FINANCIAL INSTABILITY AND ECONOMIC ENVIRONMENT

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ABSTRACT

In this paper we provide new evidence about the relationship between financial crises and economic situation for different countries which belong to the OECD and emergent economies of Latin America and Asia. The results show new support to the different influence of economic situation according to the type of financial crises. Aggregate data and panel techniques are used taking into account the occurrence of currency, banking and twin financial crises.

KEYWORDS: Financial crises, leading indicators, probit models

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1. INTRODUCTION

During the last years, there exists an increasing interest in the study of those factors affecting financial crises (Mayer, 1999; Goodhart et al., 2004). In particular, most research is based on technological changes which allow easy telecommunications and quick financial operations and legal environment of financial regulation and liberalization. In fact, the future of international financial system has motivated a wide debate among economists. Despite the importance of *Washington Consensus* which points out what policies developing countries should undertake to stimulate economic growth given the international financial system, the results experienced in the 90s have shown that the international financial system is quite flawed (Davidson, 2004).

Financial crises have happened with a high frequency in the last years of 20th Century and beginnings of 21st in spite of the different international agreements and supervision of Basel Committee, International Monetary Fund (IMF) and other institutions. The sequence of financial crises of 90s in different economies has showed the fragility of current financial system. In order to mitigate the consequences of this implicit fragility there are two principal theoretical proposals: (i) from a positive point of view, an analysis of a better financial and systemic risk measure to prevent big losses, bad hedging, irrational investment strategies, and contagion effects (Artzner et al., 1999; De Bandt and Hartmann, 2000; Szego, 2004 and 2005; Ceballos et al., 2005); and (ii) from a negative point of view, the study of the lacks and improvements of current risk measures and their financial regulation derived (Borio et al, 2001; Ceballos and Cantarero, 2005; Eichengreen and Bordo, 2003; Mayer, 1999). In this paper, we propose an intermediate analysis of the statistical relationship between economic environment and the typology of financial crisis. In this way, it is possible to connect evolution and state of economic situation with the occurrence of a particular financial crisis. Thus, we have worked with the usual three typology of financial crisis: currency, banking and twin obtaining evidence to propose leading factors for each type of crisis.

Therefore, this paper is focused on the relationship between economic variables and financial crises. The structure of the paper is the following. Section 2 describes the relationship between financial instability and economic environment from a theoretical point of view. Section 3 presents some empirical results and, finally, Section 4 gives a summary and conclusion.

2. FINANCIAL INSTABILITY AND ECONOMIC ENVIRONMENT

The occurrence of a financial crisis is always explained in relation to economic situation and international context. A financial crisis produce a fall of GDP growth rate, changes in the consumption and production and a deterioration of fundamentals and international ratings of economy. Although a financial crisis could not produce big negative effects in real economy, the evolution and reaction of macroeconomic variables is partially justified by occurrence of the crisis. Moreover, financial instability can be its origin in the extension of a deterioration of economic situation.

For example, the distribution of income can affect an economy's ability to adapt to external shocks when the ability to obtain credit depends on income (Iyigun and Owen, 2004; Krusell and Smith, 1998). Different studies have shown that the distribution of income can affect long-run growth through its effect on the accumulation of human capital. (Durlauf, 1994; Galor and Zeira, 1993; Benabou, 1996). On the other hand, *Washington Consensus* also requires different reforms: fiscal discipline, reordering public expenditure priorities, tax reform, liberalizing interest rates, a competitive exchange rate, trade liberalization, liberalization of inward foreign direct investment, privatisation, abolition of regulations that impede entry and exit of firms and market competition and securing property rights. That is to say, a series of financial measures, which affect to economic variables. However, it is also important to create incentives which ensure full employment without the fear of a balance of payments constraint or unbearable international debt service payments (Davidson, 2004). Additionally, *Washington Consensus* and its revision are marred by serious difficulties in both theoretical and empirical grounds in the issue of financial liberalization (Arestis, 2005). Thus, financial liberalization and reforms have created a higher instability of financial system and severe economic problems for Emergent economies.

