SYSTEMIC CRISIS AND GROWTH REVISITED: HAS THE GLOBAL FINANCIAL CRISIS MARKED A NEW ERA?

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ABSTRACT

Occasional crises have been shown to be part of growth enhancing mechanism (see Rancière, Tornell and Westermann, 2008). In this paper, we document that neither the stereotypical case study of India vs. Thailand, nor the benchmark growth-regression in this earlier research support this result anymore when updating the sample by one decade that includes the Global Financial Crisis, 2007/8. We analyze the time-varying nature of this relationship in rolling regressions and an historical dataset. In the subset of countries with enforceability problems, we find that the link between occasional crisis, measured by the negative skewness of credit growth, and per-capita output growth still remains intact.

KEYWORDS: Long-Term Growth; Systemic Crisis; Financial Liberalization
JEL-CODES: F34; O43; G01

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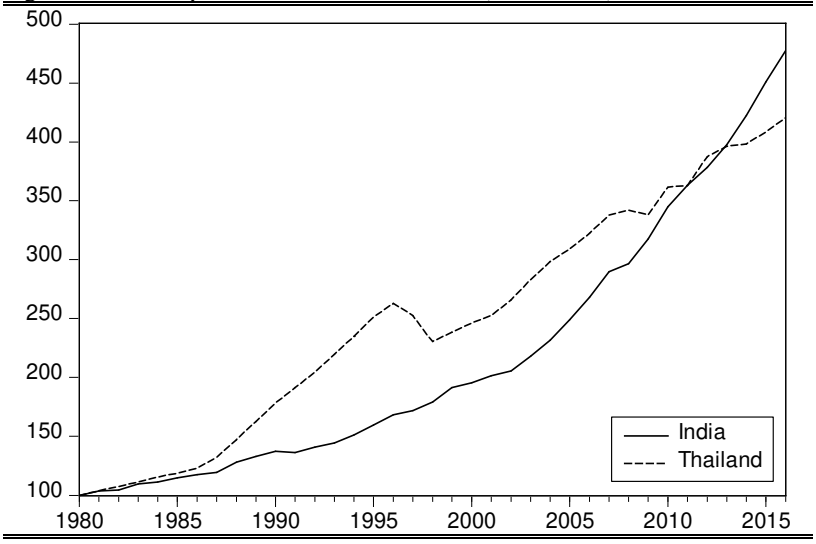
1. Introduction

Ten years ago, just before the beginning of the global financial crisis, Rancière et al. (2008) established that countries with occasional crisis have grown faster than other countries in the long run.[1] In their analysis, key pieces of evidence included a two-country comparison of India and Thailand, stereotypical cases of closed and open economies, and a Barro-type growth regression. This evidence indicated that countries with negative skewness in real credit growth were characterized by higher per-capita-output growth. Updating this evidence a decade later, we show that both have disappeared: India overtook Thailand in terms of per-capita growth and the coefficient on skewness collapsed in size and statistical significance (see Figure 1 and Table 1, below).

Figure 1: Growth paths of Thailand and India (1980–2016)



Notes: The figure shows GDP per capita (at constant prices), normalized to 1980 = 100. Data source: World Bank WDI.

Does the slow-and-steady school of economic development win after all? Has the global financial crisis not entailed the positive aspects on long-term growth associated with previous crises?[2] In this paper, we address these questions, by looking at subsets of countries and time periods, including a historical dataset going back to the 1870s.

[1] See also Tornell, Westermann and Martinez (2003) and Tornell and Westermann (2005) and Rancière and Tornell (2016). More generally, the existence of a positive empirical link between financial liberalization and economic growth is well recognized in the literature (see, among others, Bekaert et al., 2005; Henry, 2007; Quinn and Toyoda, 2008).

[2] More recently, some studies have argued that "too much finance" may be detrimental for growth, as least after a certain threshold (e.g., Law and Singh, 2014; Arcand et al., 2015). See also, Popov (2018) for a critical literature review on the link between finance and growth.

Our first finding is that the coefficient not only declines when adding the last decade, but also continuously declined in the post-World War II samples. It was strongest in the sample from 1961 to 1980, and gradually decreases in size when adding further 10-year windows. When adding the latest decade from 2001 to 2010, the size of the coefficient is roughly cut in half and it turns statistically insignificant. This is a first indication that the global financial crisis was not unique; rather, it appears to be part of a long-term trend of a declining link between occasional systemic crises and economic growth.

