

$r - g < 0$: Can We Sleep More Soundly?

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Motivation and Questions

- Standard economic models usually assume that $r - g > 0$
- After the Global Financial Crisis, low interest rates in advanced economies raise doubts on whether $r - g > 0$ is the norm
- $r - g$ is crucial in public finance
- Given low $r - g$ today, should we worry less about the likelihood of defaults?

This paper explores:

- Are the recent low differentials unique in the span of history?
- What are important drivers of the differentials?
- What is the relationship between $r - g$ and sovereign default?

Approach and Results

This paper addresses the questions empirically, drawing primarily on the “Public Finances in Modern History” dataset (available on imf.org) to compute the differentials for 55 advanced and emerging economies over up to 200 years

Main results:

- Negative $r - g$ prevail in both advanced and emerging economies
- Financial repression played a key role in the negative differentials
- Differentials computed using the effective interest rate are no higher prior to defaults
- Marginal rates often rise sharply and abruptly prior to sovereign defaults, but only a few months ahead of defaults

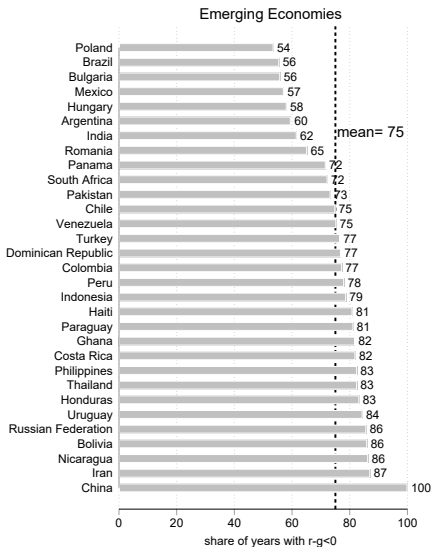
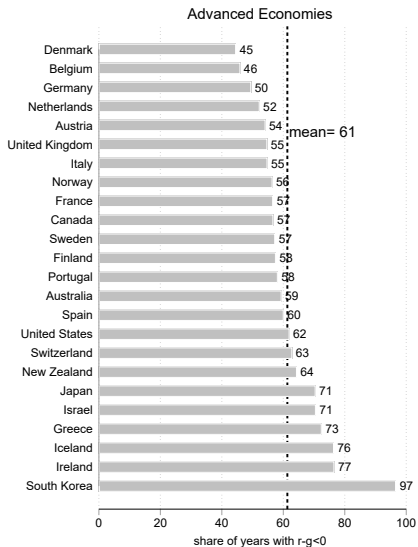
Literature Review

- *Interest-growth differential*: Ball, Elmendorf and Mankiw (95), Turner and Spinelli (11), Escolano, Shabunina and Woo (17), Barrett (18), Blanchard (19), Mehrotra and Sergeyev (19)
This paper: large sample across time and countries
- *Financial repression*: Giovannini and De Melo (91), Reinhart, Kirkegaard and Sbrancia (11), Reinhart and Sbrancia (15), Chari, Dovic and Kehoe (forthcoming)
This paper: both de jure and de facto financial repression measures, comparisons between financial repression and other contributors
- *Sovereign default*: Arellano (08), Broner, Lorenzoni and Schmukler (13), Badia et al. (19), among many others
This paper: analyzes interest-growth differentials through the lens of sovereign defaults

