Crísis Financieras y Política Macroeconómica

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Role of Credit in a Historical Perspective

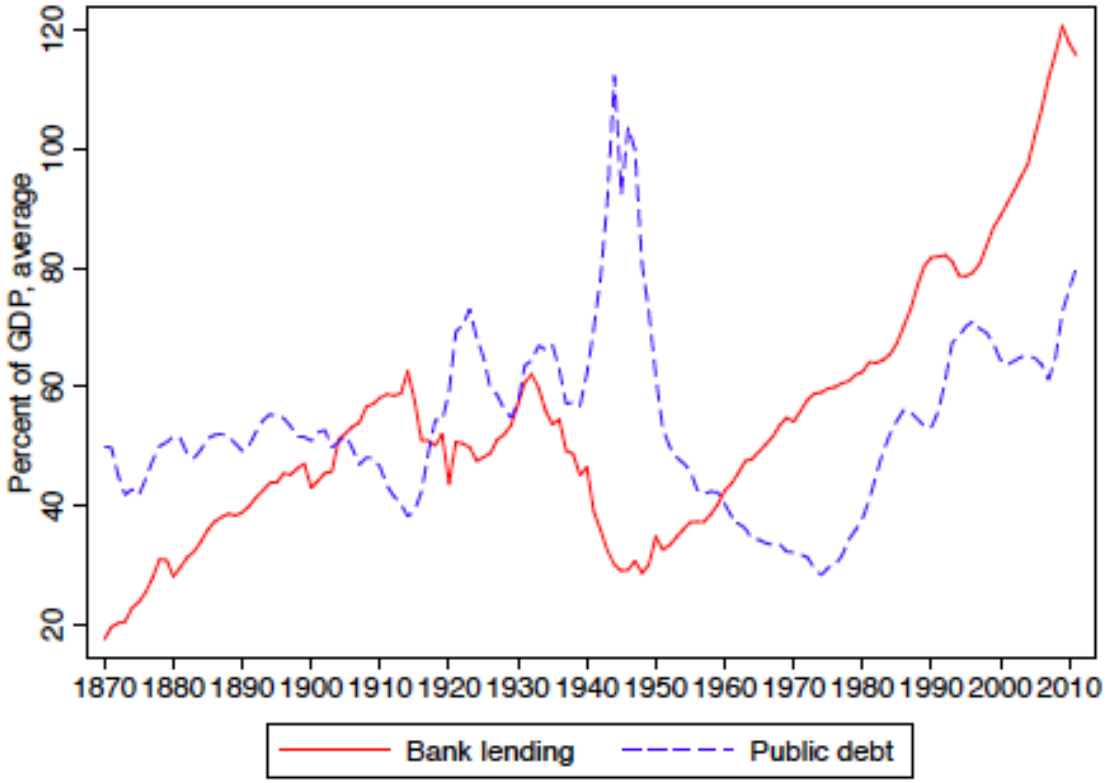
Questions

"SOVEREIGNS VERSUS BANKS: CREDIT, CRISES, AND CONSEQUENCES" by Jorda, Schularick and Taylor (2013).

- Is private or public borrowing the greater risk to financial stability?
- How do private credit and public borrowing evolve over the business cycle?
- Do high levels of public debt affect business cycle dynamics?
- What is the prevalence and effects of private and public debt booms and overhangs?

Public vs private credit

Figure 1: *Public debt and private bank credit to the private non-financial sector, 1870–2011*



Notes: The sample period is 1870–2011 and the annual averages are shown for 17 advanced countries. Total private credit is proxied by total bank loans to the nonfinancial sector, excluding interbank lending and foreign currency lending based on Schularick and Taylor (2012) and updates thereto. Public debt is the face value of total general government debt outstanding.

Predicting financial crises

$$\log \frac{P[S_{it} = 1|X_{it}]}{P[S_{it} = 0|X_{it}]} = b_{0i} + b_1(L)X_{it} + e_{it}$$

