberalized
Diagnosis								
PEV	0.012	0.031	0.006	0.019	0.012	0.005	0.006	0.009
RD <sup>2</sup>	0.001	0.083	0.011	0.002	0.021	0.113	0.056	0.004
N <sub>DH</sub>	1.135	0.630	0.743	0.134	0.129	0.576	2.368	0.039
Q (p, q)	25.070; (p=13, q=10)	10.479; (p=10, q=7)	11.886; (p=14, q=11)	4.994; (p=9, q=6)	14.459; (p=14, q=11)	10.228; (p=9, q=4)	10.687; (p=15, q=12)	6.258; (p=8, q=5)
Parameters								
σ <sup>2</sup> <sub>ε</sub>	0.000	0.010	0.000	0.001	0.000	0.001	0.001	0.002
σ <sup>2</sup> <sub>η</sub>	0.010	0.000	0.005	0.018	0.012	0.000	0.0000	0.000
σ <sup>2</sup> <sub>ζ</sub>	0.003	0.002	0.004	0.000	0.000	0.015	0.142	0.006
Characteristics								
Volatility	0.001	0.023 (+)	0.001	0.092 (+)	0.001	0.006 (+)	0.001	0.005 (+)
Amplitude	0.054	0.076	0.056	0.135 (+)	0.045	0.101	0.059	0.092 (+)
ρ	0.977	1.000	0.991	0.962	0.982	0.968	0.904	0.865
Period of the cycle	14.962	24.869 (+)	19.468	33.041	15.229	24.130	10.876	20.371 (+)
Frequency	0.419	0.252	0.603	0.159	0.412	0.260	0.577	0.303

Table 4. Trend split of Asian stock market in the post financial reform

	Philippines		Korea		Taiwan		Thailand	
	Short run	Long Run	Short run	Long run	Short run	Long run	Short run	Long run
Diagnosis								
PEV	0.037	0.016	0.019	0.064	0.005	0.033	0.024	0.001
RD <sup>2</sup>	0.035	0.365	0.353	0.170	0.325	0.436	0.505	0.468
N <sub>DH</sub>	0.294	0.104	0.051	0.073	0.333	0.735	0.544	0.131
Q (p, q)	2.0482; (p=5, q=0)	3.497; (p=7, q=2)	1.754 (p=6, q=1)	2.0175 (p=5, q=0)	2.537; (p=5, q=0)	2.3969; (p=3, q=2)	4.996; (p=5, q=0)	0.827; (p=4, q=2)
Parameters								
$\sigma^2_{\varepsilon}$	0.022	0.007	0.002	0.064	0.023	0.078	0.005	0.001
$\sigma^2_{\eta}$	0.000	0.000	0.000	0.000	0.051	0.000	0.001	0.086
$\sigma^2_{\zeta}$	0.171	0.133	0.096	0.046	0.000	0.392	0.000	0.000
Characteristics								
Volatility	0.029 (+)	0.001 (-)	0.146 (+)	0.009 (-)	0.024 (+)	0.0013 (-)	0.0031 (+)	0.0008 (-)
Amplitude	0.181 (+)	0.044 (-)	0.390 (+)	0.088 (-)	0.217 (+)	0.048 (-)	0.074 (+)	0.038 (-)
$\rho$ (damping factor)	1.000	1.000	0.996 (+)	0.951 (-)	1.000	1.000	0.839	0.978
Period of the cycle	25.258	21.235	33.849	19.246	27.461	14.098	15.441	14.593
Frequency	0.248	0.295	0.185	0.326	0.228	0.445	0.406	0.430

For the series of the Philippines studied before the date of financial liberalization, the univariate local linear trend model is accompanied by a long cycle with stochastic irregular component. After the date of financial liberalization, the univariate model is slowly moving smooth trend, accompanied by a deterministic long cycle (damping factor equal to one; graphically deterministic cycle is visible), with irregular component. Financial liberalization has a negative impact on the Philippines in the short term. However, in the long term, there is a marked improvement. Before financial liberalization, the volatility of the long cycle was very low level neighbor to 0.001. With the implementation of the process of financial liberalization, volatility took off at 0.023. The amplitude of the long cycle increased from 0.054 to 0.076. We note a gradual decrease in the levels of volatility and amplitude in the long term. In the medium term, the effects of liberalization on stock market cycles are still negative. The increase in amplitude and volatility of stock market cycles is temporary and reveals that the cycles are gone through a transitional period. The period of the long cycle during the phase of financial repression was equal to 14,962 months, but with financial liberalization, the duration of the long cycle increased to a nearby two years (24,869 months), lower than the cycle U.S.

