



# **The Growth and Welfare Effects of Macroeconomic Volatility**

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## **Characterizing the Business Cycles of Emerging Economies**

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## Characterizing the Business Cycles of Emerging Economies<sup>\*</sup>

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### Abstract

We characterized the business cycles of 14 emerging economies (7 Latin-Americans and 7 Asians) in terms of amplitude, duration and cumulative change in output. We compared these characteristics with those present in business cycles of 14 developed economies. The cost of recessions (in terms of cumulative output loss) is higher in Latin America than in Asia and developed economies. On the other hand expansions are stronger and larger in the Asian group compared to the other groups. Latin-American cycles tend to be poorly correlated with the cycle in Asia and Developed economies, with the exception of Chile and Colombia. We also conduct an exploratory analysis of the factors that determines the severity of the recessions. Terms of trade shocks, openness, capital market development and regulatory characteristics of the economies explain the cost of recessions. On the other hand, even after controlling for several variables the expansions in Asian country are 3% higher than the rest of the countries in the sample.

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## 1. Introduction

Emerging market economies (EMEs) have experienced large and persistent fluctuations of aggregate economic activity at the end of the 1990s. Crises episodes in the last decade (such as the Tequila and East Asian Crisis, depreciation of the Brazilian and Russian currencies) have increased the interest in disentangling the sources of economic crisis episodes. Despite the large output fluctuations in EMEs, the study of business cycles has been mainly conducted for developed economies. Some exceptions are Hoffmaister et al. (1998), Agénor, McDermott and Prasad (2000), Herrera, Perry and Quintero (2000), Aguiar and Gopinath (2004), Neumeyer and Perri (2005) and Raddatz (2005). A full explanation of the causes of business cycles in EMEs goes beyond the scope of the present paper, whose goal is rather modest. We attempt to characterize the business cycles in terms of intensity, cost and international synchronization for EMEs and compare these characteristics with the ones for developed economies. Following this characterization we explore the association between the cost of recessions and macroeconomic policy, external shocks and some particular features of the regulatory environment of the countries included in our sample.

The paper is divided in 5 sections. In Section 2 we briefly describe the methodology used by Harding and Pagan to characterize the business cycle. Following the traditional approach to business cycle outlined by Burns and Mitchell (1946), we identify turning points in an aggregate series —specifically, output levels. Once identified the turning points, several characteristics of the cycle are defined —e.g. duration of the phases, output loss or gained in each phase, among others. Then, we discuss the results of applying this methodology to seven Latin American (LA7) and seven East Asian and Pacific economies (EAP7). The advantage of using this methodology is two-fold: (a) the identification of cycles does not rely nor depend on any trend-cycle decomposition technique, and (b) it develops an algorithm that provides an statistical foundation to the process of identification of turning points developed by Burns and Mitchell (1946). For comparative purposes the same methodology is applied to 12 developed economies.<sup>1</sup> In section 3 we provide a

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<sup>1</sup> The full sample of countries is presented in Appendix I.

measure of the degree of synchronization or co-movements of cycles among the economies in each group, LA7 and EAP7, and with three developed countries. We use two different approaches to analyze the data. On the one hand we use the idea of synchronization developed by Harding and Pagan (2002) to estimate the probability that a pair of countries is in the same phase of the cycle. On the other hand we follow the real business cycle tradition to extract the permanent component of the GDP series and to correlate what would be associated to pure cycle. Section 4 analyzes the average output loss during recessions and the output gains over expansion phase. External factors, openness and capital market development seems to explain the cost of recessions. We also explore the correlation of recessions' characteristics and different plausible explanation for the cost of this phase. We present correlation between number of contractions and intensity of the recessions with regulatory variables such as access to credit, labor market rigidities, and quality of institutions. Finally, section 5 concludes.

## **2. Characterization of business cycles**

In the present section we briefly present the methodology used to characterize the business cycle for a sample of selected emerging market economies. There is not a unique approach to measure the features and intensity of business cycle in the literature. However, we follow a more traditional approach in this paper. Specifically, we use the algorithm designed by Harding and Pagan (2002) to identify turning points in the (log) level of GDP. Once computed these turning points, we proceed to calculate different business cycle features and cost measures across emerging economies, and compare them with analogous figures for selected industrial economies.

### **2.1 Methodological issues**

Recent research on business cycles focuses on time series *adjusted for long-run trends*, with the latter being obtained by using some specific de-trending technique (say, linear model, Hodrick-Prescott filter, and band-pass filter, among others). In contrast, influential early studies such as Burns and Mitchell (1946) defined business cycles as sequences of

expansions and contractions in the *levels* of either total output or employment (which were evaluated without any type of preliminary de-trending). This is the position advocated by the (so-called) *classical cycle* approach (dominant in NBER studies of business cycles).<sup>2</sup>

The *classical approach* consists of finding the turning points in an aggregate series — typically, the (log) level of real GDP— in order to identify peaks and troughs. Following this principle, Harding and Pagan (2002) argue that this traditional cycle measure has the advantage that the results are independent of how the researcher decide to decompose the series between trend (or permanent component) and the cycle itself. They developed an algorithm, following Bry and Boschan (1971), to identify the turning points. Their algorithm meets the following two (2) conditions: first, peaks and troughs must alternate, and, second, it designs a censoring rule that requires a complete cycle to last at least five quarters. We can also determine local maximum and minimum values of the series by looking at the differences of the *log* of GDP ( $y_t = \ln Y_t$ ). Given that we are working with quarterly data in this paper, we define a local maximum for the (log) level of GDP,  $y$ , at time  $t$  if  $\{\Delta_2 y_t > 0, \Delta y_t > 0, \Delta y_{t+1} < 0, \Delta_2 y_{t+2} < 0\}$ . This notion of local optimum, in addition to the compliance of the censoring rule, defines a complete cycle.

The methodology developed by Harding and Pagan allows us to recognize peaks and troughs in the GDP series. Once computed these turning points, we define *specific cycle information*. That is, we report the following features of the business cycles for emerging market and industrial economies:

- (1) *Duration of the cycle*. It is computed as the number of quarters from peak to trough during contraction episodes, and from trough to the next peak in the expansion phase. This tends to overestimate the length of recovery, and it will show strong asymmetry. In addition, we also compute the the number of periods that it takes the level of output to reach its initial level.

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<sup>2</sup> The world economy has suffered major slowdowns in economic activity (that is, declines in growth rates that remain positive). We can argue that the post-1973 slowdown in the world economy has had more adverse consequences than a mild and short recession. In order to analyze these so-called *growth cycles*, we need to express the level of economic activity as fluctuations in the deviations of GDP around their trends. In this case, the estimation of trend outputs —although not necessarily needed for business cycle analysis— is key to undertake growth cycle analysis (Zarnowitz and Ozyildirim, 2001).

- (2) The *amplitude of the cycle* is calculated as the maximum drop of GDP from peak (trough) to trough (peak) during episodes of contraction (expansion).
- (3) We estimate *cumulation of the cycle* as the area of the triangle conformed by the duration and amplitude. It reflects the idea of foregone output from peak to troughs during contractions and the output gains during expansion episodes.

In the following sub-section we will proceed to compute these business cycle features for our sample of emerging markets as well as industrial countries (see list of countries in Appendix I).

## **2.2 Characterizing classical cycles**

In the present section, we have estimated the duration, amplitude and cost of the business cycle for our sample of 14 emerging markets (7 LAC and 7 EAP countries) as well as for 14 industrial economies according to the methodology presented above. In Table 1 we present these results.

### *Duration of the Cycle*

- The duration of contraction phases is almost similar across country groups, with very low dispersion within each country group.

We find that contraction phases in the 7 LAC countries last about approximately 4 quarters with a standard deviations of 1 quarter. These figures are similar to the ones displayed by the 7 EAP countries (mean duration of 4.1 quarters) and the average of industrial countries (mean duration of 3.7 quarters). We should note that Argentina shows the largest mean duration of a contraction among LAC economies (5.4 quarters), while Brazil displays the lowest duration (with 2.8 quarters). On the other hand, East Asian countries show a larger variation than in LAC, with Thailand showing the largest mean duration in contraction episodes (8 quarters).

- In contrast, expansion episodes differ substantially in mean and dispersion across country groups.

We find that, on average, expansion episodes among LAC economies are shorter in duration and display a higher variation than among EAP countries and industrial economies. We find that the mean duration of expansions for LAC countries is about 19 quarters, with the mean duration of expansions fluctuating between 6.3 (Venezuela) and 62 (Colombia). On the other hand, we find that the mean duration of expansions among EAP countries is the largest across country groups (26 quarters), while the industrial economies show the lowest dispersion (9.7 quarters).

- Although the mean duration of recessions in LAC is similar than among EAP and industrial countries, they are likely to take place more frequently.

We find that over the same time period, LAC economies have experienced more contractions than countries in the other two groups (see last column of Table 1). While LAC countries have had, on average, six (6) episodes of output contractions, EAP countries and industrial economies have had approximately 3 episodes. However, the EAP region displays a higher dispersion in the number of contractions (2.2 vs. 1.7 among industrial economies).

### *Amplitude of the Cycle*

- There are large differences in the mean amplitude of the cycle between industrial economies and emerging markets, and a higher degree of dispersion within the latter group.

Contraction episodes in LAC and EAP countries are deeper relative to industrial countries. The mean amplitude from peak to trough (P-T) for the 7 LAC economies is 8 percent, while it is slightly lower for EAP countries (7.7 percent). Each group also shows a larger extent of variability in mean amplitude relative to industrial economies.

