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The Laffer curve of macroeconomic volatility and growth: can it be explained by the different nature of crises?

1. INTRODUCTION

The relation between macroeconomic volatility and growth has long been the focus of intense scrutiny. From the view held in the 1980s that the impact of volatility on growth was at most minor, great strides have been made in the literature. The most important contribution is probably that of Ramey and Ramey (1995), who find a strong negative relation between volatility and growth.

Such negative relation has generally been confirmed in subsequent studies (Martin and Rogers, 2000; Fatás, 2002; Aizenman and Pinto, 2005; and Hnatkovska and Loayza, 2005) but there are a few – albeit partial – exceptions. First, Imbs (2002) reports a positive relation between growth and volatility across sectors although he confirms that the relation across countries is negative.

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Second, Rancière, Tornell, and Westermann (2003) show how credit market imperfections in financially open economies could lead to higher growth while increasing volatility. Third, Kose, Prasad and Terrones (2005) conclude that higher trade openness brings benefits in terms of higher growth even though it exposes an economy to more volatility arising from external shocks.

There are many reasons to believe that macroeconomic volatility may lead to lower economic growth: A very general one is the fact that volatility tends to be associated with uncertainty. Economic uncertainty may reduce growth through several channels. First, it should induce agents to postpone decisions, the more so the riskier the decisions are (because of risk aversion). Second, investment irreversibilities could make firms invest suboptimally in the face of uncertainty. Servén (1998) confirms empirically the negative link between volatility and investment. A more specific argument is related to the existence of financial constraints, which are bound to increase with macroeconomic volatility, particularly during sharp recessions (Martin and Rogers, 1997; Talvi and Végh 2000).

There are also some arguments in favour of a positive relation between volatility and growth. A general one is that more volatility should lead to higher returns and, thereby, higher growth. For this general argument to hold, however, it would be necessary for countries to have risk-sharing mechanisms so that risky projects can be carried out without any major problems. Another argument comes from the higher likelihood of firms' innovating during high-growth periods (even if they are followed by contraction periods), which should bring more growth. A more specific argument is the existence of a precautionary motive for savings: more volatility should encourage more savings which – if kept in the domestic economy – would raise investment and, thereby, growth.

Given the above arguments for and against a negative relationship between volatility and growth, one possibility is that the relation is not linear, i.e. that it positive for a certain level of volatility while negative for a higher level. This is what we test in this paper as well as the underlying reasons for such non-linearity. Our results confirm that the relation between volatility and growth looks like a Laffer curve: a certain degree of volatility is more growth-enhancing than very low one. However, when volatility becomes very large, it does appear to hamper growth.

When exploring the underlying reasons for a Laffer curve depicting the relation between volatility and growth, we focus on the role of crises. This is because of their importance in explaining large swings in economic growth. While the consensus view is that crises - being associated with high volatility - are very detrimental for growth (Hnatkovska and Loayza, 2005), they could also serve as a catalyst for change and, thereby, enhance long term growth. In this vein, Rancière et al. (2003) show theoretically and empirically that countries having experienced occasional crises and with a negative skewness of credit growth experience faster income growth on average.[1] One possible explanation for this differing views lies on the different nature of crises. While Hnatkovska and Loayza (2005) study cases of extremely negative volatility independently of their source, Rancière et al. (2003) focus on experiences of sharp reductions in credit growth, generally identified as banking crises. In this study, we test the impact of three main types of financial crises (currency, banking and sovereign crises) on the degree of macroeconomic volatility. We conclude that only sovereign crises are clearly associated with higher volatility. Banking crises, on the other hand, tend to place countries in a lowers level of volatility, which are, in turn, associated with higher growth. However, this latter result is less robust to different model specifications than that for sovereign crises.

The paper is structured as follows. After this brief introduction, Section 2 describes the data used and the empirical strategy followed. Section 3 reports our results and Section 4 concludes.

2. DATA ISSUES AND EMPIRICAL STRATEGY

We have data for a maximum of 114 countries from 1978 to 2002 which gives us 25 years of data. The list of countries is presented in Table A.1 of the Appendix. Most of our data have been obtained from the World Bank's World Development Indicators (WDI). However, we have pooled data from a variety of other sources. Summary statistics for the variables we use in the paper are shown in Table A.2 of the Appendix.