Furthermore, financial crises of last years have reactivated the idea that aggregate activity is affected by financial factors. In this sense, different approaches have been used to explain how financial factors may amplify and propagate business fluctuations (Gallegati *et al.*, 2003).

The influence and effects of macroeconomic variables are different according to the type of crisis which are described in this paper: currency, banking and twin crises.

2.1 Currency crisis and economic situation

There is no universally accepted definition of a currency crisis, but most would agree that they all include one key element: investors, out of fear, fleeing in masse a currency that might be devalued and fueling the devaluation they anticipated. Such crises – the Latin American debt crisis of the 1980s, the speculations on European currencies in the early 1990s, and the ensuing Mexican, South American, and Asian crises – have played a central role in the explanation of economic evolution and situation of these economies in the 90s.

Currency crises have been the subject of an extensive economic literature, either from a theoretical or empirical points of view. Economists tend to use two models to analyse currency crises. The first one points out inconsistencies between an exchange rate commitment and domestic economic fundamentals – such as an underlying excess surplus of domestic credit, prompted by a fiscal imbalance which generates inflation, an over-valued exchange rate and a current account deficit. This model is called "canonical" by Krugman, one of the first authors who studies this type of crisis (Krugman, 1998). The second model views speculative attacks as self-fulfilling duels between speculators and the government over inflation, unemployment and growth. "Second generation" model in words of Krugman. The "canonical" crisis model is a simple and intuitive analysis, developed 20 years ago. Despite that canonical model's virtues, however, it has come in justifying critics

because of its failure to offer a realistic picture either of the objectives of central banks or of constraints they face; "second-generation" crisis models that try to remedy these defects (Krugman, 1998).

Common to both models is their emphasis on macroeconomic and financial fundamentals as determinants of currency crises, or speculative attacks. Nevertheless currency crises tend to be regional, while macroeconomic phenomena do not.

2.2 Banking crisis and economic situation

One of the most significant aspects of the Great Depression in the United States was the erosion of confidence in the banking system. Weaknesses were apparent by 1930 and they were followed by a growing wave of failures followed. As banks closed their doors, a chain reaction occurred that spread misery throughout the country. A deterioration of public confidence in the banks occurred. Nowadays, this phenomenon is observed in some Asian countries as Thailand and Japan. The banking crises had spread over Asian countries, causing the fall of Asian Miracle. Since banking crises in emerging economies has multiple causes, there is no single solution to them. Goldstein and Turner (1996), however, suggest that there are several measures that can significantly reduce the incident of each of the factors underlying banking crises. For example, greater macroeconomic stability, a larger role for foreign owned banks, the wider use of market-based hedging instruments and higher levels of bank capital would help to make the consequences for the domestic banking system less damaging. Limiting the allocation of bank credit to particularly interest-rate-sensitive sectors, close monitoring of lending by weakly capitalized banks and employing the right mix of macroeconomic and exchange rate policies would similarly limit vulnerability to lending booms, asset price collapses and surges of capital inflows. Strict asset classification and provisioning practices could reduce the "*evergreening*" of bad loans and protection against loan losses.

Although managing a banking crisis is one of the most difficult tasks facing governments because of most of measures must be carried out quickly under imperfect information, most of recommendations are related with macroeconomic variables.

2.3 Twin crisis and economic situation

Kaminsky and Reinhart (1999) coined the term of "twin crisis". They analyzed the links between banking and currency crises. They found that problems in the banking sector typically precede a currency crisis: the currency crisis deepens the banking crisis, activating a vicious spiral. Therefore, financial liberalization often precedes banking crises. They called the anatomy of these crises "twin crisis". The twin crises – that is when a currency crisis and banking crisis occur simultaneously, and reinforce each other – occur as the economy enters a recession, following a prolonged boom in economic activity that was fueled by credit, capital inflows and accompanied by an overvalued currency.