The standard deviation for LAC countries is 3.4 percent, with the mean amplitude fluctuating between 4.2 percent (Colombia) and 12.6 percent (Peru). Dispersion in the mean amplitude is slightly larger among EAP countries (4.3), where the lowest mean amplitude is 3.2 percent (Hong Kong) and the largest is 16.1 percent (Thailand).

**Table 1: Characterizing classical cycles**

Country / Region	Mean duration (quarters)		Mean amplitude (%)		Cumulation (%)		Number of Contractions
	P-T	T-P	P-T	T-P	P-T	T-P	
Argentina	5.4	8.0	-10.7	14.1	-30.9	71.5	7.0
Brazil	2.8	6.9	-4.3	9.6	-6.0	51.4	10.0
Chile	3.3	30.0	-10.1	55.6	-25.5	855.5	3.0
Colombia	3.0	62.0	-4.2	59.9	-9.3	1900.4	2.0
Mexico	4.4	14.8	-5.1	16.5	-9.9	177.9	5.0
Peru	3.7	8.2	-12.6	18.0	-20.9	112.0	7.0
Venezuela	4.6	6.3	-9.0	8.5	-19.0	44.6	8.0
<b>LA7 Average</b>	<b>3.9</b>	<b>19.4</b>	<b>-8.0</b>	<b>26.0</b>	<b>-17.4</b>	<b>459.0</b>	<b>6.0</b>
<b>LA7 Std. Dev.</b>	<b>1.0</b>	<b>20.6</b>	<b>3.4</b>	<b>22.0</b>	<b>9.3</b>	<b>697.9</b>	<b>2.8</b>
Hong Kong	2.7	11.2	-3.2	19.8	-5.2	138.5	7.0
Indonesia	3.3	29.0	-7.5	62.6	-19.3	1018.8	3.0
Korea	3.0	.	-9.3	.	-14.0	.	1.0
Malaysia	4.5	44.0	-8.0	91.3	-17.7	1882.3	2.0
Singapore	3.3	20.0	-4.8	42.8	-8.2	870.9	4.0
Taiwan	4.0	.	-4.7	.	-9.7	.	1.0
Thailand	8.0	.	-16.1	.	-45.7	.	1.0
<b>Asia Average</b>	<b>4.1</b>	<b>26.0</b>	<b>-7.7</b>	<b>54.1</b>	<b>-17.1</b>	<b>977.6</b>	<b>2.7</b>
<b>Asia Std. Dev.</b>	<b>1.8</b>	<b>14.0</b>	<b>4.3</b>	<b>30.3</b>	<b>13.6</b>	<b>715.5</b>	<b>2.2</b>
<b>OECD Average <sup>a</sup></b>	<b>3.7</b>	<b>23.8</b>	<b>-2.2</b>	<b>19.6</b>	<b>-4.4</b>	<b>321.0</b>	<b>3.3</b>
<b>OECD Std. Dev.</b>	<b>1.0</b>	<b>9.7</b>	<b>1.0</b>	<b>7.8</b>	<b>2.4</b>	<b>177.6</b>	<b>1.7</b>

<sup>a</sup> Includes the following countries: Australia, Canada, France, Germany, Italy, Japan, New Zealand, Portugal, Spain, Sweden, United Kingdom, United States.

On the other hand, Asian economies show more dynamic expansions than any other region, with a mean amplitude of the trough to peak (T-P) phase of approximately 54 quarters (substantially higher than the 26% in LAC and 20% among industrial countries). However, recovery phases among industrial economies are less volatile. For instance, the mean amplitude of T-P phases in LAC fluctuates from 8.5 percent (Venezuela) to 59.9 (Colombia).



### *Cumulation of the Cycle*<sup>3</sup>

- Output losses during P-T phases are larger among emerging market economies than among industrial ones.

The cumulative output loss among LAC countries over the period is, on average, 17.4 percent, although it shows considerable variability within the group of countries.<sup>4</sup> Argentina and Chile display the largest output losses (30.9 and 25.5 percent, respectively) while Brazil shows the smallest output loss (6 percent). In addition, output loss is also substantial on average among EAP countries (17.1 percent), with a higher degree of dispersion than among LAC economies. Output losses fluctuate between 5 percent (Hong Kong) and 45 percent (Thailand).

- Output gains during T-P phases are larger among emerging market economies.

We find that, although output losses are smaller among OECD countries, expansions are stronger among emerging market economies. This result may be attributed to the forces of conditional convergence, where growth in the transition to steady state is higher for less developed economies. For instance, Colombia and Malaysia achieved the largest output accumulation during the expansion phases<sup>5</sup>. On the other hand Argentina and Chile show large output losses; however they are quite different in terms of expansions. While Chile shows one of the largest expansions in terms of cumulative output, Argentina is below average in this dimension.

If we put emphasis only on the contraction phases, it may be interesting to look at its behavior under a different metric. Instead measuring the duration of a recession from peak to trough, we calculate the duration of the recession from its peak to the moment when the

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<sup>3</sup> The column labeled cumulation presents the output loss (gain) from peak to trough (trough to peak) of the output cycle.

<sup>4</sup> In the appendix we include a different measure of cost of a recession. We estimate the foregone output from peak up to the GDP reaches its initial level—that is the last peak level (see Table II.1).

<sup>5</sup> Korea, Taiwan and Thailand do not have data for trough to peak since they have experienced only one recession in the entire period. Therefore the algorithm do not identify another peak.

GDP reaches the initial level (which corresponds to that peak). The cost of the recession is the integral of the foregone output between these two points (see Table 2).

**Table 2. Characterizing recessions**

	Number of Contractions	Mean Duration of Recessions	Foregone Output
<b>LA7</b>			
Argentina	7.0	14.1	-96.8
Brazil	10.0	7.8	-21.6
Chile	3.0	10.3	-91.3
Colombia	2.0	10.0	-28.3
Mexico	5.0	12.2	-30.5
Peru	7.0	14.6	-146.5
Venezuela	8.0	11.6	-63.5
<b>LA7 Average</b>	<b>6.0</b>	<b>11.5</b>	<b>-68.4</b>
<b>LA7 Std. Dev.</b>	<b>2.8</b>	<b>2.4</b>	<b>46.0</b>
<b>Asia</b>			
Hong Kong	7.0	4.7	-8.7
Indonesia	3.0	6.0	-41.6
Korea	1.0	8.0	-37.1
Malaysia	2.0	10.5	-39.5
Singapore	4.0	6.0	-14.2
Taiwan	1.0	7.0	-15.7
Thailand	1.0	22.0	-134.5
<b>Asia Average</b>	<b>3.4</b>	<b>9.2</b>	<b>-41.6</b>
<b>Asia Std. Dev.</b>	<b>2.3</b>	<b>6.0</b>	<b>43.1</b>
<b>OECD Average <sup>a</sup></b>	<b>3.3</b>	<b>7.0</b>	<b>-9.0</b>
<b>OECD Std. Dev.</b>	<b>1.7</b>	<b>2.4</b>	<b>5.9</b>

<sup>a</sup> Include Australia, Canada, France, Germany, Italy, Japan, New Zealand, Portugal, Spain, Sweden, United Kingdom, United States.

Analogously to the results presented above, we observe:

- Output contractions have been much more costly in Latin America than in Asia and OECD countries. Foregone output in LAC totaled, on average, approximately 68 percent (relative to 42 percent in EAP and 9 percent among industrial economies).
- Dispersion in foregone output within the LAC region is the highest among the country groups under study. Within Latin America, Peru displays the highest cost in foregone output (147 percent) while Brazil has the smallest (22 percent).

- Not surprisingly, the cost of recessions in Hong Kong, Singapore and Taiwan is similar to the one experienced by industrial countries.

### **3. Co-movements across countries**

Another interesting issue in the study of business cycles is the degree of synchronization across countries. It has been argued that countries linked to international trade of goods and service will have a similar pattern of output fluctuations (Frankel and Romer, 1998; Imbs, 2001, 2004; Kose et al. 2003, Calderón et al. 2002). In addition, among the key criteria considered in the OCA literature is the degree of trade integration between the potential members, as well as the degree of symmetry of their business cycles. Regarding the latter, the symmetry of the business cycle plays a key role in determining the cost of sacrificing an independent monetary policy. In summary, countries with close international trade links and more symmetric business cycles are more likely to be members of an OCA.

In order to analyze the co-movement of business cycles, we we need to define a measurement of co-movements of the aggregate activity between countries. Following the measure of classical cycle, the economy could be at two states, expansion or contraction. Harding and Pagan (2002, 2003) proposed a degree of concordance between two countries, which is the fraction of time that two countries are simultaneously at the same state.

Table 3 reports the matrices of concordance among economies. These matrices present the fraction of time in the sample that a pair of countries is in the same state. Specifically, Table 3 exhibits the case of LA7 and three developed economies: Germany, Japan and US. It is interesting to notice that the concordance of business cycles across Latin American countries is relatively low. They are below 76%, except for the case of Colombia and Chile that coincide in the 94% of the time. On the other hand the same two economies show the highest degree of concordance with developed economy in the other three continents. As a contrast Argentina and Venezuela show the lowest degree of concordance with those economies. As a contrast, the developed economies tend to have on average more synchronized cycles among them than the economies within the LA group.

