

THE CYCLICAL BEHAVIOR OF EXTERNAL INDEBTEDNESS: THE CASE OF FOREIGN AND DOMESTIC BANKS IN COLOMBIA¹

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Abstract

In this paper we try to elucidate the relationship between foreign and domestic banks external indebtedness and the business cycle in Colombia. After a brief review of related literature, we characterize the historical behavior of banking external indebtedness in Colombia, and perform statistical and econometric calculations on the aforementioned relationship.

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1 Introduction: A general Outlook

Over the last fifteen years, a number of emerging market economies (especially in Latin America and Eastern Europe) became recipients of a substantial upsurge in Financial Sector Foreign Direct Investment (FSFDI). International banks have starred in this tendency, through the acquisition of financial firms in those economies (BIS CGFS, 2004). Actually, foreign banks now account for a very important share in some of the most influential economies of Latin America².

The penetration of foreign investors in the financial sector of emerging market economies has attracted the attention of a number of researchers, who generally have been concerned with the potential costs and benefits that this process can represent for host economies. To a large extent, this topic has been analyzed by means of the comparison of the microeconomic and macroeconomic activities of foreign and domestic banks. Research favors FSFDI when foreign banks perform better than their domestic competitors³.

The objective of this paper is twofold. Firstly, we make an attempt to characterize, in historical perspective, the behavior of domestic and foreign banks' external indebtedness in Colombia, especially in its relationship to the business cycle. Secondly, as a result of this historical analysis, we try to compare -by means of econometric techniques- the relationship between domestic and foreign banking external indebtedness and the business cycle in Colombia after 1997, when the foreign banks' portion of the financial system stabilized around 25% of total banking assets. This exercise follows the approach of current literature and leaves us in a position of evaluating one aspect of the entry of foreign banks in the Colombian financial system, namely, its contribution to the provision of external financing in different stages of the business cycle.

The paper is organized as follows. The second section contains a brief revision of the current state of art, which summarizes the main results obtained in the literature comparing foreign and domestic banks' activities. The third section characterizes the historical behavior of banking indebtedness in Colombia. As a result of this analysis, the fourth section focuses in banking indebtedness in the nineties, and performs an econometric comparison of the cyclical behavior of foreign and domestic banking indebtedness. The Fifth section presents the main findings of this work.

² At the end of 2002, for example, foreign banks accounted for almost 75% of total banking assets in Mexico. In Argentina, Chile and Peru, that portion was near to 60%. The penetration of foreign banks has been weaker in countries such as Colombia and Brazil, where foreign banks accounted for nearly one quarter of total banking assets (Micco and Panizza, 2004).

³ Microeconomic activities of banks comprise a set of internal features of the banking firm, which are needed in order to enhance the overall soundness of the financial system: efficiency, organizational and decision making practices, risk management, corporate control, capital adequacy, performing loans, capital provisions, etc. Macroeconomic aspects of banking activity refer mainly to the relationship between banking activities and the business cycle.

2 A brief review of literature

Multiple explorations around what we term “microeconomic activities of banks” in emerging market economies share common results. Generally, foreign banks exhibit sounder behaviors –in comparison with their domestic pairs- according to different indicators⁴. The results of the analyses concerning the macroeconomic aspects of banking activities, however, point at several directions (Box 1 summarizes the main findings). These studies try to elucidate the relationship between the business cycle and the activities of foreign and domestic banks. Albeit, they have left aside a banking activity which we consider of crucial importance for the macroeconomic stability of emerging market economies: external indebtedness.

Box 1
Foreign and domestic banks, and the business cycle

It has been hard to demonstrate the goodness of foreign bank entry to the financial system of emerging market economies, at least with respect to its capacity to smooth the host country’s business cycle.

According to Crystal, Dages and Goldberg (2001), for example, and Goldberg, Dages y Kinney (2000), foreign banks exhibit higher loan growth in comparison with domestic banks, even in the deepest moments of economic crises. In this sense, foreign banks have been potentially beneficial to host country’s economy, providing external financing when nobody does. The same authors suggest that foreign as domestic banks exhibit some degree of loan procyclicality, which accentuates the business cycle. This latter result has been challenged by Micco and Panizza (2004), for whom foreign banks are less procyclical than domestic banks. This happens because the former are supported by a more stable deposit base.

For the case of developed economies, Borio, Furfine and Lowe (2001) find an excessive degree of procyclicality of banking systems. According to their work, this is the result of misperceptions in risk measurement during different stages of the business cycle.

The Chilean experience is a good example of destabilizing influences produced by foreign banks behavior. According to Caballero (2002) and Caballero, Cowan and Kearns (2004), Chilean economy has suffered business cycles that are more pronounced than would be the case in the absence of financial system restrictions. These restrictions are related to the “rushing the door” attitudes that foreign banks exhibit in times of financial distress, abandoning the economy by means of the acquisition of international assets. In other words, foreign banks become part of the sudden stop. This evidence sounds familiar to the hypothesis put forward by Galindo, Micco and Powell (2003)⁵, who argue that, due to the foreign banks capacity for accessing to positions in international capital markets in comparison with domestic banks, it is likely to observe the abandonment of the economy in times of financial scarcity by this group of banks. Lastly, some authors have expressed concerns about the possibility that foreign banks became shocks’ transmission mechanisms from home to host countries. This happens to be the case of Japanese banks in the United States financial system at the beginning of the nineties. See, for example, Peek and Rosengren, (2000).