[1] However, Aghion et al. (2005) show the opposite theoretically and empirically, namely that tighter credit leads to both higher aggregate volatility and lower mean growth for a given total investment rate.

Data on GDP per capita come from the World Bank's WDI. The same source has been used for the rate of enrolment in secondary school, life expectancy, domestic credit to the private sector, gross fixed capital formation, inflation (measured as both the GDP deflator and the consumer price index), and trade openness (measured as the sum of exports and imports over GDP).

The frequency of banking crises is based on lists of crisis events from several sources, but mainly Caprio and Klingebiel (2003), cross-checked with Domaç and Martínez-Peria (2000) and IMF staff reports. Caprio and Klingebiel use common macroeconomic indicators to date both systemic and non-systemic banking crises and these are, in turn, complemented with interviews with financial experts of each country considered. The frequency of currency crises is based on the dataset in Bubula and Otker-Robe (2003). These authors use a definition of "de facto" currency crises, by which a crisis occurs when the index (constructed as the average of the change in the exchange rate vis-à-vis the USD and domestic interest rate) experience a change of over 3 times the standard deviation of the sample. Finally, data for sovereign debt crisis episodes are obtained from various reports available from Standard & Poor's.

Empirical strategy

In order to empirically determine what the shape of the relation between volatility and growth is and what factors might be behind it, we conduct two different types of exercises.

In the first one, we develop a new approach to unveil the shape of such relation. To this effect, we run the following regression:

$$\gamma_{c(t,T)} = \beta \cdot y_{ct} + \delta \cdot z_{c(t,T)} + Q_{c(t,T)} + \varepsilon_{c(t,T)}$$

where $\gamma_{c(t,T)}$ corresponds to the average per capita GDP growth rate of country c between time t and T; y_{ct} is the logarithm of per capita GDP level at time t; $z_{c(t,T)}$ is a set of controls based used in the growth literature and suggested by Levine and Renelt (1992). These include the logarithm of enrolment in secondary schooling at time t and the average population growth between time t and T. We move away from imposing a linear (or, at most, quadratic) relationship in the relationship between volatility and growth as it has generally been done in the literature and divide up the countries in our sample into four quartiles according to the volatility of their per capita GDP growth. We include the dummies for a country being in each quartile as a $Q_{c(t,T)}$ and these are our coefficients of interest. Obviously, in order to avoid multicollinearity, we omit the dummy for the first quartile so that each coefficient corresponds to the effect on growth of being in a given quartile relative to the first quartile.

In the second exercise, we investigate what are the determinants of a country ending up in a different level of macroeconomic volatility (namely in a different quartile). To this effect, we define a categorical variable which takes the value from 1 to 4, depending on the quartile where the observation is placed. Thus, for instance, an observation with a very low level of volatility, which would be in the first quartile of the volatility distribution, would take a value of 1. On the other hand, countries with a higher degree of volatility would be in the fourth quartile and the categorical variable would, therefore, take the value of 4. Next we regress the following equation:

$$q_{c(t,T)} = \beta_i \cdot F_{ic(t,T)} + \varphi \cdot w_{c(t,T)} + \eta_{c(t,T)}$$

where $q_{c(t,T)}$ is to the categorical variable defined earlier, and $F_{ic(t,T)}$ corresponds to the number of crises of type i that occurred in country c between time t and T. We consider three types of crises: currency crises (those brought about by a big depreciation in country c's currency); banking crises (those associated with a crisis in country c's banking system) and; sovereign crises (those where country c defaults on or restructures its sovereign debt). The coefficients β_i are those of interest to us in this exercise as they reveal which types of crisis place countries in higher or lower quartiles of the GDP per capita growth rate volatility distribution. In this regression, we also need to control for other potential determinants of the volatility of per capita GDP growth ($w_{c(t,T)}$), namely the variability of inflation and of terms-of-trade between time t and T, as well as the level of trade integration and financial development taken at time t. We assume the error term ($\eta_{c(t,T)}$) is well-behaved. The categorical nature of the dependent variable causes us to estimate the previous equation using an ordered logit. Therefore, the coefficients we estimate in these regressions can be interpreted as the predicted change in the quartile that a change in the corresponding dependent variable would imply. Thus, for instance an estimated coefficient of 0.25 for the frequency of sovereign crises would mean that, if a given country were to experience 4 additional sovereign crises over the period considered, this would cause this country to move up one quartile in the distribution of per capita GDP growth rate volatility.