To analyze this pattern more systematically, we estimate a rolling panel regression with non-overlapping windows. The results not only confirm a (weak) downward trend in the coefficient, but also document a strong cyclical pattern. Around some crisis episodes, such as the Latin American crisis in the mid-1990s, as well as following the global financial crisis in 2007/8, the size of the coefficient declines and becomes insignificant. For the majority of the sample periods, however, including the most recent window from 1987 to 2016, the coefficient is significant at the 5% level.

As a next step, we consider different sample splits. Consistent with the theoretical model and empirical results of Rancière et al. (2008), the effect is strongest in liberalized countries with only a moderate degree of contract enforceability. In this set of countries, it is always significant, even in the sample that ends in 2010. The mechanism described in the theoretical model, where taking systemic risk is a second-best policy for countries with enforceability problems, thus appears to be intact despite the insignificant full-sample findings.

We also update the regressions in a historical dimension. We use the dataset of Jordà et al. (2017), composed of 17 countries that can be considered high-enforceability countries from today's perspective, but which were classic emerging-market economies before World War I. We find the same downward trend in the magnitude of coefficients over a longer term. The strongest impact of skewness on growth is observable in the pre-World War I period.

Summing up, all findings suggest that the disappearance of a significant skewness term in the 1961–2010 regression is unlikely to be a unique result of the global financial crisis. Instead, the link between systemic risk taking and growth only applies to a special set of countries: financially liberalized economies with enforceability problems. Over time, more and more countries evolve by pursuing the first–best strategy. They have built institutions resilient to the theoretical mechanism described in Rancière et al. (2008).[3] The stunning growth performance of India in recent years would in this context have a different interpretation: Beginning in the mid-1990s, India started a gradual process of reforms, including the liberalization of its financial markets,[4] and it is beginning to reap the benefits in terms of higher growth.

[3] See Levine (2000) for evidence on the role of contract enforceability for growth.
[4] See, e.g., Kletzer, 2004; Gupta et al., 2015

2. Regression Analysis

Data and Methodology

Our work closely resembles the empirical approach of Rancière et al. (2008) with respect to the methodology, sample choice and data sources. We update the dataset wherever new observations are available. The updated sample consists of the same 58 countries and now covers a time span of 56 years (1961–2016).

The link between skewness and real per-capita GDP growth is analyzed using a standard Barro-type growth regression estimated in non-overlapping 10-year windows using feasible generalized least squares. The regression equation is given by

$$\Delta y_{it} = \gamma X_{it} + \beta_1 \mu_{\Delta B_{it}} + \beta_2 \sigma_{\Delta B_{it}} + \beta_2 sk_{\Delta B_{it}} + \omega_t + \varepsilon_{it},$$

where Δy_{it} is the average growth rate of real GDP per capita, X_{it} a vector of standard controls including initial per capita income and secondary schooling, ω_t time fixed effects, ε_{it} the (presumably heteroscedastic) error term and, finally, $\mu_{\Delta B_{it}}, \sigma_{\Delta B_{it}}$ and $sk_{\Delta B_{it}}$ the first three statistical moments of the growth rate of real bank credit to private firms. The skewness of credit growth, $sk_{\Delta B_{it}}$ – our main variable of interest – has been found to be negatively correlated with growth in the earlier study. As negative skewness of credit growth is largely driven by outliers caused by occasional financial crises, this negative correlation is taken as evidence of the positive long-run link between financial crises and growth.

The post-global-financial-crisis (GFC) period

We start our analysis by updating the benchmark regression of Rancière et al. (2008) by one decade, from 2001–2010. Column (1) of Table 1 shows that most coefficients of the regressions remain unchanged. The mean and variance of credit growth have the expected positive and negative signs, respectively. Also, the effects of conditional convergence, captured by the initial real GDP, and the effects of human capital, proxied by secondary enrollment rates, remain statistically significant. A notable exception is the skewness variable that turns insignificant. Also, its point estimate is reduced by more than half compared the original time window from 1961 to 2000, which is replicated in Column (2).

Interestingly, the reduced point estimate is not only a feature of the latest sample extension, but is also visible when reducing the sample further by dropping additional decades. The largest point estimate arises in the shortest sample, from 1961 to 1980, and it gradually declines when adding further decades. Finally, in the full sample, it is smallest and becomes statistically insignificant.