The analysis of the relationship between the business cycle and banking external indebtedness allows us to compare directly the contribution of foreign and domestic banks to the smoothing of the host business cycle. According to the BIS’ *Committee on the Global Financial System* (BIS CGFS, 2004), foreign banks in emerging market economies are characterized by its direct access to parental financial resources (the

⁴ There is a vast literature that supports this result. See, for example, Claessens, Demirgüç-Kunt y Huizinga (1998), Micco y Panizza (2004), Moguillansky, Studart y Vergara (2004), Crystal, Dages y Goldberg (2001, 2002), Goldberg (2004), Clarke, Cull, D’Amato y Molinari (1999), BIS Summaries of Workshops (2004), Honohan (1997), Pastor, Pérez y Quesada (1997), Denizler (1999), Cárdenas, Graf y O’Dogherty (2003), Clarke, Crivelli y Cull (2005), Bonin, Hasan y Wachtel (2005). For particular analyses of the Colombian case, see Barajas, Salazar y Steiner (1999). The latter contains an interesting exploration of the evolution of Colombian legislation on foreign participation in the financial system.

⁵ Quoted in Micco and Panizza (2004)

parent institution of a foreign bank is usually an internationally active bank). That potential access is reflected in a reduced sensitivity of foreign banks' external indebtedness to host country's economic conditions. Because of this reduced sensitivity, foreign banks can become a stabilizing macroeconomic influence in the financial system of host economies, providing them of stable external financing, either in good or bad times (when they need it the most). Thereby, if foreign banks maintain host economy's access to external credit along different stages of the business cycle, they would contribute to smooth host business cycle.

On the other side, domestic banks cannot rely on any source of permanent external financing. Instead, domestic banks' external indebtedness is determined by the conditions of international capital markets. Therefore, domestic banks' indebtedness is indeed sensitive to host economy's business cycles: in good times, when the economy is vigorous as spreads drop rapidly, it is easy for domestic banks to get access to external resources. When spread dropping comes to an end, and host economy falls into recession, there is hardly a chance for domestic banks in international capital markets. That behavior accentuates –as the Chilean experience puts forward (see Box 1)- the host economy's business cycle.

Our objective is then to explore these hypotheses by means of analyzing the relationship between foreign and domestic bank external indebtedness and the business cycle in the case of Colombia. In pursuing that objective, next section describes –in historical perspective- some stylized facts that characterize the behavior of external banking indebtedness in Colombia.

3 External Banking Indebtedness in Colombia, 1924-2004

3.1 Historical Evolution: Cycles and magnitudes

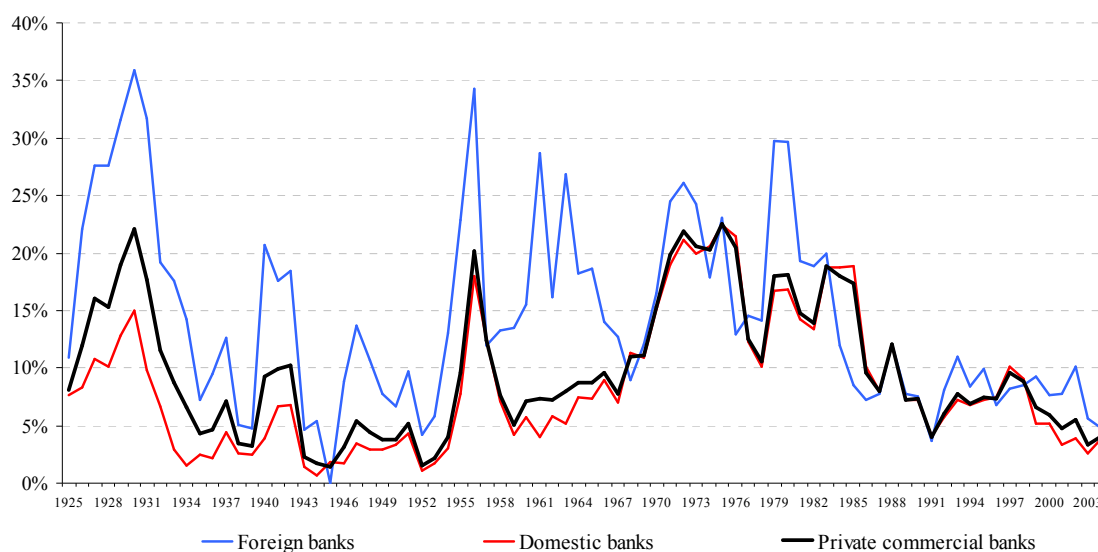
Since 1924, the external indebtedness of Colombian banks has followed a series of cycles which differ in duration and severity⁶. When banks are discriminated according to their owners, between domestic and foreign banks, their cycles are similarly of different intensity. One way of showing the magnitude of bank external indebtedness is given by the ratio of the stock of their total external indebtedness to the stock of their total assets. Figure 1 shows the evolution of such a ratio for domestic banks, foreign banks, and the whole system of private commercial banks. On average, that ratio has been of 8.4% in the case of domestic banks, of 14.5% for foreign banks, and of 9.8% for commercial private banks.