**Table 3. Degree of Concordance among LA7 and some Developed Economies**

	Argentina	Brazil	Colombia	Chile	Mexico	Peru	Venezuela	Germany	Japan	United States
Argentina	1.00	0.66	0.64	0.64	0.66	0.60	0.61	0.64	0.57	0.59
Brazil	.	1.00	0.74	0.74	0.68	0.70	0.53	0.74	0.63	0.67
Colombia	.	.	1.00	0.94	0.76	0.72	0.63	0.74	0.79	0.87
Chile	.	.	.	1.00	0.76	0.74	0.61	0.76	0.75	0.87
Mexico	.	.	.	.	1.00	0.70	0.53	0.70	0.71	0.73
Peru	.	.	.	.	.	1.00	0.57	0.60	0.63	0.67
Venezuela	.	.	.	.	.	.	1.00	0.63	0.58	0.58
Germany	.	.	.	.	.	.	.	1.00	0.79	0.79
Japan	.	.	.	.	.	.	.	.	1.00	0.84
United States	.	.	.	.	.	.	.	.	.	1.00

Table 4 also shows the coincidence index for Asian economies respect to the same group of developed economies. The picture is very different for the EAP7 economies (relative to the LA7 simulation). Concordance is very high among the economies in this group, with the index of coincidence being 80% in all cases. Asian economies tend to move together with Japan and US rather than with Germany. However, in all cases, they show higher coincidence among themselves and with industrial economies than the one shown by Latin American countries.

**Table 4. Degree of Concordance among EAP7 and some Developed Economies**

	Hong Kong	Indonesia	Korea	Malaysia	Singapore	Taiwan	Thailand	Germany	Japan	United States
Hong Kong	1.00	0.85	0.84	0.82	0.88	0.83	0.81	0.71	0.78	0.76
Indonesia	.	1.00	0.93	0.89	0.83	0.86	0.90	0.70	0.81	0.85
Korea	.	.	1.00	0.94	0.88	0.93	0.95	0.73	0.88	0.90
Malaysia	.	.	.	1.00	0.88	0.87	0.91	0.67	0.82	0.84
Singapore	.	.	.	.	1.00	0.89	0.85	0.73	0.80	0.80
Taiwan	.	.	.	.	.	1.00	0.88	0.76	0.85	0.89
Thailand	.	.	.	.	.	.	1.00	0.68	0.87	0.85
Germany	.	.	.	.	.	.	.	1.00	0.79	0.79
Japan	.	.	.	.	.	.	.	.	1.00	0.84
United States	.	.	.	.	.	.	.	.	.	1.00

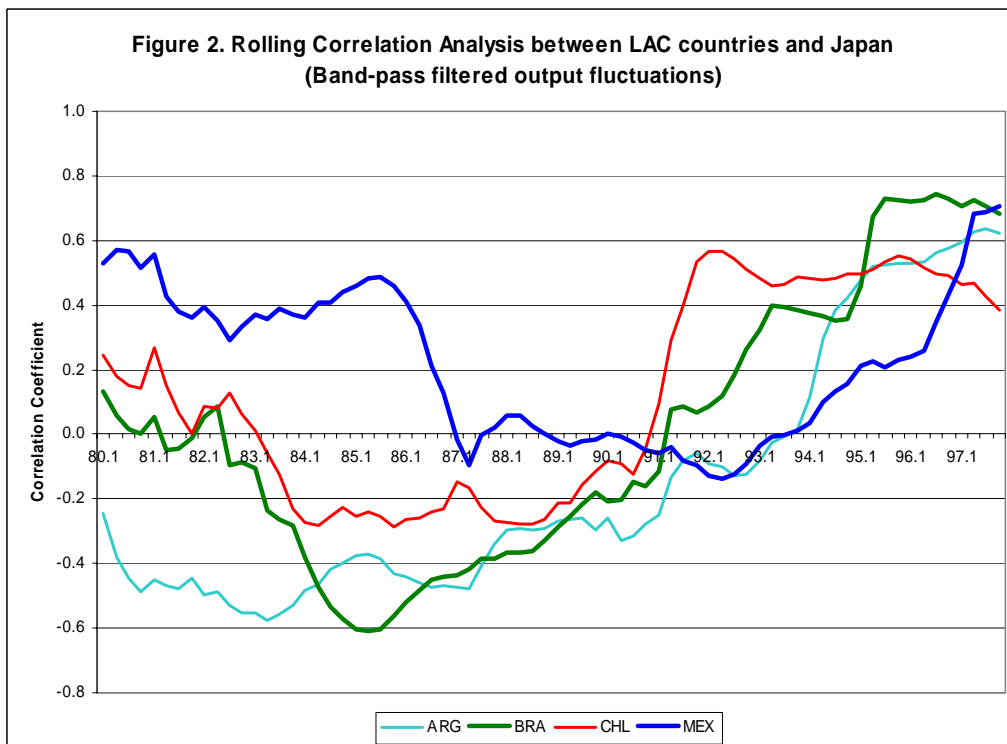
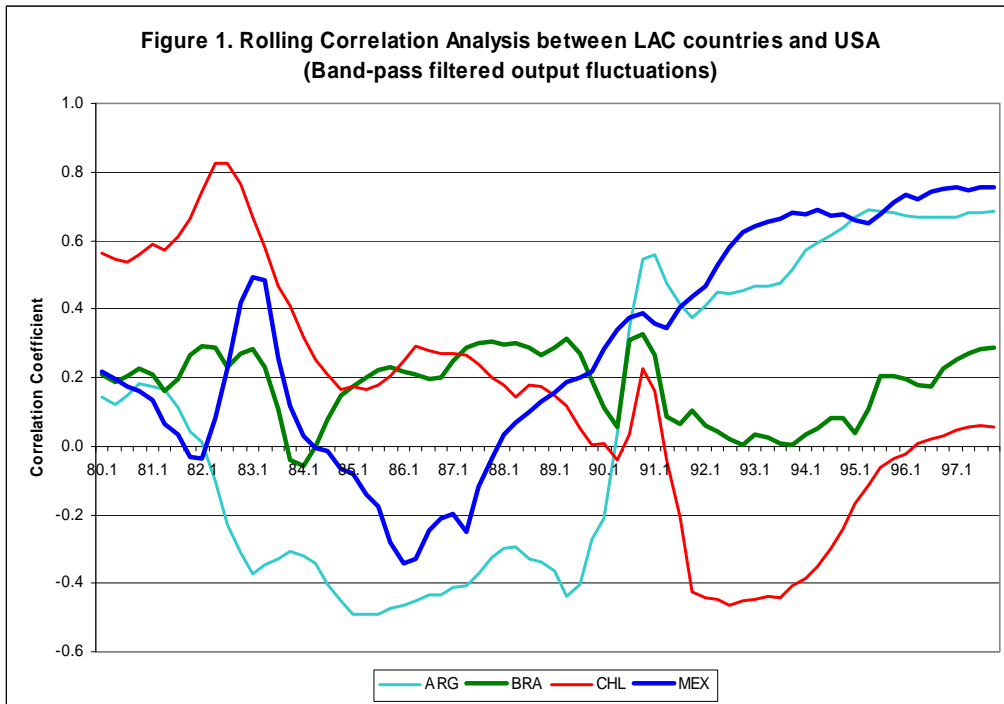
Finally, we compare the cycles of LA7 and EAP7 countries in Table 5. We can observe that the cycles in Argentina, Brazil and Venezuela exhibit the lowest index of concordance with the Asian economies. On the other hand, the index of concordance between the EAP7 cycles and the LA economies is more homogenous between 0.7 and 0.8.

**Table 5. Degree of Concordance between EAP7 and LA7**

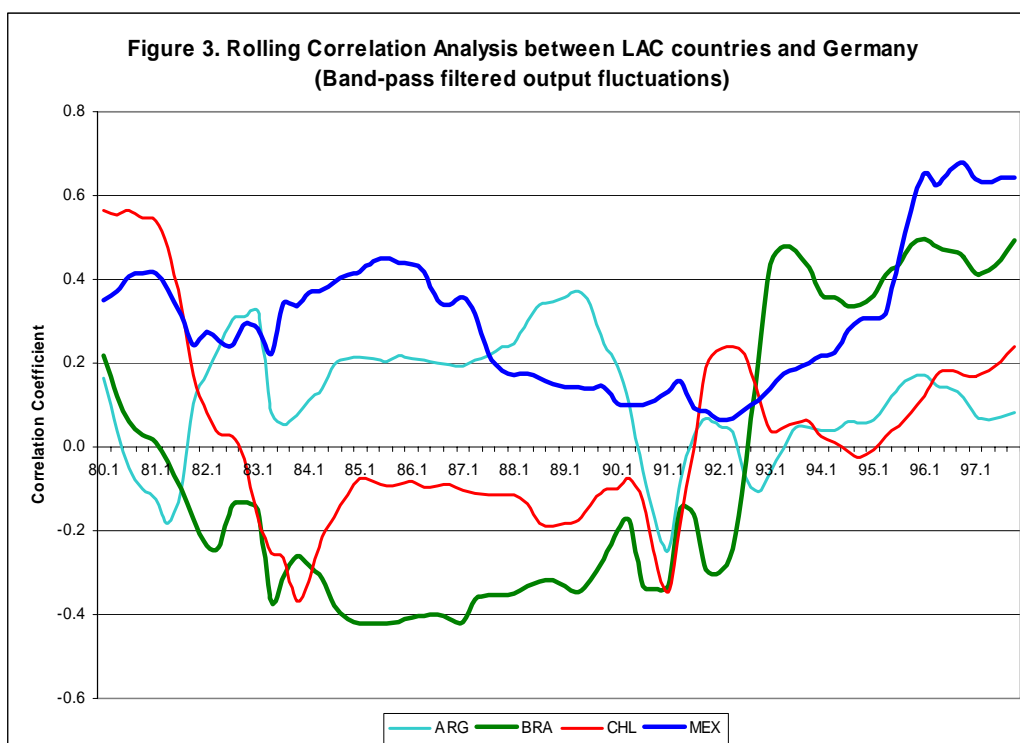
	Hong Kong	Indonesia	Korea	Malaysia	Singapore	Taiwan	Thailand	Average
Argentina	0.69	0.64	0.59	0.57	0.61	0.66	0.56	0.62
Brazil	0.71	0.66	0.69	0.65	0.69	0.72	0.70	0.69
Colombia	0.79	0.88	0.91	0.87	0.83	0.90	0.88	0.87
Chile	0.79	0.88	0.87	0.83	0.79	0.86	0.84	0.84
Mexico	0.83	0.86	0.93	0.87	0.73	0.82	0.70	0.82
Peru	0.81	0.90	0.95	0.91	0.69	0.72	0.70	0.81
Venezuela	0.62	0.57	0.56	0.54	0.60	0.55	0.53	0.57
Average	0.75	0.77	0.79	0.75	0.71	0.75	0.70	