For each of these two exercises, we perform two types of regressions: *i)* a cross-section one between 1978 and 2002; *ii)* a panel of rolling regressions which encompasses two windows, 1978-1998 and 1982-2002, with a maximum of 302 observations. We only consider these two relatively long periods since the relationships that we are investigating (especially the one between volatility and growth) are a long run ones.

Finally, it is important to point out that both estimation procedures are subject to potentially important endogeneity problems between the independent and the dependent variables. We deal with this problem in the panel estimation by shortening the period over which we calculate the dependent variable (the average standard deviation of per capita GDP growth in the first case and the quartile the country belongs to in the second) so that it does not fully overlap with the periods use to compute the variables in the right hand side of the equation.

3. RESULTS

The non-linear relation between economic volatility and growth

We begin by confirming Ramey and Ramey's result of a negative relationship between volatility and growth in our cross-section, after controlling for the usual determinants of economic growth. The result is maintained for our sample and time span (Column 1, Table 1 below). Furthermore, the estimated coefficients for the control variables (the initial level of per capita GDP, population growth and the fraction of population enrolled in secondary schooling)[2] are significant with the expected sign.

[2] We also use life expectancy as a proxy of human capital. Results do not change.

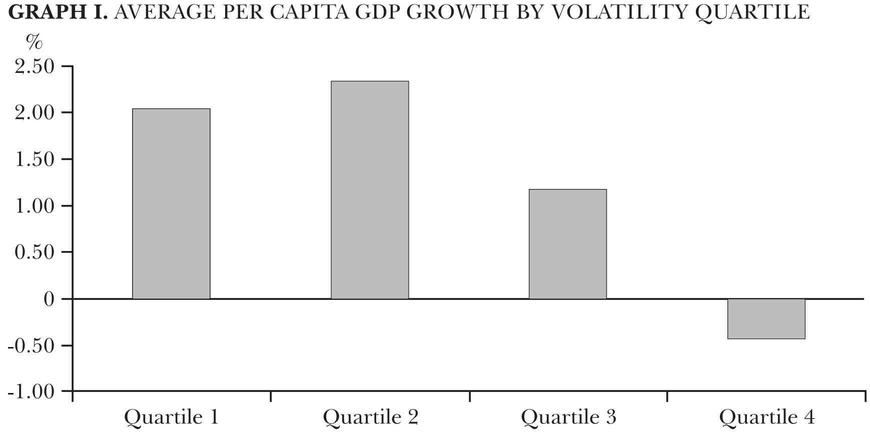
Although we have confirmed the negative slope of the volatility coefficient, we have assumed linearity in the relation between volatility and growth. We now move to testing whether this is the case. To this end, we divide our sample into four quartiles according to GDP growth volatility and compute the average GDP growth for each of them As it can be seen, the second quartile has higher average growth than the first (Graph I below). Average growth is substantially reduced for the observations in the third quartile and it even becomes negative for those in the fourth. We,

TABLE 1. RELATIONSHIP BETWEEN VOLATILITY AND GROWTH (CROSS-SECTION)