⁶ Banking external indebtedness was extracted from the liabilities side of the aggregate balance sheet of foreign, domestic, and total private commercial banks. From 1925 to 1976, the external indebtedness is equal to the sum of “Exigibilidades en moneda extranjera redimibles en moneda legal” and “Líneas Internacionales”. From 1976 to 1989, the external indebtedness is equal to the sum of “Corresponsales” and “Financiación por aceptaciones y/o avances”. Since 1989, after the expedition of the “Plan Único de Cuentas”, the external indebtedness is equal to the sum of the following accounts: (code 2-1-55-10) “Corresponsales”, (2-1-55-15) “Sucursales en el extranjero”, (2-2-10-40) “Residentes en el exterior”, (2-4-35) “Bancos del exterior”, (2-4-37) “Financiación de inversiones en el exterior”, (2-4-40) “Entidades Financieras del exterior”, (2-4-45-05) “Banco Mundial”, (2-4-45-10) “Banco Interamericano de Desarrollo”, (2-4-45-15) “Corporación Andina de Fomento” and (2-4-45-95) “Otros Organismos Internacionales”.

The share of foreign banks on total assets of commercial private banks has not been constant over time. Their highest shares were obtained in the first and in the last decade of the available time series. The share of foreign banks reached 32% in the first one (1925 – 1935), and 25% in the last one (1994 – 2004). In the interim, their average share was of 16%.

In Figure 1, three outstanding cycles of bank external indebtedness are exhibited. The first one covers a whole decade between the middle of the twenties and the middle of the thirties. Along that period, foreign bank external indebtedness reached the figure of 22.3% of their assets, in comparison with the 8% reached by their domestic peers. As a whole, the external indebtedness of those banks was equivalent to 12.8% of their assets. The second big cycle covers the period between 1970 and 1987. In such a cycle, the external indebtedness of foreign banks arrived to 18.2% of total assets, while the relevant figures for domestic banks and the whole system were 16.5% and 16.7%. The last important cycle starts in 1992 and comes to an end in 2004. The average external indebtedness of external banks as a proportion of assets was 8.1%, on top of 6% for domestic banks, and 6.5% for the entire system.

Figure 1
Banking external indebtedness
(as a percentage of assets)
1925-2004p



Source: Superintendencia Bancaria, Banco de la República

According to the quoted ratios, the period of greatest access of commercial private banks to external indebtedness was that of the cycle between 1970 and 1987, when reached a figure just below 17%. In contrast, the cycle of less relative access was that of the last fifteen years of the time series. Another historical contrast was given by the behavior of foreign banks; their highest ratios of external indebtedness were achieved in the 1920s, and the lowest in the last five years of the series. As it would be expected, the decade from 1935 to 1945, was characterized by a very limited access of banks to external indebtedness. Over these years, domestic banks just reached an indebtedness of

3% of their assets, and the complete system did not reach even 5%. It was left to foreign banks to dedicate a major part of their indebtedness, reaching 9.6% of their assets.

In the 1920s, access of banks to external credit was not limited to commercial banks. This one could be interpreted as the short-run foreign credit. Mortgage banks floated loans in external financial centers such as New York and London, getting access to long-run foreign credit. Such a financing was abruptly interrupted with the arrival of the Great Depression. External credit concentrated over the period between 1926 and 1929. The one which could be labeled as short-term lending arrived to US\$ 21 millions, and the long-term lending to US\$53 millions. The importance of these figures is notable, since they represented 18% and 45% of average exports during that period.

3.2 External Indebtedness cycles and business cycles

Up to this point, it is clear that external banking indebtedness in Colombia has undergone successive cycles. Our next step is to try to approach quantitatively the historical relationship between these indebtedness cycles and Colombian economy's business cycles.

We perform this approach by calculating cross correlograms for the indebtedness cycles and the business cycle, which constitutes a first and natural statistical approximation to its relationship. Cross correlograms show the correlation coefficient between two series at different lags and leads.

Notwithstanding, calculating cross correlations directly on a pair of series (in our case, external indebtedness and business cycles) may be misleading. If, as is common in economic series, the series exhibit autoregressive structures, cross correlations will be contaminated by this structure. Perhaps most importantly, it will mislead the calculation of confidence intervals for the cross correlations, which prevents us of making statistical inference. It is necessary, then, a prior "cleaning-up" of this autoregressive structure of the series. The process of autoregressive "cleaning-up" is known as *prewhitening*.

Prewhitening fits an ARMA model to each of the series, for cleaning-up their autoregressive structure. Of course, ARMA estimation assumes that series are stationary. The particular form of the ARMA specification depends on the conjectures about the causality relationship that exists between the series. If, for example, we assume that causality goes unidirectional from A to B, then the best ARMA specification for A (in terms of residual properties) must be estimated for B. If causality is bidirectional, it must be estimated an ARMA specification independently for A and for B⁷. Cross correlations are then calculated from the residuals of both ARMA models⁸.

From now on, we consider that causality goes unidirectional from the business cycle to the external indebtedness cycle. As we saw in the last section, the hypothesis that we are trying to test relates precisely to the strength of this relationship. In order to capture the external indebtedness cycles and the business cycle, we have used three 'trend filtering' methodologies: standard Hodrick-Prescott filter, and Baxter-King and Christiano-

⁷ In other words, the reduction to white noise is performed only for the explanatory variable.