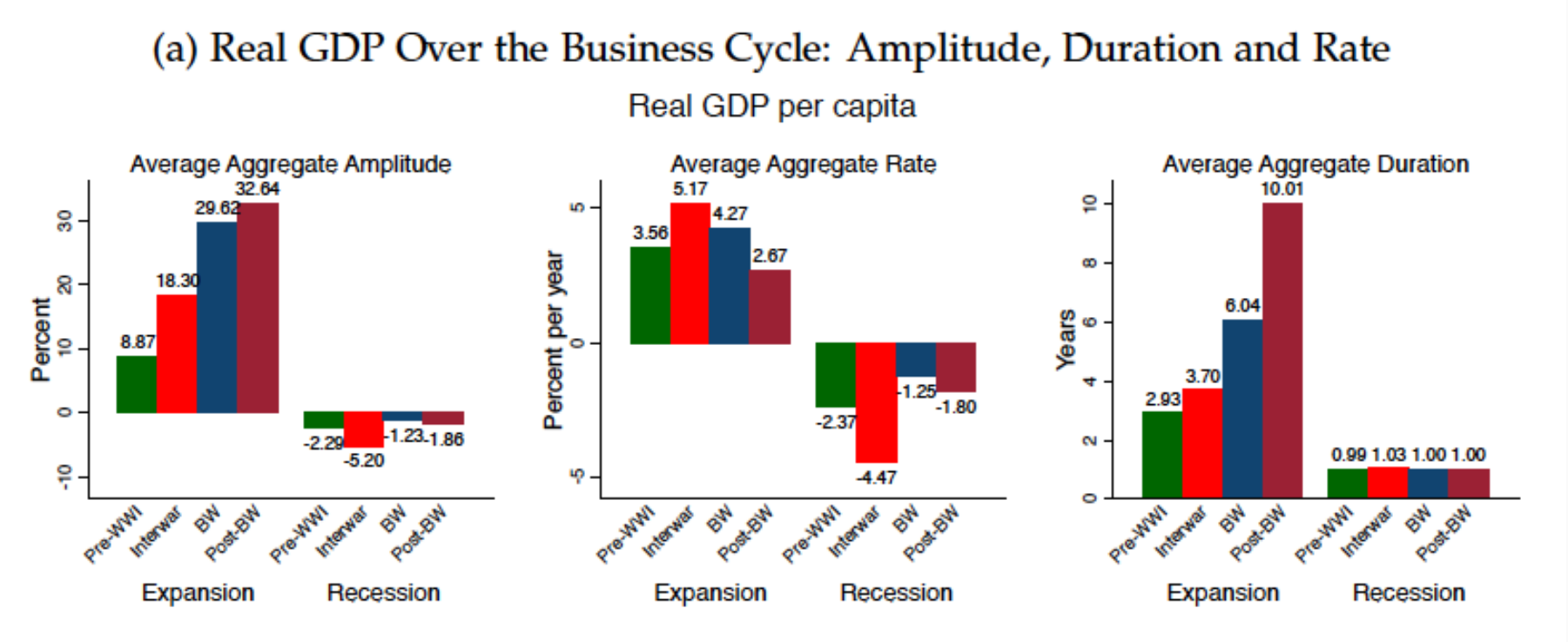
Table 1: *Financial crisis classification ability: private credit versus public debt*

The table shows logit model classifiers where the dependent variable is the financial crisis event dummy, and the regressors are lags and/or levels of private credit/GDP and public debt/GDP, their interaction, and country fixed effects.

Classifier logit model	(1)	(2)	(3)	(4)	(5)
Change in private credit/GDP	21.79***		21.34***	26.63**	
(5-year moving average)	(5.39)		(5.44)	(13.00)	
Change in public debt/GDP		-2.83	-3.17		-4.21
(5-year moving average)		(1.88)	(3.68)		(3.29)
Lagged level of private credit/GDP				-0.03	
				(0.63)	
Lagged level of public debt/GDP					-0.03
					(0.29)
(Lagged level of private credit/GDP)				-3.63	0.45
× (Lagged level of public debt/GDP)				(9.34)	(3.02)
Observations	1901	1983	1805	1895	1850
Area under the curve (AUC)	0.68	0.61	0.68	0.68	0.61
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Country fixed effects not shown. The reference null model based on a specification with country fixed effects only has an AUC = 0.59 (0.03). The two world wars are excluded from the estimation sample.