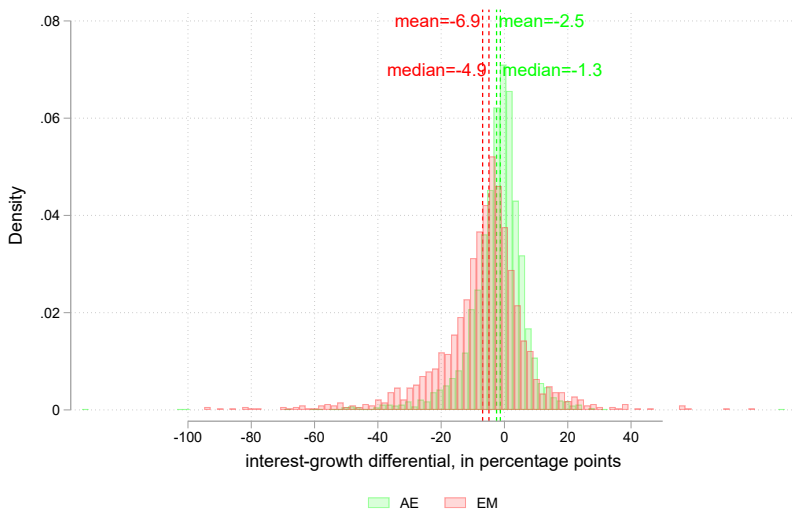
The Data

- $r - g$: “Public Finances in Modern History” (Mauro and others, 2015)
 - largest coverage of country and time: 55 countries, over 200 years
 - effective interest rate on debt = interest bill / debt
 - $r - g$ = effective interest rate – growth + depreciation adjustment
- External public debt: MAC DSA, International Debt Statistics
 - AE since 1900, EM since 1970s or 1980s
 - data limited for EM early years
- Marginal interest rate
 - post 1990s: EMBI spreads + U.S. 10-year treasury bond yields
 - 1870-1914: Mauro, Sussman and Yafeh (02, 06)
- Financial repression: Abiad et al. (08), Chinn-Ito index
 - 91 countries, since 1970s
 - interest rate controls, capital controls, financial reform index
- Baseline estimates exclude hyperinflation (>100) and extreme exchange rate collapse

Negative Differentials Prevail in A Span of Two Centuries



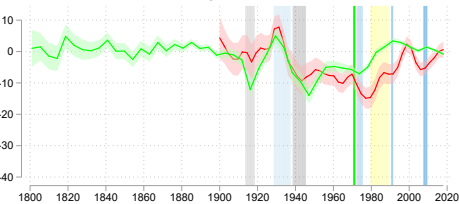
Average Differentials Are Below Zero for Both Advanced and Emerging Economies



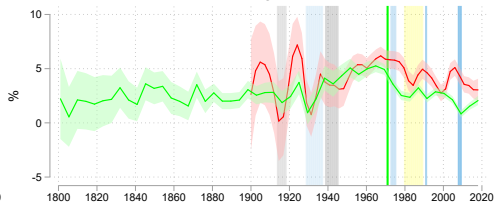
Note: The sample is consist of 2896 observations for advanced economies and 1650 for emerging economies.