⁸ A formal explanation of the prewhitening procedure is in Wei (1990) and Vandaele (1983).

Fitzgerald Band-Pass filters⁹. These three filters have been applied to three original series: foreign and domestic banks external indebtedness as a percentage of assets (used in last subsection) and the logarithm of real Colombian GDP¹⁰. Finally, in order to detect changes in the relationship between the cycles after 1991, we have calculated separately cross correlations for the periods 1925-1991 and 1925-2004¹¹.

In summary, we built 12 correlograms, reported in Table 1: foreign banks external indebtedness cycle against business cycle and domestic banks external indebtedness cycle against business cycle, each one for the three types of filters and for the two subsamples. Let's analyze our main findings.

3.2.1 Hodrick and Prescott's filtering methodology

3.2.1.1 1925-2004¹²

Foreign banks external indebtedness cycle exhibits a significant and positive relationship with the business cycle at one and two lags. No other lag or lead in a 6-year horizon is statistically significant. In the case of domestic banks, only lag 2 is in the border of statistical significance, exhibiting also a positive relationship. These results evidence –for period 1925-2004- lagged procyclicality of external indebtedness in both type of banks. Numerically, the procyclicality is weaker in the case of domestic banks.

3.2.1.2 1925-1991¹³

For the case of foreign banks, results are statistically equivalent to those presented for the total sample: only lags 1 and 2 are significant. Numerically, the correlation

⁹ Original references on the performance of the three types of filtering methodologies are: Hodrick and Prescott (1997), Baxter and King (1999) and Christiano and Fitzgerald (2003). An application of Hodrick and Prescott's and Baxter and King's filters to the relationship between the business cycles of Colombia and the United States was performed by Avella and Fergusson (2003)

¹⁰ Source: Grupo de Estudios para el Crecimiento Económico (Banco de la República) and DANE.

¹¹ 1991 is a year of intense legislation on FSFDI in Colombia. Particularly, Law 9, Law 45 and law 35 (two years later) marked the beginning of the liberalization of the Colombian financial system.

¹² A restricted AR(9) was fitted and estimated for the Hodrick and Prescott's business cycle in this sample. As we assume that business cycle causes external indebtedness cycle, this same structure was estimated for the external indebtedness cycle. This latter observation remains valid for the rest of cross correlograms.

¹³ A restricted ARMA(9,1) was fitted and estimated for the business cycle in this subsample.

Table 1
Cross Correlograms
Banking external indebtedness cycle and business cycle

Cross Correlations - Banking external indebtedness cycle (t) and Business Cycle (t+i)																
Filter	Sample	Banks	Lead						Contemporaneous i=0	Lag						Standard Error
			i=6	i=5	i=4	i=3	i=2	i=1		i= -1	i= -2	i= -3	i= -4	i= -5	i= -6	
HP	1925-2004	Foreign	-0.093	0.089	-0.063	0.037	-0.153	-0.103	-0.023	0.275*	0.354*	0.019	-0.132	-0.150	0.013	0.119
		Domestic	-0.044	0.024	0.090	0.020	-0.066	-0.221	0.007	0.146	0.245*	0.082	-0.127	-0.156	-0.032	0.119
	1925-1991	Foreign	-0.115	0.053	-0.235	-0.071	-0.159	-0.008	0.083	0.298*	0.280*	-0.031	-0.134	-0.058	0.071	0.131
		Domestic	0.126	0.047	0.085	-0.094	-0.033	-0.245	0.034	0.129	0.200	0.049	-0.112	-0.106	-0.018	0.131
BK	1925-2004	Foreign	-0.080	0.002	-0.057	0.098	-0.116	-0.034	-0.117	0.030	0.161	-0.177	0.011	0.106	0.144	0.125
		Domestic	-0.141	0.020	0.036	0.086	0.040	-0.123	-0.043	0.031	0.079	0.044	-0.030	-0.003	0.083	0.125
	1925-1991	Foreign	0.058	-0.144	-0.128	-0.055	-0.164	-0.015	0.021	0.177	0.411*	0.045	-0.112	-0.143	0.042	0.127
		Domestic	0.045	0.028	0.069	0.045	0.071	-0.166	-0.004	0.164	0.256*	0.125	0.000	-0.089	0.112	0.127
CF	1925-2004	Foreign	-0.005	0.121	-0.142	0.034	-0.088	0.073	0.047	0.285*	0.218	-0.128	0.011	-0.081	-0.030	0.119
		Domestic	-0.005	0.052	0.044	-0.034	-0.041	-0.134	0.038	0.039	0.143	0.038	0.031	-0.097	-0.057	0.119
	1925-1991	Foreign	-0.035	0.005	-0.177	-0.044	-0.159	0.067	0.072	0.323*	0.206	-0.179	0.003	-0.125	0.117	0.127
		Domestic	0.032	0.095	0.144	-0.025	0.021	-0.155	0.065	0.134	0.143	-0.016	0.041	-0.049	0.022	0.127

*Statistically significant ($\alpha= 5\%$)

coefficient at lag 1 is greater than that presented for the period 1925-2004, although at lag 2 the correlation coefficient is smaller. Results are statistically different for domestic banks: for this subsample, no lag or lead results statistically significant.