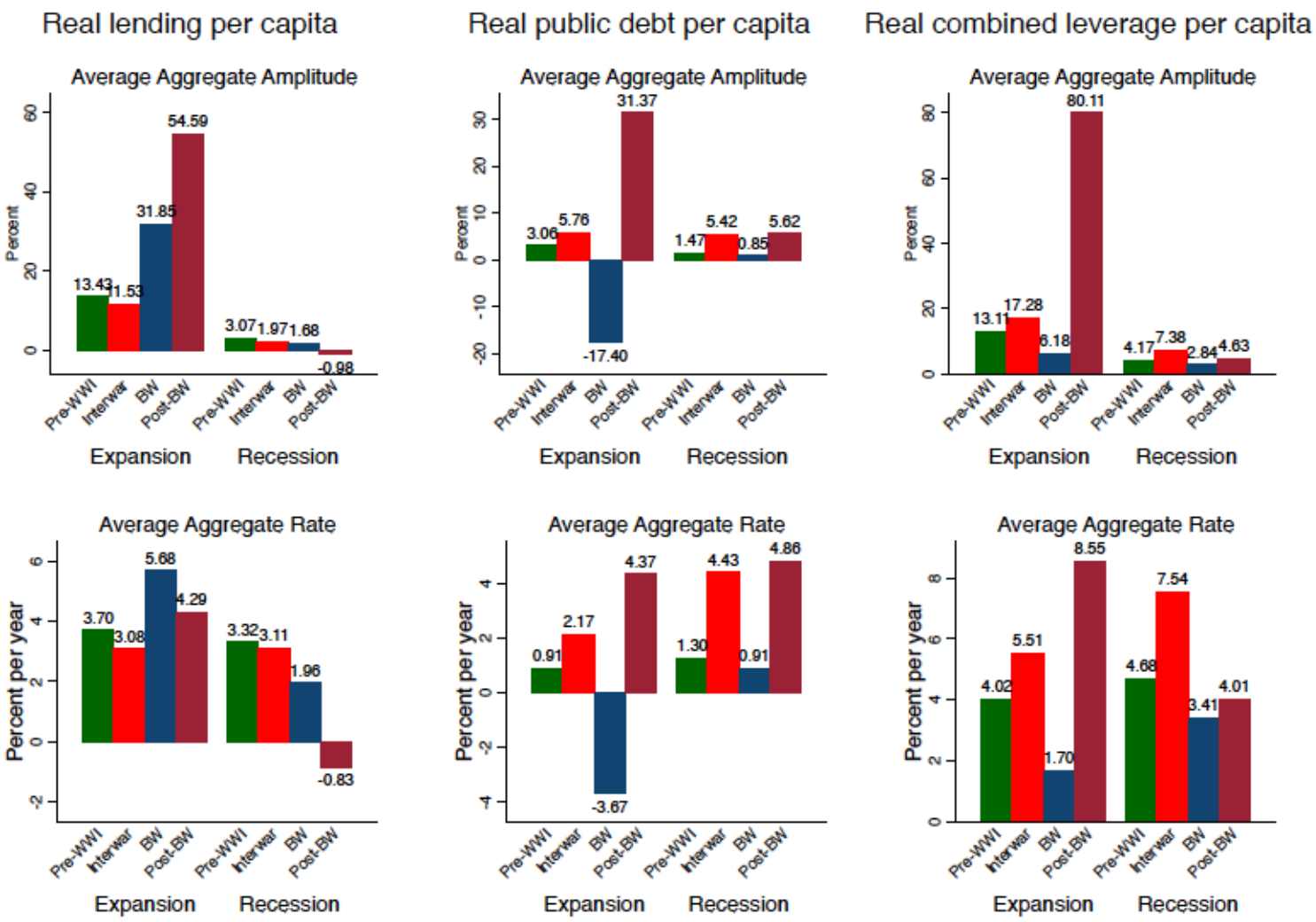
Stylized Facts (I)



- **Amplitude** denotes the average change between turning points
- **Duration** refers to the average interval of time elapsed between turning points
- **Rate** is simply the ratio of amplitude over duration and provides a per year rate of change.

Stylized Facts (II)

(b) Private and Public Debt Over the Business Cycle: Amplitude and Rate



Stylized Facts (II)

- Private bank lending is distinctly pro-cyclical
- Public debt tends to grow faster in recessions than in expansions (not true for EMs, exacerbates credit growth)
- The combined sum of public debt and private credit has grown at an unprecedented pace in the past four decades

Given these facts, we next ask: how the cyclical behavior of credit differs between normal cycles and those that end in severe financial crises?