Another way of analyzing co-movements between two countries is using the correlation of cycles measured using filtered data. The idea is to see whether the business cycle of emerging market economies move together with the business cycle German, Japanese and US economies, and if this co-movement has changed over time. To conduct this analysis we computed the cyclical component of output (real GDP in local currency at constant prices, and expressed in logs) using the band-pass filter (Baxter and King, 1999). Once computed the cyclical component of output for all our countries in the sample, we compute rolling correlations with a window period of 32 quarters (8 years). The rolling correlations for selected LA7 countries are presented in Figures 1 to 3, whereas the ones for EAP7 countries are presented in Figures 4 to 6.

The LA7 countries tend to show a higher correlation in the late nineties compared to the late eighties with Germany and Japan. For instance, rolling correlations between Latin America countries and Japan are U-shaped, with higher degrees of co-movement at the end of the sample period. On the other hand, most Latin American economies show a lower correlation with the US at the end of the period (relative to the previous decade), except for Mexico and Argentina.<sup>6</sup> Heathcote and Perri (2003) have shown that the US business cycle has become less synchronized with the cycle in the rest of the world due to an increase in US financial integration with the rest of the world. Kalemli-Ozcan et al. (2003) show that the negative relationship between financial integration and output comovement is attributed to the indirect effects of the former on the latter via specialization. That is, better access to international capital markets would allow firms to specialize in the production of goods (export goods according to comparative advantage that they could not afford before) and this specialization would lead to less symmetric cycles (Imbs, 2004)

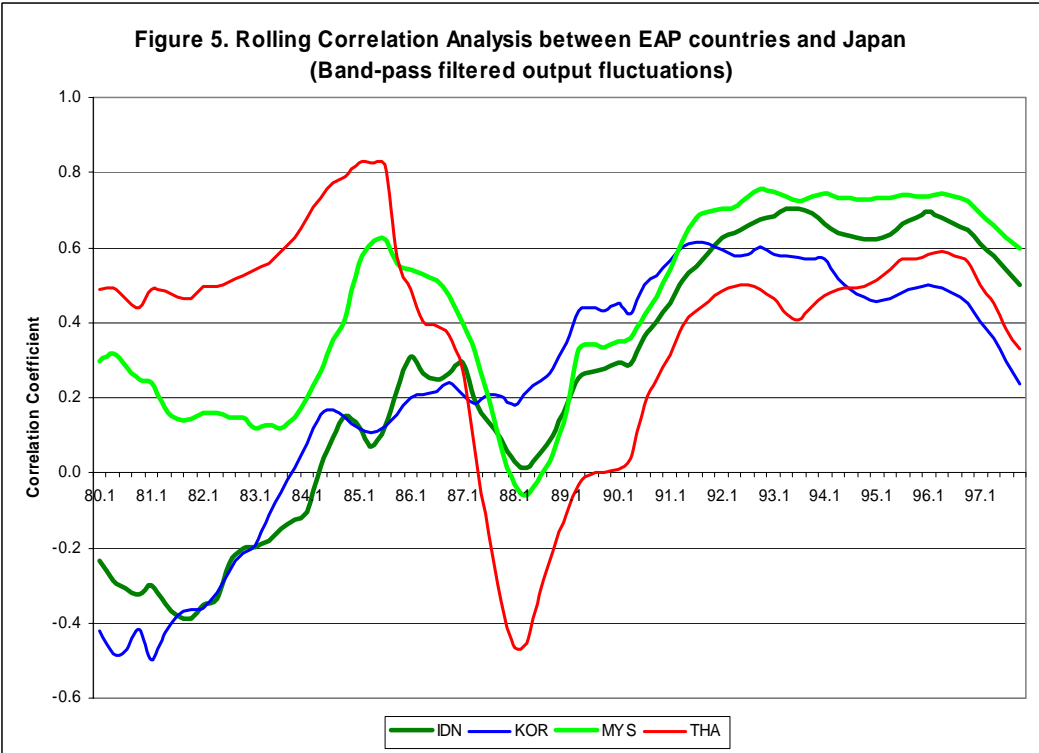
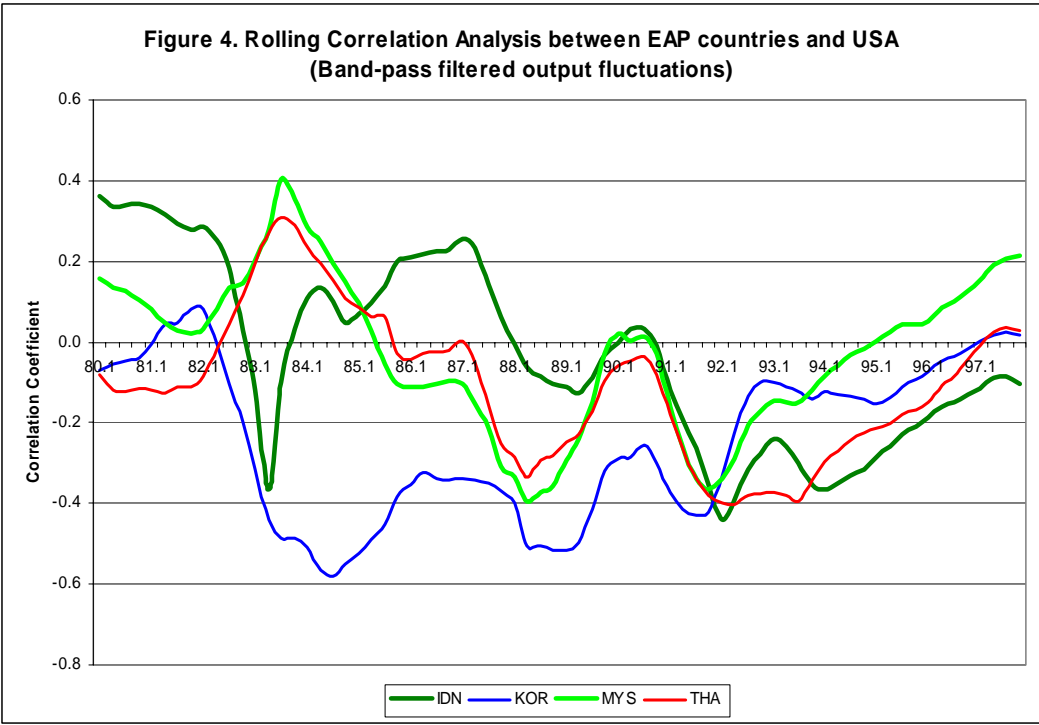


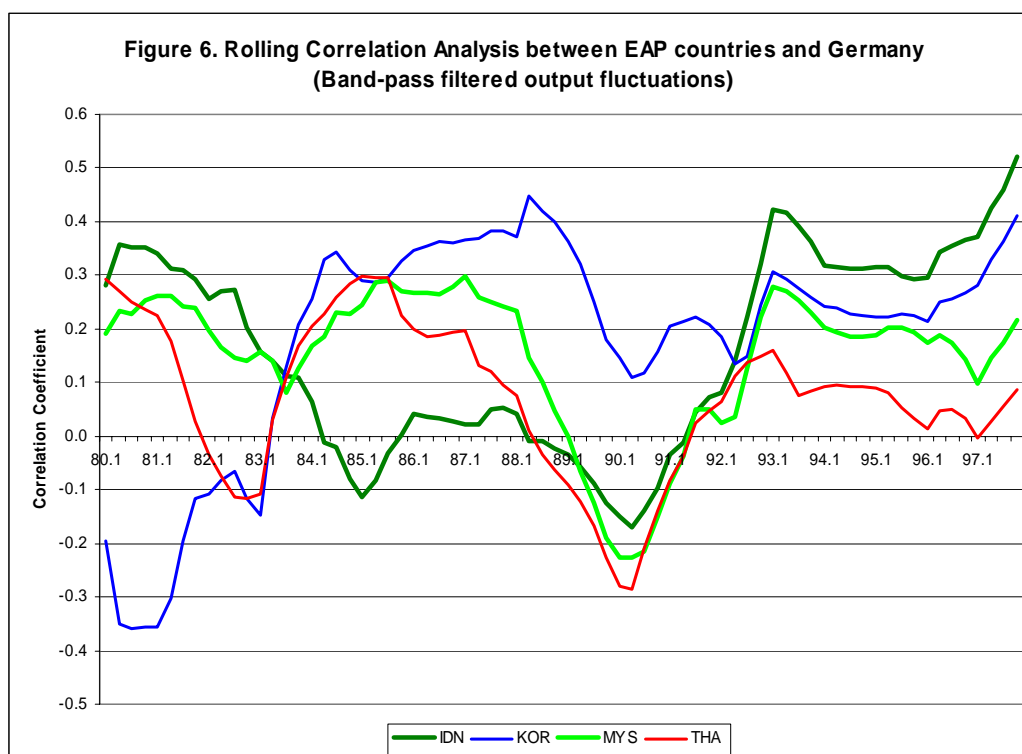
<sup>6</sup> The larger correlation in the case of Mexico could be explained for the free trade agreements between the two countries, while the surge in Argentina is attributed to the convertibility period in Argentina.