The univariate model of Korean series is local linear trend with irregular component before the date of financial liberalization. After the date of financial liberalization, the appropriate model is random walk with drift accompanied by a long cycle stochastic, with irregular component. Korea is the country whose volatility (0.001) and amplitude (0.05) are the lowest in the region and all emerging countries studied. Indeed, financial liberalization has a negative effect at short-term and medium-term. The levels of volatility (0.09) and amplitudes (0.135) increased after the date of the financial liberalization. However, from 2001 levels of volatility and amplitude tend to decrease. We note a gradual decrease in levels of volatility (0.009) and amplitude (0.088) in long term. The period of the cycle during the phase of financial repression was very short (19.468 month), but after financial liberalization, the duration of the cycle is

adjusted to nearby three years (33,041 months), comparable to the US cycle duration.

The adequate model for the univariate series studied in Taiwan's financial repression is random walk with drift (the slope of the trend is constant), accompanied by a long cycle stochastic, without irregular component. After the date of financial liberalization, the univariate model is Slowly Moving Smooth Trend, accompanied by a stochastic cycle with irregular component. In the short-term after liberalization, the model is random walk with drift with a deterministic long cycle and irregular component. In the long run, the univariate model is slowly moving smooth trend, accompanied by a deterministic cycle with irregular component. Indeed, financial liberalization has a negative impact on Taiwan in the short term, but in the long term, there is an attenuation of amplitude levels and volatility. During the financial repression, the volatility of the long cycle was very low level 0.001. In the medium term, the effects of liberalization on stock market cycles are always negative. The period of the cycle, during the period of repression, equal to 15,229 months, after financial liberalization it has increased to 24,130 months, but is still lower than the cycle of the United States.

The univariate model for the series of Thailand is slowly moving smooth trend accompanied by a long cycle stochastic, with irregular component. After the date of financial liberalization levels of volatility and amplitude of the market cycle of Thailand have increased by 0.001 to 0.005 and 0.0591 to 0.092. The volatility and amplitude increased considerably during the four years since the process of liberalization. In the medium term, the effects of liberalization on stock market cycles are negative. The cycle period during the financial repression was very short, less than one year (10,876 months). After financial liberalization, the cycle increased to 20,719 months, but still less than the cycle of the United States.

On comparison of estimates univariate delivers a range of information: First, the model Slowly Moving Smooth Trend prevails in the estimate. Then, the effects of financial liberalization on Asian emerging stock market cycles are short-term negative. However, long term effects

of financial liberalization on the characteristics of the stock market cycles are positive. In the medium term, the effects of liberalization on stock market cycles are still negative. Asian countries seem to have been affected too hard by the financial crisis of 1997. Indeed, most of the countries studied regain their stability in the most recent years. Finally, with regard to the duration of market cycles, we see that it has increased for most Asian countries, after

the financial liberalization, to be more comparable to the U.S. market cycle's duration.

Table 5 presents the results of bivariate estimation of the American and Asian splits. In fact the community model slowly moving smooth trend, makes it easy to compare the trend trajectories of American and emerging market indices.