Regressions	*1*	*2*	*3*	*4*
Std. deviation GDP growth	-0.478[b] (0.136)			
Quartile 2		0.00776[a] (0.00403)	0.00647[a] (0.00409)	0.00875[b] (0.00398)
Quartile 3		-0.002 (0.00458)	-0.0022 (0.00514)	-0.00148[b] (0.0047)
Quartile 4		-0.014[b] (0.00647)	-0.0146[a] (0.00744)	-0.0109 (0.00677)
Log(GDP)	-0.00503[b] (0.00247)	-0.00362 (0.00263)	-0.00461[a] (0.00259)	-0.00579[a] (0.00294)
Log(secondary schooling)	0.00756[b] (0.00311)	0.00732 (0.00329)	0.00603[a] (0.00334)	0.00725[b] (0.00328)
Avg. population growth	-0.00389[a] (0.00221)	-0.00532 (0.00251)	-0.00666[b] (0.00271)	-0.0055[b] (0.00254)
Log(investment rate)			0.0136[b] (0.00564)	
Domestic credit to the private sector				0.000202[b] (0.0000857)
Constant	0.0561[b] (0.0183)	0.0307[a] (0.0187)	0.00261 (0.0226)	0.0393[b] (0.0188)
Number of observations	102	102	91	97
R^2	0.3792	0.3644	0.3976	0.4061
p-values for the *F*-tests				
H_0: Quartile 2 = Quartile 3		0.0740	0.1295	0.0559
H_0: Quartile 2 = Quartile 4		0.0023	0.0083	0.0077
H_0: Quartile 3 = Quartile 4		0.0913	0.1141	0.1903

NOTE: Heteroskedasticity-robust standard errors.
[a] Significant at the 10% level. [b] Significant at the 5% level.

GRAPH I. AVERAGE PER CAPITA GDP GROWTH BY VOLATILITY QUARTILE



then, introduce the top three quartiles of the volatility distribution, instead of volatility as such, in the previous cross-section and test for the relation between each of them and economic growth.[3]

Our results show that a moderate level of volatility – i.e. the second quartile of the distribution – is associated with higher growth in a statistically significant way (Column 2, Table 1). On the other hand, very high volatility – i.e. the fourth quartile of the distribution – is accompanied by much lower growth and that this result is significant at close to 1% level. Finally, the observations in the third quartile are not distinguishable from those in the first quartile in terms on their impact on growth.

The different impact of the second and fourth quartile is confirmed when testing for the equality of their coefficients. Such equality is rejected at a 5% significance level for the coefficients of quartiles 2 and 4, but also of quartiles 2 and 3 and 3 and 4 (see tests below Column 2, Table 1). These findings point to a nonlinear relation between volatility and growth, which has the shape of a Laffer curve.

To check the robustness of the results, we introduce additional potential determinants of economic growth, as controls. We introduce them separately because of their high correlation with each other and with our previous regressors which may lead to collinearity problems. As it turns out, an important determinant of a country's growth rate – although subject to endogeneity

[3] Since we have a constant in the regression, we need to exclude the first quartile.

problems - is the accumulation of physical capital which is found significant in increasing per capita GDP growth (Column 3, Table 1). The non-linear shape of the relation between volatility and growth is basically confirmed although the positive sign of the second quartile is only significant at the 11% level. The second growth determinant introduced is the development of the financial system, measured as the level of credit granted by the banking system to the private sector. This is found significant (Column 4, Table 1) and the non-linear shape of the relation between volatility and growth is maintained although this time we obtain a significantly negative sign for countries in the third quartile although the coefficient for the fourth quartile is not significant at any standard significance level. Finally, the *F*-tests of equality of the quartile coefficients confirm the shape of a Laffer curve. Also in the two robustness tests, we reject the hypothesis that the coefficients of the second and fourth quartiles are the same. In the last regression, when financial development is taken into account, we also reject the equality of the coefficients of the second and fourth quartiles, as well as between the second and the third.

Finally, as an additional robustness test, we re-run the four equations above using panel data. Again, if we assume a linear relation between volatility and growth, the negative coefficient for volatility is confirmed (Column 1 in Table 2 below). When introducing the different quartiles in which we divide observations according to their volatility, the results are also maintained: being in the second quartile leads to relatively higher growth while being in the fourth reduces it considerably (Column 2 in Table 2). All other controls for economic growth remain statistically significant, as well as the two included in the robustness tests, namely the physical capital accumulation and the level of financial development. Furthermore, the robustness tests confirm the Laffer curve shape of the relation between volatility and growth (Columns 3 and 4 in Table 2). This is also the case of the *F*-tests of equality of coefficients: in all specifications we reject that the coefficients of the second and fourth quartile are equal and the same is true between those of the second and third quartiles.