The case of EAP7 is not very different than the LA7 economies. By the end of the period the cycle of all economies is positively correlated with Germany and Japan's. As expected the correlation with Japan is very strong and similar across the economies in this group, however it was not always like that, as illustrated by the case of Hong-Kong, Indonesia, Korea and Taiwan. On the other hand, with the US they show a more heterogeneous level of correlation, where Taiwan, Singapore and Hong Kong tend to move increasingly together with the US Economy.







In summary the Asian economies tend to have more synchronized cycles than the LA7 with the developed world. The concordance index shows a long term view where it is possible to see that cycles tend to coincide more between Asia and developed economies. Next is the high concordance among developed economies and the cycle of Latin America rank last in terms of concordance with the rest of the world. The high concordance between Asia and developed economies has become stronger in the last decade, when the correlation of the cycles has been larger.

#### 4. Economic policy and business cycles

The understanding of business cycle has been largely controversial in the literature and there is no clear answer. But in this section we will concentrate in a more limited issue, which is the determinant of the deepness of the recessions and the sharpness of an expansion after the recession. We follow two strategies. The first one is a multivariate regression analysis where we take the characteristic of those episodes in terms of average output losses as a measure of the cost of recessions and average output gains as a measure

of the expansion sizes as dependent variables. The explanatory variables are external shocks, inflation as a proxy of macro instability, trade openness and financial institutions. The second strategy is basically an exploratory analysis. We make a cross section of countries and take the average cost of recessions over the entire period of analysis and we correlate them with the quality of labor and business regulations. These variables are not used in section 4.1 since they are available only in the nineties and they do not show enough variability over time.

#### **4.1 Determinants of the size of the business cycle**

Using the methodology explained in section 2 we can define 179 episodes, 97 recessions and 82 expansions. For each episode we obtained the accumulative change in output and the duration in quarters of each episode. We define an average output change dividing the first variable by the second. This gives us the variable that we want to explain. The size of the cycle is expected to be a function of external shocks, quality of institutions and macroeconomic and structural policies.

The definition of each specific variable is in Appendix I. The external shocks are measured using gross FDI Inflows, gross equity related Inflows, terms of trade, G3 (weighted average of Germany, Japan and US) Real Money Market Rate and US Real Money Market Rate. All these variables are measured as average variation over the last four quarters before the turning point take place. Quality of institutions is measured by the political risk index reported by the International Country Risk Guide (ICRG) at the beginning of the cycle. Trade openness, financial openness and financial development at previous year measures structural policies. Real exchange rate undervaluation and average inflation on the previous four quarters measures the quality of macroeconomic policies.

Table 6 presents the model estimated for the cost for recessions. External shocks tend to be important to predict the size of the cost in a recession in terms of output losses, for LA/7 and especially for Asian emerging economies. A negative sign means that a reduction in the terms of trade produces an increase in the cost, i.e. a larger output loss. This variable was not important for developed economies, and the impact of terms of trade shock is almost

five times larger for Asia than for LA. Other external variables (international interest rate, FDI and equity flows) were not statistically significant in the regression. Among the structural policy variables financial market development and trade openness have a measurable impact on the cost of recessions. A more developed financial market reduces the cost of a recession, while openness has mixed results. It is negative and significant at the 15% level for LA and developed economies, while is positive for Asia. It means that in the case of EAP7 trade openness increase the deepness of a recession. The reason for this could be found in the causes of the recessions. More open economies may be more vulnerable to international economic activity swings. Macroeconomic policies measured by inflation and the quality of institutions were not statistically significant in any of the specifications.

**Table 6. Determinants of cost of recessions**

Variables	Average cost of the recession	Average cost of the recession	Average cost of the recession
Constant	-0.017 (0.660)	0.016 (0.000)	0.015 (0.000)
<b>External shocks</b>			
Terms of trade for LA7	-0.023 (0.103)	-0.023 (0.095)	-0.027 (0.023)
Terms of trade for EAP7	-0.105 (0.003)	-0.109 (0.002)	-0.104 (0.002)
<b>Structural policies</b>			
Private credit/GDP	-0.007 (0.033)	-0.007 (0.043)	-0.008 (0.005)
Trade Openness	-0.006 (0.232)	-0.005 (0.341)	-0.007 (0.144)
Trade Openness for EAP7	0.009 (0.056)	0.007 (0.083)	0.008 (0.037)
<b>Macroeconomic policies</b>			
Log ( $\pi/(1+\pi)$ )	0.001 (0.246)	0.001 (0.338)	
<b>Institutions</b>			
ICRG Political risk rating	0.008 (0.383)		
Adjusted R-squared	0.451	0.454	0.463
Number of episodes	52	52	60
White test (p-value)	0.205	0.187	0.397
p-values in parenthesis			

The specific effects found for the EAP7 economies could be heavily influenced by the recent Asian crisis. To isolate that phenomenon (to check the robustness of our results) we estimated the model of the third column in Table 6 for all the episodes except those occurred in 1997 and 1998. The results are shown in Table 7. The first column reproduces third column in Table 6, the second column show the estimation without 1997-1998 episodes. This means that episodes of recession that started those years for Argentina, Brazil, Chile, Colombia, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, Peru, Singapore and Venezuela are left out of the sample. As it is seen, the coefficients do not change except the coefficient of the terms of trade for Asia. The size increases but turn to be non-significant different from zero. But if we take out the episode for Thailand 1996 (since the crisis started earlier there) we obtain the results shown in column [3]. Now the coefficient is similar to the one found for LA, but it is not statistically significant. The reason for being statistically non-significant could be the reduction in the number of episodes for Asia.

**Table 7. Determinants of cost of recessions**

Variables	[1]	[2]	[3]
Constant	0.015 (0.000)	0.015 (0.000)	0.014 (0.000)
<b>External shocks</b>			
Terms of trade for LA7	-0.027 (0.023)	-0.030 (0.017)	-0.031 (0.015)
Terms of trade for EAP7	-0.104 (0.002)	-0.268 (0.194)	-0.056 (0.862)
<b>Structural policies</b>			
Private credit/GDP	-0.008 (0.005)	-0.008 (0.019)	-0.008 (0.018)
Trade Openness	-0.007 (0.144)	-0.007 (0.138)	-0.006 (0.214)
Trade Openness for EAP7	0.008 (0.037)	0.008 (0.106)	0.008 (0.083)
Adjusted R-squared	0.463	0.407	0.389
Number of episodes	60	49	48
White test (p-value)	0.397	0.399	0.459

Column [1] is the same as column 3 in Table XX, column [2] includes all episodes except for those occurred in 1997 and 1998, column [3] is the same than [2], but taking out Thailand 1996 recession. p-values in parenthesis

The analysis for the output gains in expansion is shown in Table 8. An important variables that we need to control for, since this is a measure over the period from trough to peak, is the magnitude of the previous recession, since countries that experienced larger drops in output are suppose to bounced back strongly. This is shown with the negative coefficient for the average amplitude of the previous recession. The terms of trade are quite important in the magnitude of the expansion and again they are more important (7 times) for EAP7 than for LA7. Initial measure of capital market development has non-statistically significant effect on expansions. Again trade openness has a different effects for LA7 (positive) than for EAP7 (negative). In the case of LA7, more open economies showed larger gains in output during expansions, while in the case of EAP7 openness reduce the gains in terms of output of expansions. The effect of average inflation one-year before the recovery starts is positive. This could be considered a puzzle if we interpret inflation as quality of macroeconomic policy. Finally, there is an important part of the size of the recovery that could not be explained and makes EAP7 to gain output over the rest of the countries in the sample. The dummy EAP7 captures that effect and it is showing that EAP7 economies gain 3% more output per year during the recoveries episodes, after controlling for all the other variables. The quality of institutions had non-statistically significant impact on expansion. The main caveat of this exercise is that our definition of expansion involves a recovery from a recession and the forces behind long term growth.

**Table 8. Determinants of gains during recoveries**

Variables	Amplitude/N	Amplitude/N
Constant	0.010 (0.000)	0.009 (0.000)
Average amplitude of the previous recession	-0.433 (0.000)	-0.450 (0.000)
<b>External Shocks</b>		
Terms of trade for LA7	0.007 (0.025)	0.008 (0.017)
Terms of trade for EAP7	0.049 (0.000)	0.052 (0.000)
<b>Structural policies</b>		
Private credit/GDP	-0.001 (0.399)	
Trade Openness for LA7	0.010 (0.094)	0.012 (0.025)
Trade Openness for EAP7	-0.005 (0.000)	-0.005 (0.000)
<b>Macroeconomic policies</b>		
Log ( $\pi/(1+\pi)$ )	0.001 (0.020)	0.002 (0.007)
<b>Other factors</b>		
Dummy EAP7	0.028 (0.000)	0.030 (0.000)
Adjusted R-squared	0.830	0.834
Number of episodes	41	41
White test (p-value)	0.006	0.002

p-values in parenthesis

## 4.2 Cycle and microeconomic regulations

The different characteristic of cycles in each country should depend on the specific conditions of that country. Several reasons have been given in the literature to explain the extension or cost of contractions or crisis. Among the explanations we can mention access to credit, firing and hiring cost, start up business and quality of institutions. There is no time series available on this data, that is the reason why these variables were no included in the regression analysis. Here we will try to characterize through scatter plots the relationships between each of these variables and different characteristic of recessions: number of contractions and average change in output from peak to trough.