Detour: Average Treatment Effect

- Suppose we are interested on estimating the effect of x on y.
- Let $y(x)$ denote the outcome of y given x
- Suppose we randomly assign x to group treatment group ($x = 1$) and not to control group ($x = 0$)
- The Average Treatment Effect (ATE) is:

$$ATE = E\left(E(y|x = 1) - E(y|x = 0)\right)$$

- Can obtain ATE from the following regression

$$y_i = \alpha + x_i\beta + \epsilon_i$$

- $\hat{\beta} = ATE$

Detour: Local Projections

- Interpret impulse-responses as ATE
- Define the following function

$$R(h) = E\left[E(y_{t+h}|x_t = x_t + \delta) - E(y_{t+h}|x_t = x_0)\right]$$

Where:

y_{t+h} : outcome h-periods ahead (e.g. GDP)

x_t : Driving-variable (e.g. credit-growth, exchange rate)

δ : treatment of interest

- Can add additional controls $\mathbf{w}$

$$R(h) = E\left[E(y_{t+h}|x_t = x_t + \delta, \mathbf{w}_t) - E(y_{t+h}|x_t = x_0, \mathbf{w}_t)\right]$$

- Conditional expectation can be obtained from

$$y_{t+h} = \alpha_h + x_t\beta_h + \mathbf{w}_t\gamma_h + \epsilon_{t+h}$$

- Homework: show that $R(h) = \delta\beta_h$

Public vs private credit

- Classify a recession as *financial* if a major financial crisis erupts within a two year window around the peak (the start of the recession)

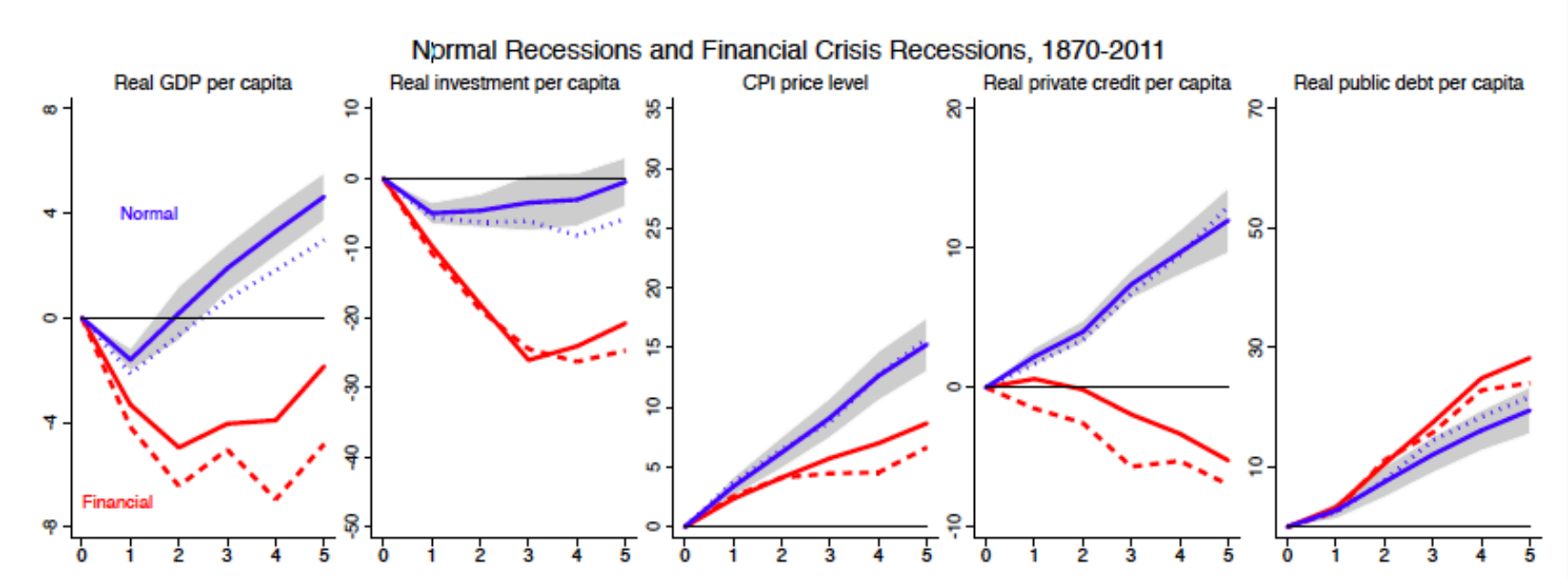
Table 2: *Summary statistics for recessions, private credit, and public debt variables*

Financial crisis and normal recession indicators are binary 0-1. Changes in private credit and public debt are in percentage points change per year in the prior expansion. Public debt level is the ratio relative to GDP at the business cycle peak.