The distinguishing feature of twin crises is the spill-over effects across financial institutions, through collateral constraints, declines in market values of assets, currency mismatches on the balance sheet and the endogenous amplification of financial distress through asset sales. But empirically, currency crises are frequently accompanied by sovereign debt crises instead of banking crises. Nevertheless, the phenomenon of both currency and debt crises has so far been neglected in economic literature. A bank-currency crisis is not the only way fragilities in the financial system can spill over into the currency markets; others examples include debt and equity markets (Solomon, 2003). In this sense, it is possible to consider two kind of twin crisis, although this paper only considers the first meaning: currency and banking crisis.

Twin crises, such as Turkish crisis in 2001, have a strong relationship with macroeconomic environment because they suppose an economic recession.

3. EMPIRICAL RESULTS

In order to analyse the relationship between the different typology of financial crises and some indicators of economic environment series of representative OECD economies and emergent countries have been used. Thus, we will focus the analysis on the relationship between financial crises and economic situation paying special attention to economic activity that is engaged in by households. The sources of these variables are the data bases of World Development Indicators, International Financial Statistic, Statistical Yearbook (ONU) and World Federation Exchange. These data cover the 90's for 46 countries that belong to OECD and Emergent economies of Latin America and Asia. The panel data results are also analysed with the data of financial crises stated in Eichengreen and Bordo (2003). We have considered three different models according to each type of financial crisis.

Authors propose to use a panel probit model to study the relationship between typology of financial crisis and macroeconomic environment. In this way, it is possible to obtain different relations in terms of probability of the occurrence of a financial crisis according to the macroeconomic environment.

The dependent variable in each of the statistical models is a dichotomy variable which takes value 1 if the financial situation of the country is, respectively, banking crisis, currency crisis or twin crisis and zero otherwise. Thus, factors such as GDP growth, Current Account Balance, Foreign Direct Investment, Gross Domestic Savings, Industry value added, Inflation, Population Growth and Unemployment could be relevant in explaining whether a country is suffering a financial crisis or not. The definition of each variable used in the estimates is given in Table 1 and Table 2 and 3 report some summary statistics and correlation matrix. As expected, there exists high correlation between Industry Value Added and GDP growth and between External Balance on Goods and Services and Current Account Balance.

TABLE 1
Description of Variables

	Variable	Definition
Economic Situation	GDPGROW	Growth of Gross Domestic Product (annual %)
	GDPGROWLAG	Previous Growth of Gross Domestic Product
	CAB	Current Account Balance (% of GDP)
	CABLAG	Previous Current Account Balance
	EBG	External Balance on Goods and Services (% GDP)
	FDI	Foreign Direct Investment, net inflows (% of GDP)
	FDILAG	Previous Foreign Direct Investment
	GDS	Gross Domestic Savings (% of GDP)
	IVA	Industry Value Added (% of GDP)
	IVALAG	Previous Industry Value Added
	ICP	Inflation, Consumer Prices (annual % growth)
	POPGROW	Population Growth (annual %)
	UNEM	Unemployment (% of total labor force)
Financial Crisis Situation	BCRI	Dummy variable which takes value 1 if country is suffering banking crisis and 0 otherwise
	CCRI	Dummy variable which takes value 1 if country is suffering currency crisis and 0 otherwise
	TCRI	Dummy variable which takes value 1 if country is suffering twin crisis and 0 otherwise

Source of data: World Development indicators and International Financial Statistics.

TABLE 2
Summary Statistics

	Number of observations	Mean	Standard Deviation	Minimum	Maximum
GDPGROW	657	2,97	3,81	-14,53	14,20
CAB	644	-0,43	4,63	-14,22	21,73
EBG	655	0,39	6,00	-21,52	25,05
FDI	632	2,49	2,87	-3,03	24,02
GDS	654	22,79	7,15	4,79	48,68
IVA	620	2,80	5,46	-22,48	21,20
ICP	654	54,65	394,61	-1,41	7481,66
POP	658	1,13	0,79	-0,60	3,31
TAXR	508	21,53	9,66	0,00	44,17
TRADE	655	64,30	33,78	13,24	229,28
UNEM	577	7,61	4,32	0,10	29,50