These results suggest that the relationship between external indebtedness cycles and the business cycle underwent profound changes after 1991. In particular, after 1991, domestic banks external indebtedness became procyclical (no significant correlations for 1925-1991, and a significant correlation at lag 1 thereafter), and foreign banks external indebtedness' exhibited a numerically weaker procyclicality at lag 1, and stronger at lag 2.

3.2.2 Baxter and King's filtering methodology

3.2.2.1 1925-2004¹⁴

For the whole sample, neither foreign banks external indebtedness nor domestic banks external indebtedness exhibit any cyclical behavior. No lag or lead results statistically significant for both types of banks.

3.2.2.2 1925-1991¹⁵

Again, results are as numerically as statistically different for this subsample. In particular, the correlation between the business cycle and foreign banks external indebtedness cycle is positive and significant at lag 2. This result statistically reinforces those results obtained under Hodrick and Prescott's filter: foreign banks indebtedness is procyclical until 1991, and is insensitive to the business cycle if the last portion of the sample is included. Apparently, something occurred after 1991 that allowed foreign banks to access to external financing aside Colombian economic conditions. According to the related literature, this kind of breakpoint could be the natural result of the hike in FSDI.

In the case of domestic banks, the use of Baxter and King's filter contradicts those obtained with Hodrick and Prescott's technique. In this case, as with foreign banks, external indebtedness is procyclical at lag 2 (positive and significant correlation) during the period 1925-1991, and *acyclical* (no relationship with business cycle) if subsequent data is included in the sample.

3.2.3 Christiano and Fitzgerald's filtering methodology

3.2.3.1 1925-2004¹⁶

As with Hodrick and Prescott's filter, foreign bank external indebtedness is procyclical at lag 1 (positive and statistically significant correlation). On the other side, the

¹⁴ A restricted ARMA (10,3) structure was identified and estimated for business cycle using this filter in this sample.

¹⁵ A restricted ARMA (2,3) structure was identified and estimated for business cycle using this filter in this subsample.

¹⁶ When using Christiano and Fitzgerald's filtering technique, a restricted ARMA (3,2) was identified and estimated for the business cycle.

domestic banks external indebtedness cycle exhibits no relationship with the business cycle at any lag or lead in an horizon of 6 years.

3.2.3.2 1925-1991¹⁷

Foreign bank external indebtedness is procyclical at lag 1 (positive and statistically significant correlation), but the numerical correlation is greater when using this subsample. Domestic banks external indebtedness cycle is not related –at any lead or lag- with the business cycle.

To sum up, the interpretation of the cross correlograms provides interesting and useful insights. Each one of the three filtering methodologies employed in this section suggests that the cyclical behavior of foreign banks external indebtedness experienced changes after 1991. According to the three techniques, foreign banks procyclical behavior observed until 1991 either weakens (Hodrick-Prescott and Christiano-Fitzgerald) or disappears (Baxter-King) thereafter. The evidence for the case of domestic banks points at no clear direction: Domestic banks external indebtedness procyclicality either arises (Hodrick-Prescott) after 1991, disappears after 1991 (Baxter-King) or has never existed (Christiano-Fitzgerald).

The statistical evidence presented up to this moment lead us to consider more carefully the period after 1991. As we explained, foreign banks external indebtedness became less (or no) procyclical after 1991. As we try to compare foreign and domestic banks especially after the upsurge of FSFDI, next section focuses on last fifteen years, and performs econometric calculations in order to discern the cyclical behavior of foreign and domestic external indebtedness in Colombia after the breakpoint of 1991.

4 Banking external indebtedness in Colombia since 1991: stylized facts

Table 2 reports the evolution of foreign, domestic and public banks external indebtedness (as a percentage of assets) in Colombia since 1990. As Table 2 shows, foreign banks have benefited in average from a greater access to external resources (7.9% against 5.9% in domestic banks and 3% in public banks)¹⁸. Notwithstanding, the development of external indebtedness has been far from steady. In 1990, for example, before the upsurge in FSFDI, external indebtedness was fairly the same in foreign as domestic and public banks (near 7% of assets). During the next three years (1992-1995), foreign banks received in average a greater amount of external resources. This situation

¹⁷ For this subsample and using Christiano and Fitzgerald's filter, an ARMA (2,1) model was fitted and estimated for the business cycle.

¹⁸ A deeper exploration into the group of foreign banks reveals that external indebtedness is greater in those banks established in Colombia after Law 45, and smaller in those formerly domestic banks acquired by foreign investors.