**Table 5. Bivariate estimation of the American and Asian splits**

	Synchronization in pre-liberalization	Synchronization in post liberalization	Synchronization in short term	Synchronization in long term
Korea	0.029	0.312 (+)	0.298 (+)	0.465 (+)
Philippines	0.030	0.013 (+)	0.032 (=)	-0.010 (-)
Taiwan	0.052	0.496 (+)	0.215 (+)	0.688 (+)
Thailand	0.136	0.543 (+)	0.314 (+)	0.699 (+)

The cycle synchronization is almost absent before the date of financial liberalization, with the exception of Thailand. However, after the date of the financial liberalization, there is an improvement of synchronization cycles, although it is always less than 1, with the exception of the Philippines. The level of synchronization of market cycles of the Philippines with the United States declined after the date of financial liberalization. In the long run, synchronization is negative. This explains a cyclical movement opposite between the Philippines and the United States.

The similarity between American and Asian market cycle has improved considerably during the four years that followed the process of financial liberalization. However, there's not a perfect synchronization. Taiwan and Thailand are the countries with the highest levels of the region synchronization after the date of financial liberalization. It can be concluded that there is a convergence and improved synchronization between stock market cycles of the countries of East Asia with the

United States. However, the synchronization levels are very low because they do not reach 50% for most of the countries studied, with the exception of Thailand.

### 5.2. Trend-Cycle Split of American Latin Stock Market Cycles Compared to US Cycle

The Table 6 and Table 7 shows the characteristics of stock market cycles in Latin American countries (Argentina, Brazil, Colombia, Mexico and Chile) during 1975–2005.

The univariate model for the series of Argentina is random walk with drift, with a stochastic cycle, and irregular components. With regard the series of long term, the univariate model slowly moving smooth trend, with a deterministic cycle and irregular component. Argentina is the country with the level of volatility is the highest in the region of Latin America and the entire sample of countries studied. In fact financial liberalization has positive effects on Argentina in the medium term.

**Table 6. Trend cycle split of Latin American in repressed and liberalized period**

	Argentina		Brazil		Chile		Colombia		Mexico	
	Repre	liberaliz	Repre	Liberalized	Repre	Liberaliz	Repre	Liberal	Repres	Liberal
Diagnosis										
PEV	0.075	0.015	0.027	0.014	0.006	0.002	0.006	0.006	0.019	0.007
RD <sup>2</sup>	0.053	0.020	0.011	0.024	0.144	0.068	0.026	0.134	0.084	0.147
N <sub>DH</sub>	1.249	0.514	4.267	1.138	0.526	0.130	0.995	0.658	0.057	0.346
Q (p, q)	4.127; (p=12,q=7)	8.215; (p=12,q=7)	15.722; (p=14,q=11)	2.322; (p=10,q=7)	20.110; (p=13,q=10)	22.260; (p=11,q=8)	11.889; (p=15,q=12)	2.697; (p=8,q=5)	21.415; (p=12,q=7)	7.397; (p=11,q=6)
Parameters										
$\sigma^2_\varepsilon$	0.004	0.002	0.000	0.013	0.002	0.000	0.000	0.0004	0.000	0.000
$\sigma^2_\eta$	0.055	0.001	0.010	0.005	0.000	0.000	0.000	0.0000	0.015	0.0065
$\sigma^2_\zeta$	0.000	0.000	0.000	0.000	0.027	0.012	0.005	0.002	0.000	0.000
Characteristics										
Volatility	0.128	0.029(-)	0.069	0.032(-)	0.018	0.008(-)	0.066	0.006	0.021	0.005
Amplitude	0.224	0.109(-)	0.222	0.0885(-)	0.099	0.078(-)	0.083	0.076	0.186	0.091
$\rho$ (damping factor)	0.996	0.971	0.924	0.7276	0.828	0.801	0.957	0.776	1.0000	0.999
Period of the cycle	39.927	27.530	41.622	34.327	32.994	24.254	36.796	24.69	33.388	23.372
Frequency	0.151	0.186	0.104	0.119	0.551	0.732	0.110	0.722	0.188	0.268