Table 1: Skewness and Growth (1961–2010)

Dependent Variable: Real GDP per capita growth [%]				
	(1)	(2)	(3)	(4)
Variables	1961–2010	1961–2000	1961–1990	1961–1980
Real Private Credit Growth – mean	0.148***	0.166***	0.193***	0.169***
	(11.09)	(13.47)	(13.72)	(9.74)
Real Private Credit Growth – standard deviation	−0.039***	−0.037***	−0.050***	−0.042***
	(5.66)	(6.02)	(6.72)	(4.61)
Real Private Credit Growth – skewness	−0.094	−0.221***	−0.238***	−0.335***
	(1.50)	(3.38)	(2.92)	(3.62)
Initial real GDP per capita (logged)	−0.000***	−0.000***	−0.000***	−0.000***
	(4.91)	(5.35)	(3.44)	(4.69)
Initial Secondary Schooling [%]	0.014***	0.019***	0.018***	0.024***
	(4.52)	(6.86)	(5.24)	(6.11)
Constant	2.153***	1.759***	1.653***	1.644***
	(10.16)	(8.80)	(8.79)	(8.56)
Countries/Observations	58/258	58/208	58/150	58/95

Notes: Columns show panel regressions of nonoverlapping 10-year windows, estimated using feasible generalized least squares. All specifications include time fixed effects and a constant. Heteroscedasticity-robust z-values are reported in parenthesis. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$. Data sources: See Appendix A.

Rolling regressions and cyclical ups and downs

As a next step, to exploit the full dataset, we estimate a rolling regression based on three non-overlapping 10-year windows. In Figure 2, one can see that the skewness-and-growth relationship is quite stable over time. The skewness variable is statistically significant in the majority of the periods, but some intervals exist, where it is only borderline significant at the 10% level, or statistically insignificant. This includes the sample sets starting in the 1980s and ending somewhere close to the global financial crisis.

This finding suggests a potential end-point problem in crisis–and–growth regressions. Samples that have a severe financial crisis towards the end of the sample may not be able to fully capture the underlying mechanism. For instance, when a sharp downturn happens towards the end of the sample, the usual rebound following the crisis would be missed.

As Figure 2 shows, this rebound effect has indeed taken place somewhere after the turmoil of the post-crisis years from 2009 to 2013. The samples starting in the mid-1980s, and ending 2014 to 2016, again display the significant link between skewness of real credit growth and per-capita income growth.

Figure 2: Rolling skewness coefficient

Notes: The solid line reports the rolling point estimates of the skewness coefficient, 1990–2016. The dashed lines represent the two standard-errors band around the coefficients. Coefficients are estimated based on the specification of Table 1, albeit in rolling 3 × 10 year nonoverlapping windows. The number of observations ranges between 148 and 167. Data sources: See Appendix A.

The roles of contract enforceability and financial liberalization

Another way to explore the insignificant results of the updated benchmark regression, in Table 1, Column (1), is to consider subgroups of countries. The theoretical model predicts that only countries that (i) have a moderate degree of enforceability problems (MECs) and (ii) have liberalized financial markets (LIB) would benefit from systemic risk taking.

As Table 2 shows, the effect of skewness on growth is indeed stronger when confining the analysis to liberalized MECs. The interaction-term variables, reported in Column (1) for the original 1961–2000 sample and Column (2) for the updated period, 1961–2010, both have negative signs (γ_{2a}) and are significant at 5 and 10%, respectively. Furthermore, skewness is statistically insignificant, with a point estimate close to zero for the remaining countries (γ_1).

The total impact of skewness on growth for liberalized MECs, as documented by a Wald-test on the coefficients ($\gamma_1 + \gamma_2$), is negative and statistically significant at the 1% level in both cases. Thus, for this group of countries, also in the updated sample, the positive relationship between systemic crisis and growth still holds.

When considering the skewness interaction with dummy variables for MECs or financially liberalized countries only, the interaction terms γ_{2b} and γ_{2c} are insignificant. Nevertheless, the full impact of skewness on growth, ($\gamma_1 + \gamma_2$), for the two subgroups of countries, is again negative and statistically significant in all cases.