Table 2
 Banking external indebtedness
 (as a percentage of assets)
 1990-2004p

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004p	Average
Foreign	7.6	3.6	8.1	11.0	8.4	9.9	6.8	8.2	8.5	9.3	7.6	7.7	10.2	5.6	4.7	7.9
Domestic	7.3	4.0	5.7	7.3	6.7	7.2	7.4	10.2	9.0	5.2	5.2	3.3	3.8	2.6	3.9	5.9
Public	7.4	6.0	5.8	6.6	3.6	4.7	4.6	5.1	4.7	2.1	2.5	1.2	1.2	0.7	1.5	3.0
Total Banking System	7.4	5.2	5.9	7.2	5.9	6.7	6.8	8.8	8.0	5.4	5.3	4.2	4.8	2.9	3.7	6.0

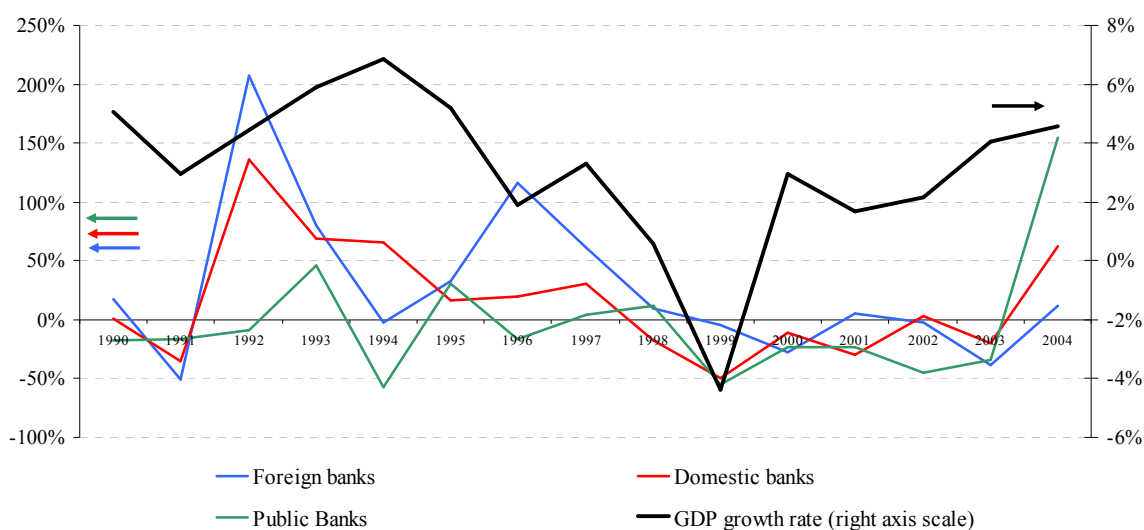
Source: Banco de la República

reversed in favor of domestic banks from 1995 until 1998. Thereafter, when foreign share of total banking assets stabilized around 25%, foreign banks again placed first in its access to external indebtedness.

Table No. 2 also suggests that foreign banks external indebtedness has been more stable in comparison with domestic and public banks. From 1993 to 2002, it fluctuated slightly around the 15-years average. Domestic banks indebtedness has been more volatile. From 1992 to 1997, for example, it almost duplicated: 5.7% to 10.2%. Two years later, it came back to 5.2%. The coefficient of variation CV (the ratio of standard deviation to average) reinforces these visual impressions: CV equals 0.23 in the case of foreign banks indebtedness, and 0.31 for domestic banks indebtedness. The greater stability of foreign banks external indebtedness suggests, as we mentioned in prior sections, its reduced sensitivity to Colombian economic conditions.

In the spirit of Goldberg, Dages and Crystal (2001), Figure 2 compares the evolution of external indebtedness growth rate, and real GDP growth rate during the same period. As with the Table 2, Figure 2 may provide insights into the relationship between business cycle and indebtedness cycle.

Figure 2
Banking external indebtedness and GDP
Growth rate (%)
1990-2004p



Source: Banco de la República and DANE.

According to Figure 2, this relationship not only has experienced several stages during the period, but has been different for each group of banks. Until 1992, external indebtedness for the group of banks apparently behaved in a procyclical way. From 1993 to 1996, external indebtedness was slightly procyclical for the case of domestic and public banks, and considerably anticyclical for the case of foreign banks. After 1996, when Spanish investors (now Banco Bilbao Vizcaya Argentaria and Banco Santander Central Hispano) stabilized the foreign portion of total banking assets around 25%, foreign banks external indebtedness took up again a procyclical behavior. During the period from 1999, when the Colombian economy experienced a sharp recession,

external indebtedness fell for every bank in the system. This fall was, however, less severe for the case of foreign banks. Since 2000, finally, foreign banks external indebtedness is once more anticyclical, differing from domestic banks.

5 External Indebtedness cycles and business cycle after FSFDI: A dynamic panel data exercise

In Section 3.1 and 3.2, we stated that banking external indebtedness in Colombia followed several cycles, with differing severity and duration. From 1991 and thereafter, and probably because of the upsurge in FSFDI, external indebtedness has apparently behaved in a different way, at least in its relationship with the business cycle. Section 4 presented some facts about this relationship after 1991. This section focuses then in quantifying –in the spirit of Goldberg, Dages and Kinney (2000) – the direction and strength of this relationship in the period after FSFDI.