Table 7. Trend split of American Latin stock market in the post financial reform

	Argentina		Brazil		Chile		Colombia		Mexico	
	Short run	Long run	Short run	Long run	Short run	Long run	Short run	Long run	Short run	Long run
Diagnosis										
PEV	0.019	0.064	0.005	0.033	0.024	0.001	0.003	0.003	0.007	0.006
RD <sup>2</sup>	0.353	0.170	0.325	0.436	0.505	0.468	0.272	0.385	0.409	0.151
N <sub>DH</sub>	0.051	0.073	0.333	0.735	0.544	0.131	0.252	0.914	0.030	0.046
Q (p, q)	1.754 (p=6,q=1)	2.017 (p=5,q=0)	2.537; (p=5,q=0)	2.396; (p=3,q=2)	4.996; (p=5,q=0)	0.827; (p=4,q=2)	2.680; (p=5,q=0)	2.403; (p=4,q=0)	0.375; (p=5,q=0)	8.201; (p=9,q=4)
Parameters										
$\sigma^2_\varepsilon$	0.005	0.001	0.002	0.064	0.023252	0.078	0.001	0.001	0.004	0.001
$\sigma^2_\eta$	0.001	0.086	0.000	0.000	0.051805	0.000	0.000	0.000	0.001	0.003
$\sigma^2_\zeta$	0.000	0.000	0.096	0.046	0.000	0.392	0.002	0.002	0.000	0.000
Characteristics										
Volatility	0.206	0.007	0.070	0.003(-)	0.038	0.005(-)	0.076	0.004	0.07	0.005
Amplitude	0.229	0.115	0.315	0.064(-)	0.206	0.0579(-)	0.113	0.033	0.302	0.100
$\rho$ (damping factor)	0.998	1.000	0.999	1.000	0.805	0.951	0.969	0.896	1.000	1.000
Period of the cycle	27.269	23.398	33.309	19.036	25.212	22.699	26.754	23.609	28.069	25.083
Frequency	0.230	0.268	0.188	0.330	0.992	0.276	0.318	0.059	0.223	0.250

Levels of volatility and the amplitude of the cycle decreased significantly after the date of financial liberalization. During the period of repression, volatility was very high, 0.128. However, after financial liberalization, volatility has significantly decreased to 0.029. With the implementation of the process of financial liberalization, the market cycle of Argentina became more pronounced in the short term, but stabilized in the long term.

The series of Brazil, present a univariate model, type random walk with drift with a long cycle stochastic, and without irregular component. Brazil is the country with the highest level of amplitude in the region of Latin America and the entire sample of countries studied. However, financial liberalization has negative effects on Brazil in the short term and positive in the medium and long term. The results of the estimation of volatility and amplitude, cycle after March 1995 were surprising. Levels of volatility and the amplitude of the cycle, decreased significantly after the date of the financial liberalization in the long term. Before financial liberalization, volatility was at a high level equal to 0.069, but after financial liberalization, volatility decreased to 0.032. The amplitude of the cycle has also increased due to the implementation of the process of financial liberalization (0.222-0.315). However, in recent years, the amplitude has decreased, it reaches 0.064. The cycle after financial liberalization reaches 34,327 months, comparable to the U.S. cycle

The series studied from Chile before and after the date of financial liberalization, have a univariate model, type slowly moving trend smooth with a stochastic cycle and irregular component for the series until 1992, and without irregular component to the series after 1992. In the short term, financial liberalization has a negative effect on the amplitude and the volatility of Chile market cycle, but in the long term levels of volatility and amplitude are depreciated reaching low levels.

The Colombia series studied before and after the date of financial liberalization have a univariate model type slowly moving trend smooth with a stochastic cycle

without irregular component for the study before September 1998 and with irregular component for the series studied after September 1998 series. The level of volatility of the long cycle of Colombia has declined after the date of financial liberalization (0.066-0.006). However, the amplitude level had decreased slightly (0.083-0.076). The series studied before and after the date of financial liberalization, have a univariate model type Random walk with drift with a deterministic long cycle without irregular component for the series before November 1991 and with irregular component for the series after November 1991.