The AEs and EMs Diverged in the 1975 – 1990

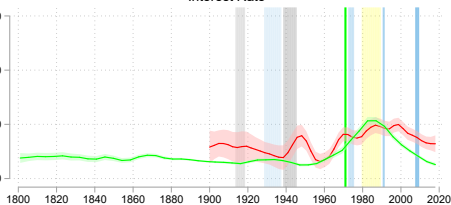
Interest-Growth Differential



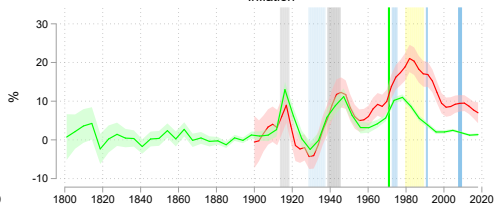
Real Growth



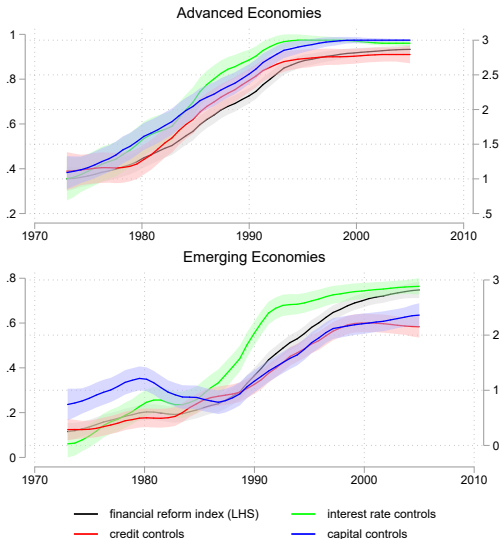
Interest Rate



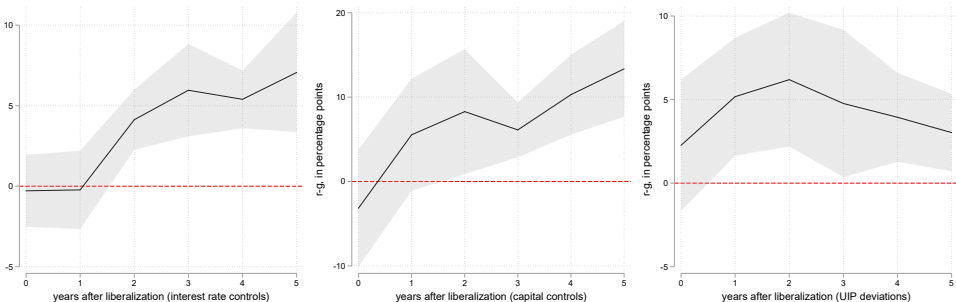
Inflation



Financial Repression Largely Ended in 1980s for Advanced Economies and 1990s for Emerging Economies



Differentials Rose after Financial Liberalization



- Local projection on 5-year horizons, controlling for macro and fiscal variables that could affect interest-growth differentials
- De jure measures are interest rate controls and capital controls full liberalizations, and de facto measures are structural breaks in deviations from uncovered interest parity (UIP)

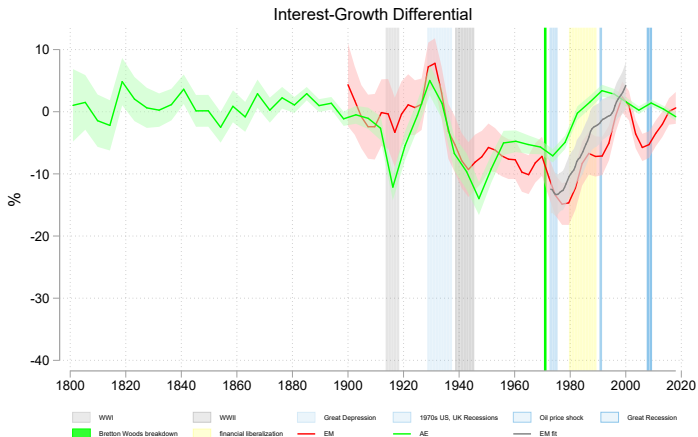
Financial Repression Significantly Suppresses Differentials, by Constraining Interest Rates and Limiting the Pass-through of Expected Inflation to Interest Rates

	financial regulations			capital controls		
	$r - g$	nominal r	nominal g	$r - g$	nominal r	nominal g
financial repression	-14.591** (5.38)	-10.209** (4.31)	1.399 (1.16)	-5.432** (2.09)	-4.750** (2.31)	0.375 (0.56)
inflation	0.949*** (0.25)	1.322*** (0.27)	0.863*** (0.07)	0.963*** (0.15)	1.389*** (0.17)	0.923*** (0.03)
repression × inflation	-0.598** (0.20)	-0.377* (0.22)	-0.051 (0.05)	-0.406** (0.20)	-0.317* (0.19)	0.009 (0.04)
N	1376	1376	1376	2221	2221	2221

Note: financial regulation index is available for 1973 – 2005, and capital control index for 1970 – 2017.