5.1 The Methodology

In order to achieve our objective, we performed an econometric estimation of a panel data model which involves –as regressors- lagged values of the dependent variable. This kind of models is termed in econometric literature as “dynamic panel data” models, and authors such as Arellano and Bond (1991) have developed estimation techniques which produce consistent and efficient estimators of parameter values. Our particular model specification is:

$$\log EI_{i,t} = \alpha_i + \beta_1 \log EI_{i,t-1} + \beta_2 \log EI_{i,t-2} + \lambda_0 \log RGDP_t + \lambda_1 \log RGDP_{t-1} + \lambda_2 \log RGDP_{t-2} + \varepsilon_{i,t} \quad [1]$$

As in previous sections, we assume that the explanatory variable is real GDP (RGDP), whereas explained variable is banking external indebtedness (EI). Variables in the left-hand and in the right-hand side are in logs, which allow us to interpret the coefficients as elasticities. “t” corresponds to the time index, and “i” corresponds to each group of banks¹⁹. According to equation [1], insofar as λ_0 , λ_1 or λ_2 be positive and statistically significant, negative and statistically significant, or statistically insignificant, banking external indebtedness is respectively procyclical, anticyclical, or insensitive to the business cycle²⁰.

To perform our calculations, we used a quarterly dataset on banking external indebtedness in Colombia. The dataset contains information on external indebtedness for 6 foreign banks, 7 domestic banks, and one public bank, which account for nearly

¹⁹ We have two reasons for choosing a dynamic panel data model. Firstly, since 1989 the available information is disaggregated to a bank-level basis. Before 1989, there isn’t such disaggregated information. We can profit from this kind of disaggregated datasets using a panel data model. Secondly, previous estimation of static panel data models (such as fixed and random effects models in the spirit of Goldberg, Dages and Kinney (2001)) exhibited persistent residual serial autocorrelation. To overcome this problem, we decided to introduce lagged dependent values as regressors. This implies the abandonment of static panel data techniques, in favor of dynamic panel data models.

²⁰ The inclusion of two lags of real GDP and External Indebtedness in equation [1] gets ahead of our results: the properties of estimation residuals were optimal only under the inclusion of a number of lags smaller or equal to 2.

three quarters of total banking assets²¹. Quarterly information on Real GDP is obtained from Colombia's Departamento Administrativo Nacional de Estadística (DANE).

The estimation of equation [1] has been deliberately limited to the period after the third quarter of 1997 until last quarter of 2003. This limit has conceptual and statistical reasons. To a large extent, FSFDI in Colombia has implied the acquisition by foreign investors of a domestic bank. From 1991 until 1997, several of these financial operations were carried out. As acquired banks change their status (domestic to foreign), these operations cause "jumps" in the series of foreign and domestic external indebtedness. From an econometrician point of view, this "jumps" are very harmful. One approach to overcome this problem is to assume that banks keep (for the entire sample) the property status of one particular moment of time. But of course, this is conceptually unacceptable. The remaining alternative (the one which we have chosen) is to limit the sample to a period lacking "jumps". 1997 and thereafter is a period that satisfies this condition.

Before proceeding to the estimation results, it is necessary to consider an assumption that is involved in the specification of equation [1]. 1997-2003 was a period of remarkable international financial distress. Emerging market economies suffered spread shocks as well as terms of trade drops. Equation [1] doesn't control explicitly for these shocks. Instead, it assumes implicitly that these shocks impact directly the GDP, and from there, the external indebtedness.

5.2 Estimation results

We estimate Equation [1] for three different groups of banks: the total banking system, foreign banks independently, and domestic banks independently. By separating these groups, we are allowed to calculate the differing cyclical behavior of total banking external indebtedness, foreign banks external indebtedness and domestic banks external indebtedness.

Table 3 reports the estimation results of those specifications whose residual properties were optimal according to Gilbert (2001). With respect to the total banking system (first two columns of Table 3), external indebtedness is procyclical at lag 1 ($\lambda_1 > 0$) only when one lag of GDP as well as one lag of indebtedness are included (an increase of 1% in GDP is associated to a increase of 0.73% in total banking external indebtedness). In the case of foreign banks, external indebtedness is clearly insensitive to the Colombian business cycle, in the sense that neither λ_0 , λ_1 nor λ_2 are statistically different from zero in any of our specifications. This result confirms the hypothesis we posed in previous sections: in Colombia, foreign banks access to external resources is insensitive to Colombian economic conditions. This insensitiveness contributes to smoothing Colombian business cycles. Domestic banks (last four columns in Table 3) are therefore responsible for the banking system's procyclicality: λ_1 is positive and statistically different from zero (with a significance level of 10%) when one lag of GDP and either one or two lags of external indebtedness are included in the estimation. However, its

²¹ The list of banks is as follows: Foreign banks: Citibank, BBVA, Santander, Sudameris, Tequendama and Lloyds TSB. Domestic banks: Bancolombia, Bogotá, Colpatria, Crédito, Occidente and Popular. Bancafé is the only public bank in our dataset. Information on external indebtedness has been deflated using the Consumer Price Index of the United States (Source: Bureau of Labor Statistics).

magnitude is smaller than is the case for the total banking system. Additionally, when two lags of GDP are included in the estimation, λ_2 is positive and statistically significant. In either case, it is clear that domestic banks behave accordingly to our posed hypothesis: they accede to external resources primarily when economic conditions are satisfactory. When GDP falls, domestic banks find the door of external indebtedness closed.