Figures 7 and 8 show all the relevant scatter plots of different measures of rigidities like starting and closing a business, and hiring and firing cost. It also relates contractions with quality of institutions, using enforcing contracts as a proxy (measured in number of procedures and time). Finally the relationship with access to credit, measure as the cost of getting credit, is also shown. All the variable definitions are shown in Appendix 1.

What are the main basic lessons from our preliminary observation at the scatters: First, countries with more cumbersome (higher number of procedures) and time-consuming (more duration) the procedures to either start or close a business usually display a larger number of contractions in their economic activity. This implies that countries with a larger number of contractions are usually associated with economic systems that have a slower process of creation and destruction of firms. In the case of the average loss of recessions, we also find that countries with excessively cumbersome process of creation and destruction of firms usually show the larger average losses due to recession. On the other hand, the higher recovery rate —which measures the efficiency of foreclosure or bankruptcy procedures<sup>7</sup>— the less frequent and less costly the episodes of recessions are.

Second, countries with more rigid labor markets usually display a larger number of contractions, with a larger output loss. However, the degree of association is in most cases smaller than (and not significant relative to) the correlation of regulation of creation/destruction of firms.

Third, getting access to credit is very important to smooth out negative shocks. The development of financial institutions is argued to lift some of the credit constraints faced by the less-favored sectors in society. In general, we find that when the population of a determined country has better access to the domestic financial system (e.g. lower cost to create collateral and better enforcement of legal rights), its business cycle usually displays a lower number of contractions and smaller costs of recessions.



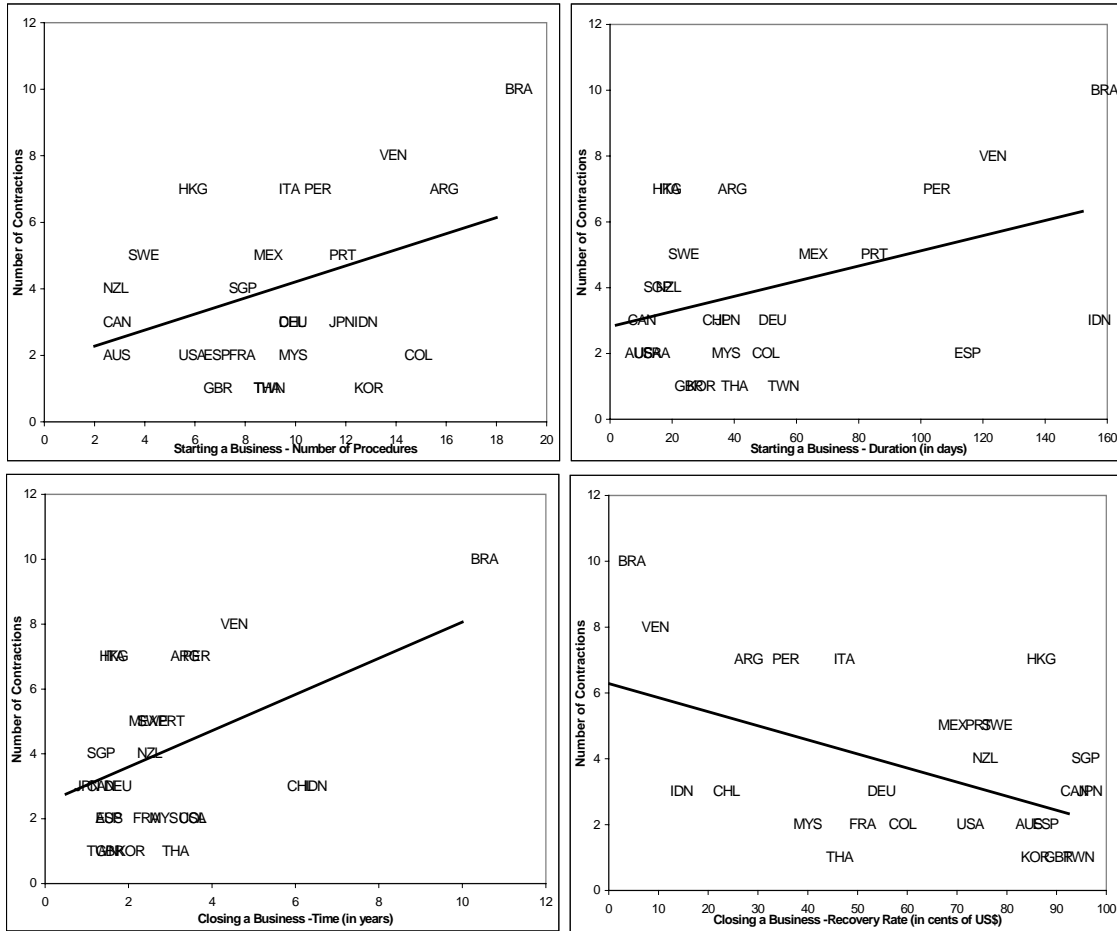
Finally, the more intricate and longer are the procedures to enforce contracts (by the legal systems -- via court decisions), the larger are the number of contractions and the output loss.

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<sup>7</sup> As measured by how many cents on the dollar claimants—creditors, tax authorities, and employees—recover from an insolvent firm.

Figure 7

Business and Labor Regulations vs. Number of Contractions



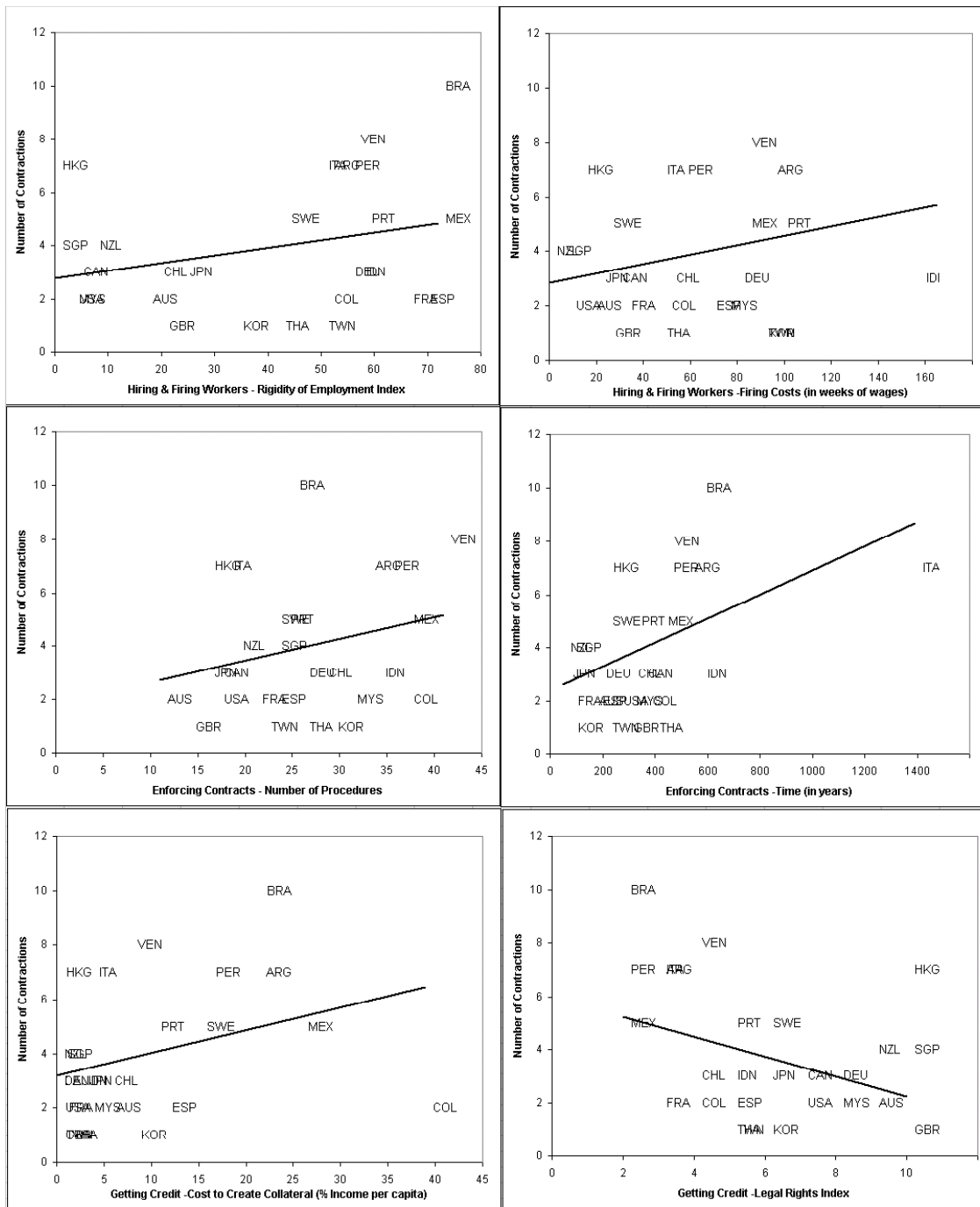
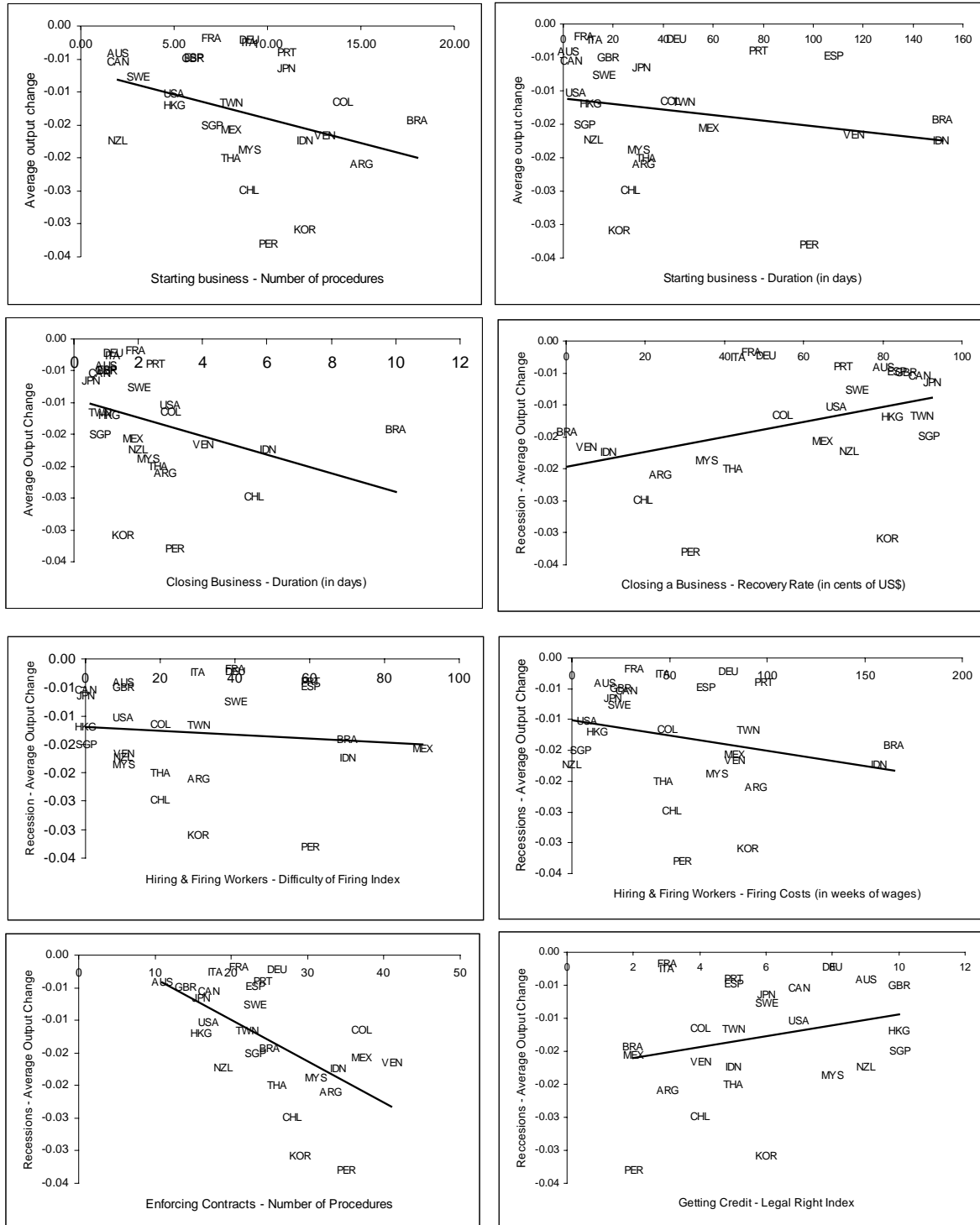