Table 2: Skewness and Growth in Liberalized Countries with Medium Enforceability Quality

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	1961–2000	1961–2010	1961–2000	1961–2010	1961–2000	1961–2010
Real private credit growth – mean	0.127***	0.135***	0.125***	0.133***	0.134***	0.132***
	(8.80)	(10.57)	(9.16)	(10.59)	(11.38)	(10.36)
Real private credit growth – standard deviation	−0.040***	−0.038***	−0.039***	−0.037***	−0.044***	−0.040***
	(4.25)	(4.47)	(4.09)	(4.30)	(5.25)	(4.90)
Real private credit growth – skewness (γ_1)	0.040	−0.039	0.019	−0.060	−0.055	0.034
	(0.39)	(0.41)	(0.17)	(0.60)	(0.40)	(0.24)
Skewness × MEC_LIB (γ_{2a})	−0.318**	−0.224*				
	(2.12)	(1.78)				
Skewness × MEC (γ_{2b})			−0.202	−0.159		
			(1.44)	(1.33)		
Skewness × LIB (γ_{2c})					−0.091	−0.281
					(0.50)	(1.64)
Total effect ($\gamma_1 + \gamma_2$)	−0.270***	−0.265***	−0.183**	−0.219***	−0.176**	−0.246***
	(2.73)	(3.44)	(2.29)	(3.20)	(2.14)	(3.41)
Initial real GDP per capita (logged)	−0.000	−0.000***	−0.000*	−0.000***	−0.000*	−0.000***
	(1.59)	(3.62)	(1.68)	(4.26)	(1.86)	(3.78)
Initial secondary schooling [%]	0.012***	0.013***	0.011***	0.012***	0.014***	0.015***
	(3.37)	(4.67)	(3.10)	(4.24)	(3.61)	(4.93)
Constant	1.077***	0.528**	1.115***	0.644***	1.303***	0.714***
	(4.08)	(2.32)	(4.51)	(2.81)	(4.99)	(3.00)
Countries/observations	58/158	58/205	58/159	58/206	58/158	58/205

Notes: Dependent variable: Real GDP per capita growth [%]. Columns show panel regressions of non-overlapping 10-year windows, estimated using feasible generalized least squares. All specifications include time fixed effects and a constant. MEC, LIB, MEC_LIB are included as control variables, wherever they also enter the specification interacted with skewness but not reported for brevity. Heteroscedasticity-robust z-values are reported in parenthesis. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$. Data sources: see Appendix A.

Table 3: Skewness and Growth: An Historical Perspective (1874–2013)

Variables	(1) Full Sample: 1874–2013 (excl. world wars)	(2) Pre-World War I: 1874–1913	(3) Interwar period 1924–1933	(4) Post-World War II: 1954–2013	(5) Pre- and post-world wars: (2) + (4)
Real private credit growth – mean	0.045**	0.086***	0.027	0.060***	0.068***
	(2.54)	(2.93)	(1.31)	(2.70)	(3.40)
Real private credit growth – standard deviation	−0.070***	−0.044**	−0.083**	−0.131***	−0.070***
	(4.40)	(2.34)	(2.57)	(4.68)	(4.12)
Real private credit growth – skewness	−0.037	−0.237**	0.355*	−0.182**	−0.137*
	(0.51)	(2.46)	(1.79)	(2.21)	(1.83)
Initial real GDP per capita (logged)	−0.104***	−0.041**	−0.096***	−0.106***	−0.097***
	(9.92)	(2.39)	(6.72)	(10.16)	(9.64)
Initial secondary schooling [%]	−0.002	−0.002	−0.017***	0.001	−0.001
	(0.55)	(0.47)	(3.54)	(0.28)	(0.32)
Constant	1.916***	0.789**	4.083***	11.206***	1.636***
	(5.79)	(2.02)	(8.55)	(10.57)	(5.11)
Countries/observations	17/172	17/53	17/17	17/102	17/155

Notes: Dependent variable: Real GDP per capita growth [%]. Columns show panel regressions of non-overlapping 10-year windows, estimated using feasible generalized least squares. All specifications include time fixed effects and a constant. Heteroscedasticity-robust z-values are reported in parenthesis. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$. Due to data availability, initial schooling is proxied by the first available observation in each country (usually 1960) and should be interpreted with caution. Data sources: Jordà et al. (2017), World Bank WDI, own calculations.