Financial liberalization has positive effects on the stock market cycles of Mexico in the medium and long term, like all countries in the region of Latin America already studied. Volatility levels and amplitude of the cycle of Mexico decreased significantly after the date of financial liberalization. Before financial liberalization, the volatility of the cycle was very high equal to 0.021, but with financial liberalization, volatility declined significantly in 0005. The amplitude of the Mexican cycle has decreased significantly after financial liberalization, rising from 0.186 to 0.091. The duration of the Mexican cycle is comparable with that of the U.S. cycle.

Based on the comparison of characteristics of cyclical before and after the date of the financial liberalization series, we can conclude that the effects of financial liberalization in emerging market cycles in Latin America are positive in the medium and long term, and negative in the short-term. With regard the duration of market cycles, it decreased for most Latin American countries except Chile, order to be comparable to those of U.S. cycles.

Table 8 presents the results of bivariate estimation of the American and American Latin splits. In fact the community model Slowly Moving Smooth Trend, makes it easy to compare the trend trajectories of American and emerging market indices.

First, the synchronization of market cycles is almost absent during the period of financial repression. However, after the date of the total financial liberalization, there was an improvement in synchronization although it is always

less than 1. Then it is clear that the stock market cycles of Latin America are similar, but not common with the United States. Mexico is the country with the level of

synchronization, the highest in the region, which is equal to 74% after the date of financial liberalization.

**Table 8. Bivariate estimation of the American and American Latin splits**

	Synchronization in pre-liberalization	Synchronization in post liberalization	Synchronization in short term	Synchronization in long term
Argentina	0.002	0.485 (+)	0.175 (+)	0.698 (+)
Brazil	0.021	0.545 (+)	0.395 (+)	0.715 (+)
Chile	0.008	0.466 (+)	0.269 (+)	0.575 (+)
Colombia	0.020	0.302 (+)	0.212 (+)	0.383 (+)
Mexico	0.068	0.515 (+)	0.469(+)	0.743 (+)

Finally, the level of synchronization of Latin America with the United States increased during the years following financial liberalization. In the long term, this synchronization tends to increase more and more. Synchronization of stock market cycles of the American Latin countries is higher than those in the region of East Asia.

## 6. Conclusions

Our analysis showed that liberalization seems to generate more stable financial markets in the long run, but in the short run, we found that financial liberalization does tend to trigger more pronounced cycles. Indeed, during the first five years following financial liberalization, the amplitude and volatility of emerging market cycles have increased dramatically. But in the long term, the amplitude and volatility of stock cycles are amortized to achieve very low and comparable to those of cycles U.S. levels. The effects of financial liberalization on the cyclical characteristics of the countries in the region of Latin America are increasingly positive and they already appear in the medium term. Our results are the same finds by G. L. Kaminsky and S. Schmukler (2003) using non-parametric approach.

The amplitude and volatility of American Latin countries have declined substantially after the date of financial liberalization to achieve less than those detected during the financial repression. The cycle synchronization with the United States has also grown considerably to around 70%. For the Asian countries, the positive effects of financial liberalization on the cyclical characteristics are not yet clear in medium term. The amplitude and volatility cycles of the Asian countries have been strengthened following the implementation of financial liberalization. But in recent years, there is a downward trend in the amplitude and volatility with improved synchronization of market cycles with those of the United States.

These results we have obtained, we push to conclude that the effects of financial liberalization on stock market cycles in emerging markets are part depending on the intensity of the implementation process. Therefore, in countries that have made progressive liberalization, such as countries in the region of Latin America, the period of turbulence and market cycles amplification was accomplished quickly, which allowed these countries without much benefit as possible the benefits of financial liberalization. In contrast, in countries that have made rapid liberalization as the countries of the region of East Asia, the period of turbulence and exaggerate market cycles was longer, which delayed the benefits financial

liberalization. The countries of East Asia appear to have been heavily affected by the financial crisis of 1997, which partly explains why the recovery of stability has most recently performed. These findings may be of interest, especially for emerging countries that have not yet fully liberalized their financial systems. Indeed, these countries have a behavior of vigilance and prudence with respect to the process of financial liberalization. These countries are therefore encouraged to liberalize gradually, step by step, and taking into consideration the reality of the economic environment in order to make the most of the benefits of financial liberalization.

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