The policy implication of such Laffer curve is that very high volatility should clearly be avoided but that some volatility – basically that within the second quartile of the distribution - could be a first best in terms of economic growth. We now move to exploring

TABLE 2. RELATIONSHIP BETWEEN VOLATILITY AND GROWTH (PANEL)

Regressions	*1*	*2*	*3*	*4*
Std. deviation GDP growth	-0.507[b]			
	(0.0875)			
Quartile 2		0.00798[b]	0.00743[b]	0.00907[b]
		(0.00294)	(0.00281)	(0.00278)
Quartile 3		-0.00874[b]	-0.00878[b]	-0.00598[a]
		(0.00344)	(0.00355)	(0.00336)
Quartile 4		-0.0184[b]	-0.021[b]	-0.0139[b]
		(0.00423)	(0.0049)	(0.00457)
Log(GDP)	-0.00475[b]	-0.00424[b]	-0.00541[b]	-0.00679[b]
	(0.00175)	(0.00169)	(0.00167)	(0.00206)
Log(secondary schooling)	0.00652[b]	0.00687[b]	0.00588[b]	0.00776[b]
	(0.00215)	(0.00207)	(0.00212)	(0.00219)
Avg. population growth	-0.00419[b]	-0.00489[b]	-0.00609[b]	-0.00547[b]
	(0.0016)	(0.00168)	(0.00172)	(0.00173)
Log(investment rate)			0.0125[b]	
			(0.00427)	
Domestic credit to the private sector				0.00017[b]
				(0.000059)
Constant	0.0579[b]	0.0384[b]	0.0147	0.0484[b]
	(0.0129)	(0.0122)	(0.016)	(0.0132)
Number of observations	213	213	197	201
R^2	0.3427	0.3593	0.3984	0.397
p-values for the F-tests				
H_0: Quart 2 = Quart 3		0.0000	0.0001	0.0001
H_0: Quart 2 = Quart 4		0.0000	0.0000	0.0000
H_0: Quart 3 = Quart 4		0.0455	0.0224	0.1283

NOTE: Heteroskedasticity-robust standard errors.
[a] Significant at the 10% level. [b] Significant at the 5% level.

the reasons behind such Laffer curve, instead of a linear negative relation, between volatility and growth.

The nature of crisis and volatility

As previously mentioned, we explore empirically what explains why certain countries find themselves in higher –rather than lower – quartiles in terms of macroeconomic volatility. We focus on crisis events given their prominence in determining large swings in growth and the role they have acquired in the recent literature.

As a first exercise, we assess, using cross-section data and estimating with an ordered-logit, whether having more crises increases the probability of being in a higher quartile in terms of the macroeconomic volatility. We find that this is the case (Column 1, Table 3). This seems to confirm Hnatkovska and Loayza's suggestion that crises are behind the very negative relation between volatility.

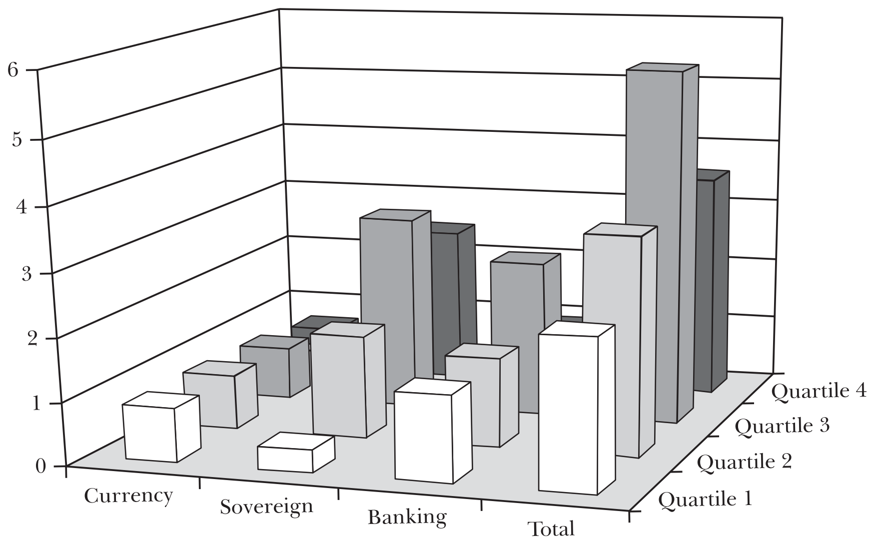
TABLE 3. DETERMINANTS OF VOLATILITY (CROSS-SECTION)