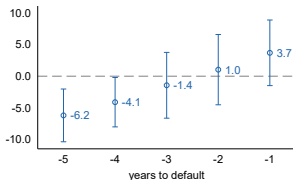
- $y_{it} = \beta_1 FR_{it} + \beta_2 \pi_{it} + \beta_3 FR_{it} \pi_{it} + \Gamma X_{it-1} + \Phi G_t + \alpha_i + \epsilon_{it}$
- Expected inflation instrumented by inflation last year

Financial Liberalization in Emerging Economies Could Have Narrowed Their Gaps with Advanced Economies



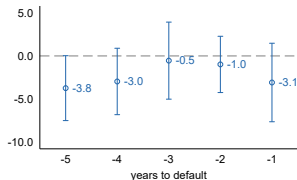
Differentials in the Run-up to Defaults Are No Different From Those in Normal Times

Interest-Growth Differential



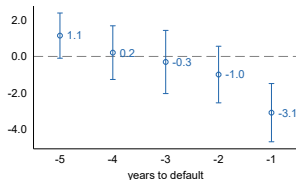
Note: No. of default episodes with all 5 pre-default years = 33
No. of default episodes with at least 1 pre-default year = 49

Real Interest Rate



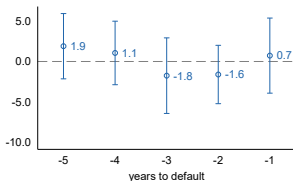
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Real Growth



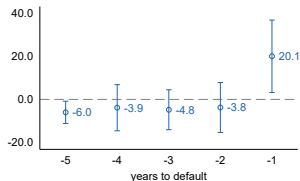
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Inflation



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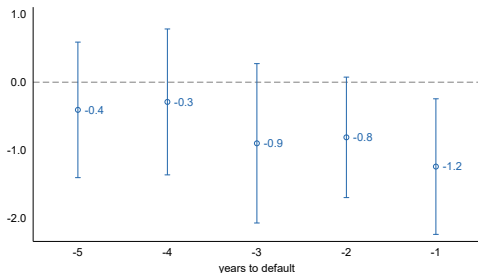
Depreciation



Note: No. of default episodes with all 5 pre-default years = 18
No. of default episodes with at least 1 pre-default year = 27

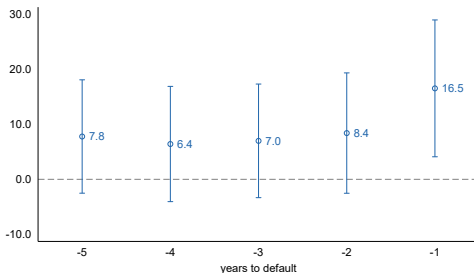
Primary Deficits and Public Debts Are Larger In the Run-up to Default than in Normal Times

Primary Balance, in percent of GDP



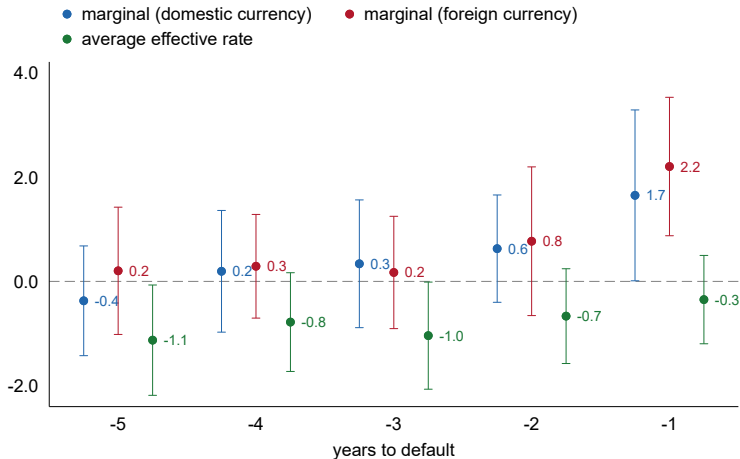
Note: No. of default episodes with all 5 pre-default years = 33
No. of default episodes with at least 1 pre-default year = 48