Figure 8

Business and Labor Regulations vs. Output Loss per Annum in Recessions



## 5. Concluding remarks

In this paper we have characterized the business cycles for a group of selected emerging market economies in Latin American and East Asia, with a group of twelve developed economies serving as a benchmark. Using quarterly data for the period 1980-2005, we have found the following results:

First, the duration of contractions is very similar for the three groups of countries, while the depth of the contractions are larger for LA7 and EAP7 economies. Thus, the cost of recessions (in terms of cumulative output loss) is higher in Latin America than in Asia and developed economies. The magnitude of the recessions is very volatile within the LA7 group.

Second, the expansion phase is very different for each group. It tends to be the largest in the EAP7, with LA7 economies running in second place and developed economies showing the smallest amplitude. On the other hand, the mean duration of the expansion is shorter in LA than in developed economies and EAP7.

Third, Latin American countries not only experienced the highest business cycle's costs, but also their cycles are poorly synchronized with EAP7 or developed economies, according to our indicators of the degree of concordance. On average, EAP7 tend to have cycles very synchronized among them and with Japan and the US. On the other hand Chile and Colombia have historically high synchronization with the US, but this has changed in the late nineties. The GDP of Mexico and Argentina tend to present higher correlation during the nineties compared to what was before and to the rest of LA7 economies.

Finally, an exploratory analysis for the causes of business' cycles cost was conducted. This analysis was conducted in two approaches. For 60 recession episodes and 41 episodes of expansions we calculated the average output change per year. We use this as a measure of cost of recession and gains of expansions, respectively. We regress this variable on

different potential determinants like, macroeconomic policy (inflation, size of the financial market, trade and financial openness), quality of institutions and external shocks (terms of trade and capital flows). We found that the terms of trade shock previous to the recession is a key explanatory variable of the average size of the recession. The effect of this variable is larger for EAP7 than for LA7 economies, while is not statistically significant for developed economies. When we take out the recent Asian crisis the impact is the same for both groups. Openness and the size of financial market seem to have a negative effect on the cost of a recession. In the case of expansions, terms of trade and openness increase the output gain during expansions episodes. However the effect of openness in the case of Asian economies is the opposite. Another puzzle in our results is the positive effect of inflation on the average increase in output during expansion episodes.

As expected, economies with higher cost of starting and closing business tend to have higher number of contractions and more output losses. Economies with higher labor market rigidities also experienced higher cost of the recessions. Higher cost of enforcing contract and lower access to credit increase the number of contraction and the cost in terms of average output loss.

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## APPENDIX I: Data Description

### I.1 Data on Gross Domestic Product

We gather data GDP data on local currency at constant prices for a sample of selected countries. See Table I.1 for more details.

**Table I.1**  
**Sample of Countries and Sources of Data**

Country	Period	Source
Argentina	1970.Q1-2005.Q1	IMF's International Financial Statistics (IFS) for 1970-79, and Ministerio de Economic y Producción (MECON) for 1980-2005. Webpage: <a href="http://www.mecon.gov.ar/secpro/dir_cn/default1.htm">http://www.mecon.gov.ar/secpro/dir_cn/default1.htm</a>
Australia	1970.Q1-2005.Q1	Australian Bureau of Statistics. Data available from the Reserve Bank of Australia ( <a href="http://www.rba.gov.au/">http://www.rba.gov.au/</a> ).
Brazil	1980.Q1-2005.Q1	Central Bank of Brazil and Instituto Brasileiro de Geografia e Estatística ( <a href="http://www.ibge.gov.br/">http://www.ibge.gov.br/</a> )
Canada	1970.Q1-2005.Q1	IMF's International Financial Statistics (IFS)
Chile	1977.Q1-2005.Q1	Central Bank of Chile, Department of National Accounts
Colombia	1977.Q1-2004.Q4	Departamento Administrativo Nacional de Estadística (DANE, <a href="http://www.dane.gov.co/">www.dane.gov.co/</a> ) for 1994-2004 and Departamento Nacional de Planeación (DNP, <a href="http://www.dnp.gov.co">www.dnp.gov.co</a> ) for 1977-1993
France	1970.Q1-2005.Q1	IMF's IFS and Bloomberg for 2005
Germany	1970.Q1-2005.Q1	IMF's IFS and Bloomberg for 2005
Hong Kong	1973.Q1-2005.Q1	Census and Statistics Department of Hong Kong ( <a href="http://www.info.gov.hk/censtatd/eng/hkstat/">http://www.info.gov.hk/censtatd/eng/hkstat/</a> ).
Indonesia	1970.Q1-2005.Q1	Statistics Indonesia, IMF's IFS
Italy	1970.Q1-2005.Q1	IMF's IFS and Bloomberg for 2005
Japan	1970.Q1-2005.Q1	Economic and Social Research Institute of Japan, IMF's IFS and Bloomberg for 2005
Korea	1970.Q1-2005.Q1	Bank of Korea
Malaysia	1988.Q1-2004.Q4	IMF's International Financial Statistics
Mexico	1980.Q1-2005.Q1	Instituto Nacional de Estadística Geografía e Informática (INEGI, <a href="http://www.inegi.gob.mx/">http://www.inegi.gob.mx/</a> )
New Zealand	1982.Q2-2005.Q1	Statistics New Zealand (SNZ, <a href="http://www.stats.govt.nz/">http://www.stats.govt.nz/</a> )
Peru	1979.Q1-2005.Q1	Central Reserve Bank of Peru ( <a href="http://www.bcrp.gob.pe">www.bcrp.gob.pe</a> )
Portugal	1970.Q1-2005.Q1	IMF's IFS and Bloomberg for 2005
Singapore	1975.Q1-2005.Q1	Singapore Department of Statistics ( <a href="http://www.singstat.gov.sg/">http://www.singstat.gov.sg/</a> )
Spain	1970.Q1-2005.Q1	IMF's IFS and Bloomberg for 2005
Sweden	1970.Q1-2005.Q1	IMF's IFS and Bloomberg for 2005
Taiwan	1970.Q1-2005.Q1	National Statistics, Republic of China ( <a href="http://eng.stat.gov.tw/">http://eng.stat.gov.tw/</a> ).
Thailand	1993.Q1-2005.Q1	National Economic and Social Information Board ( <a href="http://www.nesdb.go.th/">http://www.nesdb.go.th/</a> ).
United Kingdom	1970.Q1-2005.Q1	IMF's IFS and Bloomberg for 2005
United States	1970.Q1-2005.Q1	Bureau of Economic Analysis ( <a href="http://www.bea.gov">www.bea.gov</a> )
Venezuela	1993.Q1-2005.Q1	Central Bank of Venezuela ( <a href="http://www.bcv.org.ve/">http://www.bcv.org.ve/</a> ).