Regressions	*1*	*2*	*3*	*4*	*5*	*6*
Dependent variable is quartile of volatility (ordered logit used for estimation)						
Number of crises	0.184[b]					
	(0.0463)					
Currency crises		-0.147	-0.0573	-0.255	-0.308	-0.432[a]
		(0.195)	(0.264)	(0.213)	(0.282)	(0.232)
Banking crises		-0.0946	-0.0617	-0.143	-0.0704	-0.227[b]
		(0.0738)	(0.095)	(0.0785)	(0.0977)	(0.0996)
Sovereign Crises		0.108[a]	0.242[b]	0.0924[a]	0.1868[b]	0.0836
		(0.0532)	(0.07)	(0.0553)	(0.0586)	(0.0681)
Std. deviation of terms-of-trade growth			0.558			
			(1.737)			
Std. Deviation of inflation				0.473[b]		
				(0.17)		
Trade openness					0.405	
					(0.304)	
Domestic credit to the private sector						-0.0415[b]
						(0.00838)
Number of observations	151	151	98	146	108	108
Pseudo-R^2	0.0003	0.0130	0.0471	0.0528	0.0388	0.1091

NOTE: Heteroskedasticity-robust standard errors.
[a] Significant at the 10% level. [b] Significant at the 5% level.

We explore the issue further by distinguishing among three main types of crises: currency, banking and sovereign ones. Graph II below depicts the relation between the frequency of different types of crises and the volatility quartiles. The average number of

GRAPH II. DISTRIBUTION BY QUARTILE OF DIFFERENT CRISES



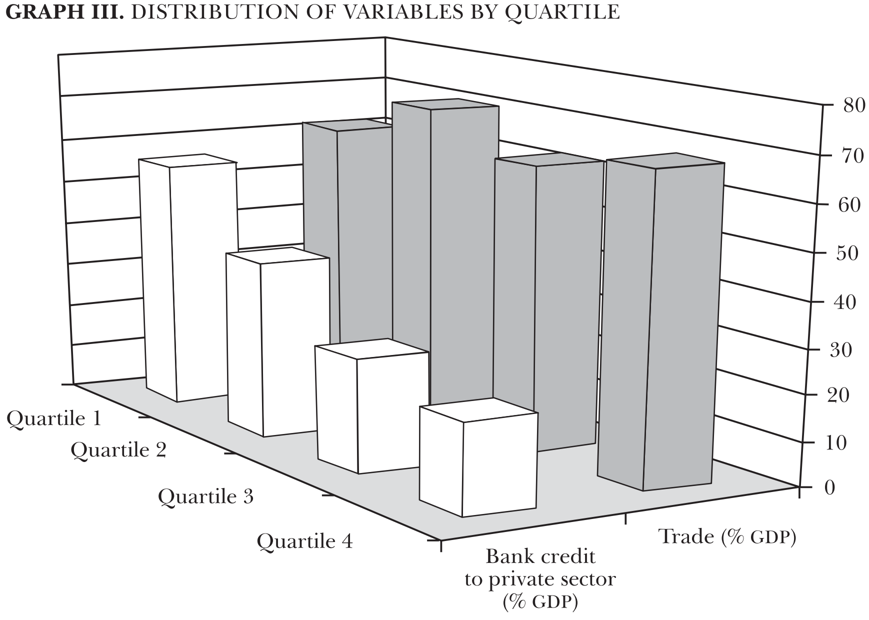
sovereign crises is higher for the third and fourth quartiles but that of banking crises is somewhat lower for the fourth quartile than the second, although it is much higher in the third. Finally, the average number of currency crises is practically the same across quartiles. We move to the regression analysis so as to take into account other potential determinants of macroeconomic volatility.