Evidence from historical data

Finally, we analyze a dataset recently assembled by economic historians, ranging from 1874 to 2013 and covering 17 countries.[7] When considering the full sample, the effect of skewness on growth is negative but insignificant, as documented in Column (1) of Table 3. This finding can plausibly be attributed to the changes in the structure of the economy following war-years and thus structural breaks in the underlying data-generating process.

In subsamples, we observe a more diverse picture. In the earliest period, from 1874 to 1913, we find the strongest negative impact of skewness on growth, which is statistically significant. The interwar period, Column (3), displays an insignificant but positive coefficient – possibly due to the small number of observations, but also consistent with the view, that capital controls during this period were more strictly enforced. Finally, the most recent sample, reported in Column (4) confirms our analysis above. It covers nearly the same sample period, but uses a different dataset.[8] Here the coefficient is negative and significant, but smaller than in the prewar period.

3. Conclusions

The link between systemic crisis and growth, motivated by a theoretical model with limited contract enforceability, does not universally hold for all countries. It is strongest for countries with a moderate range of enforceability problems, but only to a much lesser extent applicable to today's advanced economies that were in the epicenter of the 2007/8 global financial crisis.

As the global financial crisis originated in the advanced industrialized economies, it is plausible that it mitigated the link between skewness and growth in the updated regressions. We find, however, that among the subset of financially liberalized economies, with a medium degree of contract enforceability problems, the coefficient remains significant with the expected sign. Thus, the theory is not challenged by the updated evidence.

It is important to keep in mind however, that one should nevertheless be cautious when attributing positive growth effects to financial crises – in the past or in the present. Financially liberalized economies with moderate contract enforceability take higher systemic risks and experience increased investment. They are on risky growth paths with higher mean growth rates, but also higher probabilities of realizing the downside risks in the form of financial crises. There are no normative implications of this observation, and it is for each country to decide which path to follow.

[7] Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.

[8] Note that for the historical dataset, we do not have the schooling variable reaching all the way back to the prewar period. Instead, we use the earliest available data point for each respective country.

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Appendix A: Data

For our main regression analysis, we updated the original dataset from Rancière et al. (2008) wherever new or updated data were available. We aimed to use the same data sources wherever possible. The definitions and sources are given Table 4 below. For the historical regressions (Table 3), we made use of the *Jordà–Schularick–Taylor Macrohistory Database* (Jordà et al., 2017) enriched with data on schooling from the World Bank (see below).

Table 4: Variable Definitions and Data Sources

Variable	Definition	Data Source/Identifier
Real GDP per capita	Ratio of total GDP to total population. Measured in constant 2010 USD.	World Bank, World Development Indicators (2004, 2018). Code: NY.GDP.PCAP.KD
Real GDP growth	Year-on-year log difference of *Real GDP per capita*.	Author's calculations based on World Bank, World Development Indicators (2004, 2018). Code: NY.GDP.PCAP.KD
Initial GDP per capita	Initial value (i.e., value in $t = 0$ of each window) of *Real GDP per capita.*	Author's calculations based on World Bank, World Development Indicators (2004, 2018). Code: NY. GDP.PCAP.KD
Initial secondary schooling	Initial value (i.e., value in $t = 0$ of each window) of the ratio of total secondary school enrollment (regardless of age, to the population of the age group that officially corresponds to the level of education).	World Bank, World Development Indicators (2004, 2018). Code: SE.SEC.ENRR
Real private credit growth	Year-on-year log difference of real domestic credit claims of Other Depository Corporations /banks on the private sector. Deflation is done using end of the year Consumer Price Indexes.	Author's calculations based on IMF, International Financial Statistics (2018). Codes: IFS lines 22d_XDC, FOSAOP_XDC, PCPI_IX
Medium-enforceability country (MEC)	A binary variable coded 1 if the *law and order index* is between 2 and 5. The index ranges from 1 to 6 according to the quality of enforceability of the legal system. We use the earliest available observation (usually 1984) for each country.	Degree of contract enforceability: Law and order index from the International Country Risk Guide (ICRG) of Political Risk Service (2004).
Financial liberalization (LIB)	Updated Chinn–Ito index of de jure financial liberalization (based on codified restrictions on cross-border financial transactions reported by the IMF)	Chinn and Ito (2006), updated dataset from their webpage.