Control Variables	Period
Gross FDI Inflows	Yearly average variation (last 8 qtr before the episode)
Gross Equity related Inflows	Yearly average variation (last 8 qtr before the episode)
Terms of trade	Yearly average variation (last 8 qtr before the episode)
G3 Real Money Market Rate	Yearly average variation (last 8 qtr before the episode)
US Real Money Market Rate	Yearly average variation (last 8 qtr before the episode)
ICRG The Political Risk Rating	At the beginning of the previous year
Trade Openness	At previous year
Financial Openness (at previous year)	At previous year
Private credit by deposit money banks to GDP	At previous year
REER Sub-valuation	4 qtr before turning point (average of HP filter gap)
Inflation average	Average over previous 4 quarters

## I.2 Data on Labor and Industry Regulations

In order to measure business regulations and their enforcement, we use the *Doing Business* database ([www.doingbusiness.org](http://www.doingbusiness.org)). This database provides indicators on the regulatory costs of business that are comparable across 145 economies.

*Starting a Business.* There are several bureaucratic and legal procedures that an entrepreneur should follow in order to incorporate and register a new firm. Regulation of entry to a new business differs substantially across countries. For instance, some countries have a relatively simple and affordable process, whereas others have cumbersome procedures that lead to entrepreneurs paying bribes or joining the informal sector.<sup>8</sup> It counts all procedures (defined as a legal requirement that involves a separate interaction between the firm and an outside entity—officials, notaries, etc.) required to register a firm, and also include screening procedures by overseeing government entities, tax- and labor-related registration procedures, health and safety procedures, and environment-related procedures (see Djankov, La Porta, Lopez-de-Silanes, and Shleifer, 2002). Here, we include in our analysis the number of procedures, the average time spent during each procedure (in calendar days), the official cost of each procedure (as a percentage of income per capita), and the paid-in minimum capital (as a percentage of income per capita)

*Closing a Business.* Recent crisis episodes in emerging market economies have resuscitated the interest in the design of bankruptcy systems and the ability of such systems to help reorganize viable companies and close down unviable ones. Countries with inefficient bankruptcy systems would allow unviable business to survive.<sup>9</sup> Using a survey of bankruptcy lawyers, accountants, and judges, *Doing Business* covers the procedures on filing for bankruptcy proceedings, initiation of bankruptcy, the petition hearing, the court's decision, the appointment of an insolvency practitioner, the assessment of claims and their ordering by priority, and the sale of assets (see Djankov, Hart, Nenova, and Shleifer, 2005). A recovery rate—how many cents on the dollar claimants recover from an insolvent firm—is computed to measure the efficiency of foreclosure or bankruptcy procedures. In addition to this indicator, we also use the time of bankruptcy (in years) and its cost (as a percentage of the estate).

*Hiring & Firing Workers.* The regulation of labor is designed in order to protect the interests of workers and guarantee a minimum standard of living for the population. This system encompasses four bodies of law: employment, industrial relations, occupational health and safety, and social security (see Botero, Djankov, La Porta, Lopez-de-Silanes, and Shleifer, 2004). The data focuses on the regulation of employment, specifically the hiring and firing of workers. *Doing Business* measure the difficulties in hiring new workers and the rigidity of expanding or contracting the number of working hours, as well as the difficulty and cost of dismissing redundant workers. Note that the rigidity of employment index, reported here, is the simple average of the Difficulty of Hiring index, Rigidity of

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<sup>8</sup> The Doing Business survey examines the startup of commercial or industrial firms with up to 50 employees and start-up capital of 10 times the economy's per-capita Gross National Income (GNI).

<sup>9</sup> Often, the bottlenecks in bankruptcy are associated with the inefficient judicial process, and hence the unwillingness of banks and other lenders to push for a formal insolvency resolution.

Hours index, and Difficulty of Firing index. In addition, we have the indicator of firing costs.

*Enforcing Contracts.* When businesses engage with new customers (or borrowers), the inability to enforce contracts leads to restrictions on trade and credit to a small community of people that has developed informal relations through kinship, repeated dealings with each other, or the security of available assets. Courts enforce contracts between debtors and creditors, suppliers and customers. In many countries, courts are slow, inefficient, and even corrupt. *Doing Business* follows the step-by-step evolution of a payment dispute to measure contract enforcement. It counts the number of procedures from the moment the plaintiff files the lawsuit in court until the moment of actual payment; the associated time, in calendar days; and the associated cost, in court fees, attorney fees, and other payments to accountants, assessors, etc. Following Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2004), three indicators are used: the number of procedures, time (in calendar days), and official costs (as a percentage of the debt value).

*Getting Credit.* One of the greatest barriers for firms is the difficulty in obtaining credit. Well-intended protections of borrowers, such as interest rate caps or restrictions on pledging collateral, can backfire and prevent borrowers from financing their business projects. In particular, small businesses, women, and the poor face the greatest difficulties in obtaining financing. Djankov, McLiesh and Shleifer, (2004) show that broader sharing of credit information and stronger legal rights in and out of bankruptcy lead to more credit. Their database covers two sets of issues—credit information registries and the effectiveness of collateral and bankruptcy laws in facilitating lending. Credit registries are institutions/firms that gather and disseminate information on credit histories, which helps creditors assess risk and allocate credit more efficiently. Lending is also easier when borrowers are allowed to pledge their assets to lenders. But creating and registering collateral can be quite expensive and lengthy. *Doing Business* also investigates how well collateral and bankruptcy laws are designed to facilitate access to credit. Here, we use the five indicators developed: cost to create and register collateral (as a percentage of income per capita), index of legal rights of borrowers and lenders, index of credit information availability, coverage of public registries (number of individuals and/or firms that have a record in the registry, scaled to the adult population size), and coverage of private bureaus (number of individuals and/or firms that have a record in the bureau, scaled to the adult population size).

*Protecting Investors.* Preventing expropriation and exposing it when it occurs, requires legal protection of shareholders, enforcement capabilities, and disclosure of ownership and financial information. Investors benefit greatly from such legal protection. So do entrepreneurs. If expropriation remains unpunished, few would dare invest in business partnerships or publicly listed companies. The result: businesses would not reach efficient size for lack of financing, and economic growth would be held back. *Doing Business* provides a disclosure of ownership index which comprises four types of ownership disclosure that reduce expropriation: information on family, indirect ownership, beneficial ownership, and voting agreements between shareholders. Two types of financial disclosure help investors: an audit committee that reviews and certifies financial data, and a legal requirement that an external auditor be appointed. Finally, disclosure is most effective

when ownership and financial information is available to current and potential investors (see Djankov, La Porta, Lopez-de-Silanes, and Shleifer, 2005).

## APPENDIX II: Comparing the Cost of Deep Crises

In the following table appears some descriptive statistics of four important crises: Chile 1982, Mexico 1995, Korea 1998, and Chile 1999. We compared the duration, amplitude, duration of the entire cycle (defined from peak until the economy reaches that initial level) and cost (foregone output respect to the initial level) among them and with the developed countries.

Table A2.1.Characterizing the Business Cycles: 1990-2004

	Duration of the Recessions (Quarters)	Duration of the Recovery (Quarters)	Duration of the Entire Cycle (Quarters)	Maximum Drop of Initial GDP (% of initial GDP)	Foregone Output (% of initial GDP)
Chile 1982-83	5.0	21.0	26.0	23.3	204.1
Chile 1998-99	3.0	6.0	9.0	4.3	13.5
Mexico (2)	4.0	4.0	8.0	6.4	23.8
Corea (1)	3.0	5.0	8.0	9.3	37.1
Latin America <sup>1</sup> (3,2)	4.0	5.6	9.6	6.4	46.8
Emerging 7 <sup>2</sup> (2)	3.8	4.0	7.8	10.6	46.1
OECD Economies <sup>3</sup> (1,7)	3.1	3.9	7.0	1.6	6.4

<sup>1</sup>Include Argentina, Bolivia, Brazil, Colombia, Ecuador, Mexico, Peru, Uruguay y Venezuela.

<sup>2</sup>Include Korea, Hong Kong, Indonesia, Malaysia, Singapore y Taiwan.

<sup>3</sup>Include Australia, Canada, France, Germany, Italy, Japan, New Zealand, United Kingdom, United States.  
In parenthesis is the number of recessions included in each period. The time period used is 1990 2004.

A couple of conclusions could be derived from Table A2. First, under any measure of recession intensity (duration, maximum GDP drop or foregone output) the combinations of debt crisis (1982) an internal policy hit Chile harder than the recent Asian crisis and domestic policies. Second, while Chile needed more time to recover from the Asian crisis than Korea, the cost in terms of foregone output was much lower.