When regressing the frequency of each type of crises on the different volatility levels (from the first to the fourth quartile) with the same cross-sectional data as before, sovereign crises raise the likelihood of being in a higher quartile at a 1% significance level (Column 2 in Table 3). No significant impact is found for currency and banking crises.

As a robustness test, we control for other factors which may influence the level of macroeconomic volatility, such as the variability of the terms of trade, that of inflation, trade openness and the degree of financial development. The first two are relatively obvious factors. The third one has been found to raise volatility although economic growth (Kose, Prasad and Terrones, 2005). The last one has been associated with lower volatility (Easterly, Islam, and Stiglitz, 2000). Graph III below depicts the relation between these two variables and the four quartiles in which the observations of volatility of per capita GDP growth can be divided. Bank credit to the private sector is clearly lower in the higher volatility quartiles while no clear trend is seen for trade openness. Moving to the regression analysis, the volatility of the terms of trade does not appear to influence the volatility of per capita GDP growth (Column 3 in Table 3) while that of inflation increases it in a statistically significant way (Column 4 in Table 3). Trade openness does not seem to have an impact while a larger share of bank credit to the private sector reduces it in a significant way (Columns 5 and 6 in Table 3). In all cases, except the last, a higher frequency of sovereign crises is associated with a higher volatility quartile. One explanation for the lack of significance of the frequency of sovereign crises when controlling for financial sector development is that such development may allow agents to use insurance mechanism, thereby, reducing the macroeconomic volatility that a sovereign crisis would, otherwise, cause. In the same vein, only in the last robustness tests, when controlling for financial sector development, do we find that currency and banking crises actually reduce the level of volatility.

Finally, as for the growth equations, we re-run the above regressions with panel data. Again, suffering more crisis, of any sort,

GRAPH III. DISTRIBUTION OF VARIABLES BY QUARTILE



does seem to place countries in a higher quartile in terms of macroeconomic volatility (Column 1 in Table 4). The explanation is basically the same as before: more sovereign crises place countries in higher volatility levels (Column 2 in Table 4). When including other controls, the detrimental impact of sovereign crises – in terms of higher volatility – is confirmed but banking crises appear as beneficial when controlling for the variability of inflation and also financial system development (Columns 4 and 6 in Table 4).

The positive influence of banking crises on macroeconomic volatility is in line with Rancière et al. (2003) in as far as very sharp drops in credit generally occurred during –or right after – banking crises.

TABLE 4. DETERMINANTS OF VOLATILITY (PANEL)

Regressions	*1*	*2*	*3*	*4*	*5*	*6*
			Dependent variable is quartile			
Number of Crises	0.0697[a] (0.0388)					
Currency Crises		-0.0221 (0.141)	0.037 (0.171)	-0.168 (0.153)	-0.119 (0.168)	-0.163 (0.159)
Banking Crises		-0.104 (0.0657)	-0.104 (0.0799)	-0.182[b] (0.0702)	-0.123 (0.0798)	-0.207[b] (0.0878)
Sovereign Crises		0.170[b] (0.0459)	0.312[b] (0.0569)	0.156[b] (0.0466)	0.274[b] (0.0498)	0.172[b] (0.0549)
Std. Deviation of terms-of-trade growth			0.349 (1.071)			
Std. Deviation of inflation				0.499[b] (0.139)		
Trade openness					0.358[a] (0.206)	
Domestic credit to the private sector						-0.0318[b] (0.00513)
Number of observations	302	302	196	291	230	225
Pseudo-R^2	0.0034	0.0163	0.0547	0.0585	0.0446	0.0984

NOTE: Heteroskedasticity-robust standard errors.
[a] Significant at the 10% level. [b] Significant at the 5% level.

All in all, sovereign crises a high inflation variability and low financial development seem to explain why countries find themselves in the right part of the Laffer curve relating macroeconomic volatility and growth (i.e., when such relation is negative). As for the right-hand side of the Laffer curve (i.e., a positive volatility and growth relation) the occurrence of banking crises may help but this result is less robust to different model specifications.