Public Debt, in percent of GDP



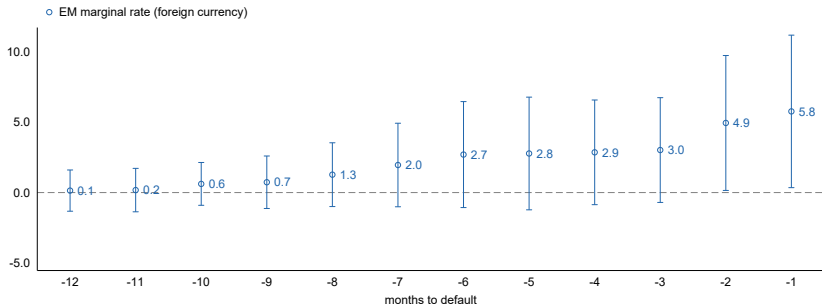
Note: No. of default episodes with all 5 pre-default years = 33
No. of default episodes with at least 1 pre-default year = 49

In Contrast to Effective Rates, Marginal Rates Are Higher in the Run-up to Default



Note: No. of default episodes with domestic marginal rates in all 5 pre-default years =17, foreign =13
No. of default episodes with domestic marginal rates in at least 1 pre-default year =21, foreign =22

However, Marginal Rates Rise Only Few Months Prior to Default



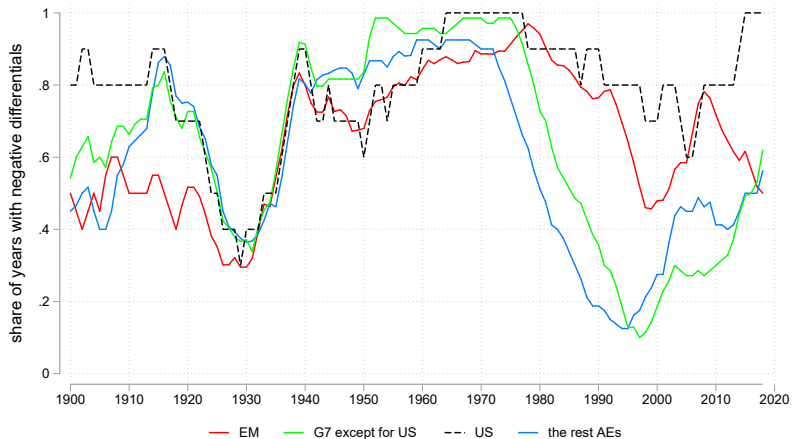
Note: No. of default episodes =15

Conclusion

- Drawing on a large dataset of interest-growth differentials covering 55 countries over two centuries, we find that
 - Contrary to the assumptions in theory, negative differentials are the norm in all countries
 - Greater prevalence of negative differentials in emerging than advanced economies is largely confined to 1975 – 1990
 - Differentials computed using the effective interest rate are no higher prior to defaults
 - Marginal rates rise sharply prior to sovereign defaults, but only a few months ahead
- For those who lose sleep over possible sovereign defaults, $r - g < 0$ should not provide reassurance.

Extra

Likelihoods of Negative Differentials Vary Across Time



Negative Differentials Are Often Associated with Low Primary Balance and Reduction in Debt, and It Is More Pronounced in the Recent Decade

	r-g	interest rate	growth	inflation	primary balance	change in debt
<i>post-war</i>						
r-g	1					
interest rate	0.2	1				
growth	-0.4	-0.1	1			
inflation	-0.8	0.3	-0.1	1		
primary balance	-0.1	0.1	0.2	0.1	1	
change in debt	0.3	0.1	-0.4	-0.0	-0.3	1
<i>post-GFC</i>						
r-g	1					
interest rate	0.4	1				
growth	-0.9	-0.4	1			
inflation	-0.5	0.1	-0.0	1		
primary balance	-0.4	-0.3	0.4	0.0	1	
change in debt	0.6	0.3	-0.6	-0.3	-0.6	1