Source: Authors' elaboration

TABLE 3
Correlation Matrix

	GDPGROW	CAB	EBG	FDI	GDS	IVA	ICP	POP	TAXR	TRADE	UNEM
GDPGROW	1,0000	-	-	-	-	-	-	-	-	-	-
CAB	-0,1222	1,0000	-	-	-	-	-	-	-	-	-
EBG	-0,0829	0,7361	1,0000	-	-	-	-	-	-	-	-
FDI	0,1889	0,0136	0,1519	1,0000	-	-	-	-	-	-	-
GDS	0,2564	0,4236	0,6263	0,2348	1,0000	-	-	-	-	-	-
IVA	0,9006	-0,0717	-0,0946	0,1324	0,2479	1,0000	-	-	-	-	-
ICP	-0,1991	-0,0324	0,0380	-0,0838	-0,0280	-0,1462	1,0000		-	-	-
POP	0,1532	-0,1619	-0,1582	-0,0041	-0,1358	0,1576	0,0736	1,0000	-	-	-
TAXR	-0,1636	0,1812	0,2840	0,1132	0,0521	-0,2289	-0,1138	-0,5634	1,0000	-	-
TRADE	0,1331	0,2192	0,2665	0,3985	0,3759	0,1035	-0,1359	0,0242	0,3338	1,0000	-
UNEM	-0,1891	-0,0484	-0,0230	-0,0739	-0,3497	-0,1985	-0,0121	-0,0926	0,1297	-0,1302	1,0000

Source: Authors' elaboration

This set of factors is gathered in a vector x, so the probability model can be expressed as:

$$E(y \mid x) = F(x, \beta) . \tag{1}$$

The set of parameters β reflects the impact of changes in x on the probability. In order to estimate this equation, a nonlinear specification of $F(.)$ can prevent logical inconsistency and the possibility of predicted probabilities outside the range [0,1]. The most common nonlinear parametric specifications are logit and probit models which have been analysed. So, we will use a latent variable interpretation. Also, recent literature in the area of qualitative response models has produced new techniques (Greene, 2003) which allow to use panel probit models.

Let

$$
\begin{aligned}
y_{it} &= 1 \quad if \ y_{it}^{*} > 0 \\
y_{it} &= 0 \quad if \ y_{it}^{*} \leq 0
\end{aligned}
\tag{2}
$$

where

$$y_{it}^{*} = x_{it}'\beta + \varepsilon_{it} . \tag{3}$$

and if the distribution is symmetric, such as the normal and logistic, then:

$$\Pr(y = 1 \mid x) = \Pr(y_i^{*} > 0 \mid x) = \Pr(\varepsilon < x'\beta \mid x) = F(x'\beta) . \tag{4}$$

If we assume that ε has a standard normal distribution, we obtain the probit model, while assuming a standard logistic distribution, we obtain the logit model. The results of the estimation obtained considering a panel data probit model are shown in Tables 4 and 5.

In Table 4 we have only included five variables to explain each type of crisis. There are some characteristics which are common. Firstly, sign of coefficients are approximately those expected. The sign of GDPGROWLAG is always negative meaning that increases in the GDP growth rate reduce the probability of the country to suffer a bank, current or twin crises. On the other hand, there is a positive

relationship between Industry Value Added in the previous year (IVALAG) and financial crises (bank, current or twin).

In order to deep in those variables which can affect financial crises we have enlarged the number of variables included in the models (Table 5). Again sign of coefficients are approximately those expected. Thus, a decrease in the GDP growth rate produces an increase in the probability of suffering a financial crisis. On the other hand, if we consider this variable lagged one period, the sign of the coefficient is positive in the case of twin crisis. This fact could be explained because twin crises are less predictable than the other ones. Also, it is important to point out the impact of the variable Current Account Balance (CAB) even when the variable has been lagged over the financial crises. Other factors which should be taken into account are Foreign Direct Investment (FDI), Industry Value Added (IVA), Inflation (ICP) and Unemployment (UNEM).