4. CONCLUSIONS

We build upon the general consensus since Ramey and Ramey (1995) that the volatility of per capita GDP growth reduces growth. To this end, we show empirically – using cross-section and panel analysis for over 100 countries during the period 1970-2000 – that a moderate degree of volatility can be growth-enhancing while very high volatility is clearly detrimental. These results point to the existence of a "Laffer curve" between volatility and growth.

When exploring what are the underlying reasons for such Laffer curve, we focus on the role of crises because of their relevance in explaining large swings in economic growth. While the consensus view is that crises - being associated with high volatility - are very detrimental for growth (Hnatkovska and Loayza, 2005), they could also serve as a catalyst for change and, thereby, long term growth, following Rancière et al. (2003). In this vein, we find evidence that the detrimental effect of high volatility is mainly explained by the occurrence of sovereign crises, as well as a low degree of financial development. Banking crises, in turn, reduce volatility for some model specifications, particularly when controlling for financial development. In sum, the existence of a "Laffer curve" between volatility and growth can be attributed, at least in part, to the different nature of the crisis buffeting each country.

Appendix

TABLE A.1. COUNTRIES INCLUDED IN THE SAMPLE AND TIME SPAN

	Emerging		
Developed	*1*	*2*	*3*
Australia	Algeria	Ghana	Pakistan
Austria	Antigua and Barbuda	Guatemala	Papua New Guinea
Belgium	Argentina	Guyana	Paraguay
Canada	Bahamas, The	Honduras	Peru
Denmark	Barbados	Hong Kong, China	Philippines
Finland	Bolivia	Hungary	Saudi Arabia
France	Botswana	India	Senegal
Greece	Brazil	Iran, Islamic Rep.	Singapore
Iceland	Burundi	Israel	South Africa
Ireland	Cameroon	Jamaica	Sri Lanka
Italy	Central African Republic	Jordan	Sudan
Japan	Chile	Kenya	Suriname
Korea, Rep.	China	Lesotho	Swaziland
Luxembourg	Colombia	Libya	Syrian Arab Republic
Mexico	Congo, Dem. Rep.	Madagascar	Thailand
Netherlands	Costa Rica	Malawi	Trinidad and Tobago
New Zealand	Cyprus	Malaysia	Tunisia
Norway	Dominica	Mali	Turkey
Spain	Dominican Republic	Malta	Uruguay
Sweden	Ecuador	Morocco	Zambia
Switzerland	Egypt, Arab Rep.	Nepal	Zimbabwe
United Kingdom	El Salvador	Nicaragua	
United States	Fiji	Nigeria	

TABLE A.2. DESCRIPTIVE STATISTICS TOTAL SAMPLE, 1978-2002 (n=90)

Dependent Variable:	*Full Sample*	*Quartile 1*	*Quartile 2*	*Quartile 3*	*Quartile 4*
Average per capita GDP growth	1.26	2.05	2.34	1.18	-0.43
Objective Variable:					
Std. Deviation GDP p.c. growth	3.77	1.749	2.961	4.231	6
Controls:					
Log initial per capita GDP	7.738	8.913	7.675	7.241	7.17
Secondary schooling enrolment	24.7	45.23	24.59	16	13.83

TABLE A.2 *(concluded)*

Dependent Variable:	*Full Sample*	*Quartile 1*	*Quartile 2*	*Quartile 3*	*Quartile 4*
Domestic credit to the private sector (% GDP)	35.4	56.02	39.52	25.39	20.08
Dom. Credit to the private sector growth	2.35	2.574	1.831	4.141	0.852
Trade (% GDP)	65.82	61.77	70.95	63.04	67.78
Investment (% GDP)	23.54	23.83	26.62	20.45	23.42
Average Inflation	67.19	9.14	38.3	38.96	178.6
Std. Deviation Inflation	169.2	8.168	123.34	45.46	490.7
Average terms-of-trade growth	-0.183	-0.0043	-0.323	-0.474	0.176
Std. Deviation terms-of-trade growth	9.554	5.59	9.238	11.82	12.58
Number of currency crises	0.811	0.864	0.864	0.826	0.696
Number of sovereign crises	1.911	0.364	1.636	3.087	2.478
Number of banking crises	1.556	1.364	1.409	2.478	0.957
Number of crises (of any kind)	3.744	2.364	3.409	5.565	3.565

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