Table 3
Estimation Results
Dynamic panel data models

	All banks		Foreign Banks						Domestic Banks			
	97:3 04:2	97:3 04:2	97:3 03:4	97:3 03:4	97:3 03:4	97:3 03:4	97:3 03:4	97:3 03:4	97:3 03:4	97:3 03:4	97:3 03:4	97:3 03:4
β_1	0.81 (0.00)	0.81 (0.00)	0.75 (0.00)	0.75 (0.00)	0.74 (0.00)	0.67 (0.00)	0.67 (0.00)	0.67 (0.00)	0.81 (0.00)	0.77 (0.00)	0.75 (0.00)	0.69 (0.00)
β_2						0.09 (0.29)	0.08 (0.32)	0.09 (0.29)			0.08 (0.32)	0.10 (0.18)
λ_0	0.53 (0.13)	0.30 (0.41)	-0.64 (0.32)	-0.91 (0.19)	-0.50 (0.55)	-0.55 (0.44)	-0.77 (0.29)	-0.52 (0.52)	-0.19 (0.56)	0.24 (0.56)	-0.31 (0.38)	0.28 (0.49)
λ_1		0.73 (0.04)		0.83 (0.25)	0.68 (0.39)		0.83 (0.24)	0.63 (0.41)	0.65 (0.07)	0.22 (0.55)	0.61 (0.08)	0.18 (0.61)
λ_2					0.48 (0.57)			0.56 (0.49)		1.16 (0.00)		1.22 (0.00)
α	-0.01 (0.00)	-0.01 (0.00)	-0.006 (0.19)	-0.007 (0.14)	-0.01 (0.08)	-0.007 (0.14)	-0.009 (0.09)	-0.01 (0.07)	-0.009 (0.00)	-0.01 (0.00)	-0.007 (0.07)	-0.01 (0.00)
Sargan Test p- value	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.97
AB AC(1) p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AB AC(2) p-value	0.35	0.42	0.83	0.64	0.50	0.99	0.77	0.86	0.13	0.04	0.13	0.04

Notes:

- This table reports the estimated specifications whose residual properties were optimal according to Gilbert (2001).
- The Generalized Method of Moments (GMM) procedure is suggested by Arellano and Bond (1991) for estimating dynamic panel data models. All estimations were performed using the statistical software package Intercooled Stata 8.2.
- Coefficient p-values reported in parentheses.
- The Sargan Test null hypothesis corresponds to adequacy of instrumental variables employed in the estimation process.
- The Arellano-Bond Autocorrelation Test (AB AC) null hypothesis corresponds to the absence of residual autocorrelation. According to these authors, if the model is well specified, the AB AC null hypothesis of order 1 (AB AC(1)) should be rejected, and the AB AC null hypothesis of order 2 (AB AC(2)) should not be rejected.

6 Conclusions

The purpose of this paper was to compare foreign and domestic banks in Colombia with respect to their capacity to access to external indebtedness. This work followed the approach of a vast set of articles whose concern is the performance of the financial system after the recent upsurge in Financial Sector Foreign Direct Investment in emerging market economies. Several conclusions arise from this effort.

From a historical point of view, the Colombian banking external indebtedness has undergone several cycles. The 20th century witnessed three outstanding cycles of banking external indebtedness: The first, during the twenties and thirties. The second one, during the seventies and eighties, was the greatest cycle of the century, right in the middle of the 'golden age' of international banks. The last cycle, less pronounced in comparison with its predecessors, was experienced after 1992.

These cycles not only differ in amplitude and severity, but also in its relationship with the business cycle. Moreover, this relationship between indebtedness and business cycles is different for foreign and domestic banks.

The calculation of the cross correlograms between these cycles is an appropriate tool for approaching this evolving relationship. For the case of foreign banks, for example, the relationship between the external indebtedness cycle and the business cycle underwent changes after 1991, in the direction of eliminating its former procyclical behavior (positive relationship between both cycles). Similar calculations for the case of domestic banks point at no clear direction.

To a large extent the FSFDI upsurge occurred after 1991, and according to the suggestions of the aforementioned statistical analysis on foreign banks external indebtedness, we focused particularly on the period after 1991. During this period, foreign banks enjoyed a higher and more stable access to external indebtedness. But this is not all. Our main finding for the period 1997-2003 (after the hike in FSFDI), obtained using dynamic panel data techniques, is that foreign banks external indebtedness is insensitive to the Colombian economic conditions. On the contrary, domestic banks external indebtedness behaved clearly in a procyclical way.

The implication of the latter result is very important from a macroeconomic point of view. As foreign banks obtain external resources away from economic conditions, they contribute to the smoothing of the Colombian business cycle. When the economy goes wrong, for example, foreign banks prevail as an open door for external resources, contributing to dampen the economic downturn. Exactly the opposite occurs in the case of domestic banks. The procyclical behavior of its external indebtedness accentuates the Colombian business cycle. When economic conditions are buoyant, domestic banks external indebtedness grows rapidly. When the economic situation turns out negative, the external indebtedness falls and the financial scarcity deepens.

The relationship between the business cycle and the external indebtedness of banks, especially after the recent upsurge of FSFDI, is a traditional mechanism of interdependence between developed economies and emerging market economies. Apart from international trade and traditional international capital flows, external indebtedness of foreign banks in host emerging market economies is a channel by which foreign investors (owners of international banks) can contribute to stabilize or destabilize macroeconomic performance in those economies. Our calculations suggest that in Colombia the former is the case.

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