TABLE 4
Estimation Results

Variables	Dependent variable: BCRI		Dependent variable: CCRI		Dependent variable: TCRI	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
GDPGROWLAG	-0.0397	0.0396	-0.0699	0.0262	-0.1872	0.0601
CAB	-	-	-0.0206	0.0276	-	-
CABLAG	-0.0386	0.0441	-	-	-0.1718	0.0991
FDILAG	-0.2455	0.1516	-0.0790	0.0713	-0.2682	0.2315
IVALAG	0.0301	0.0273	0.0360	0.0176	0.0603	0.0449
POPGROW	0.0566	0.1907	0.1985	0.1261	0.4855	0.3994
UNEM	-0.0504	0.0436	0.0496	0.0226	-0.0036	0.0609
Log likelihood	-99.9280		-26.1374		-38.5824	
Wald Chi2	20.22		11.48		6.55	
Prob Chi2	0.0025		0.0746		0.3646	

Source: Authors' elaboration

TABLE 5
Estimation Results

Variables	Dependent variable: BCRI		Dependent variable: CCRI		Dependent variable: TCRI	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
GDPGROW	-0.0138	0.0630	-0.0385	0.0303	-0.2336	0.0670
GDPGROWLAG	-0.0788	0.0590	-0.0652	0.0306	0.2161	0.0839
CAB	-0.0269	0.0550	-0.0591	0.0360	-0.0404	0.0786
CABLAG	-0.0332	0.0585	0.0230	0.0331	-0.1140	0.0876
FDI	0.1086	0.1518	-0.1117	0.1003	-0.1092	0.2289
FDILAG	-0.3542	0.2211	-0.0511	0.0972	-0.2681	0.2841
GDS	-0.0564	0.0471	0.0527	0.0262	0.0458	0.0564
IVA	0.0404	0.0831	0.0000	0.0342	-0.0661	0.0860
IVALAG	0.0668	0.0747	0.0163	0.0309	0.0683	0.0750
ICP	-0.0179	0.0160	0.0000	0.0002	0.0001	0.0003
POPGROW	0.0488	0.2771	0.2994	0.1438	0.4351	0.3862
UNEM	-0.0695	0.0537	0.0689	0.0250	0.0219	0.0622
Log likelihood	-35.4655		-95.8058		-20.67819	
Wald Chi2	9.28		25.23		22.68	
Prob Chi2	0.6793		0.0138		0.00306	

Source: Authors' elaboration

4. CONCLUSIONS

The study of those factors affecting financial instability continues being an important aspect from an economic point of view. The aim of this paper is to analyse the relationship between the different typology of financial crises and some indicators of economic environment. As a result of this analysis, based on panel probit models, leading factors can be pointed out for each type of financial crisis. Empirically, we have used the information contained in different data bases (World Development Indicators, International Financial Statistic, Statistical Yearbook (ONU) and World Federation Exchange aggregate).

The following conclusions can be emphasized. Firstly, for the banking crises, it is noted that "Foreign Direct Investment can be used as leading indicator. Also, its previous value is significant and negatively related with the occurrence of a banking crisis. This indicator is more significant than the impact of GDP growth. On the other hand, there are not clear effects of trade over banking crises although a reduction of savings could reflect a lost of confidence and solvency of banks. In addition, an increase in Industrial Value Added enlarge the probability of suffering a banking and credit crisis.

Secondly, the currency crises show that the evolution of GDP and Foreign Direct Investment have important consequences. It is important the variable Current Account Balance due to currency crises affect principally to trade. Also, unemployment normally rises in periods of crisis because of the consequently fall of GDP.

Finally, the sum of effects of banking and currency crises are reflected in the estimated parameters of the twin crisis model. However, in this case, the relationship with the variables considered is not so clear although there exists evidence that after a period of economic growth an important recession might occur.

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