(a) Full sample	All Recessions		Financial Recessions		Normal Recessions	
Financial recession indicator	0.23		1.00		0.00	
Observations	269		63		206	
Normal recession indicator	0.77		0.00		1.00	
Observations	269		63		206	
Change in private credit/GDP	0.70	(2.26)	1.73	(2.35)	0.41	(2.15)
Observations	198		44		154	
Change in public debt/GDP	-0.76	(6.06)	-0.13	(3.65)	-0.95	(6.62)
Observations	218		51		167	
Public debt level/GDP	0.51	(0.36)	0.50	(0.34)	0.51	(0.37)
Observations	247		58		189	

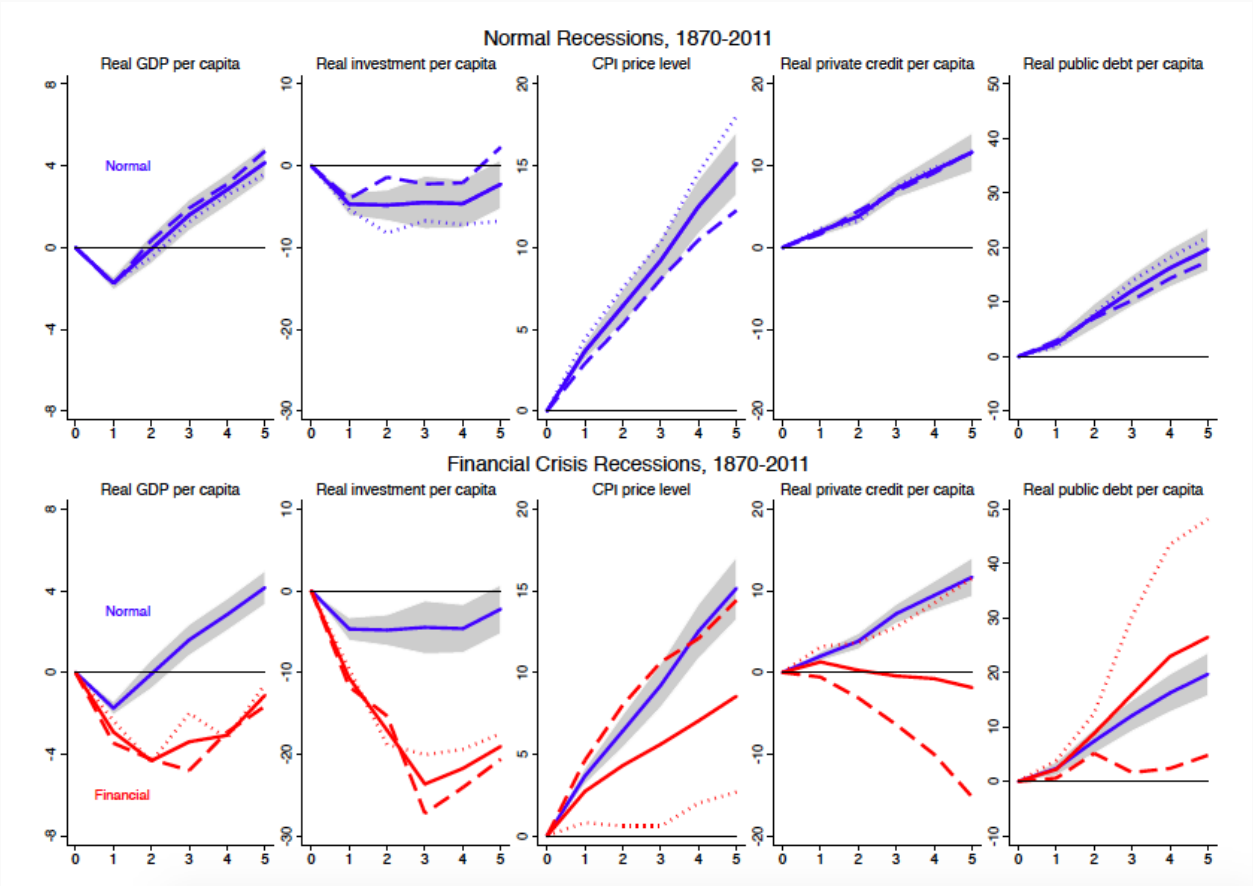
Cost of financial recessions

- How does a period of strong credit growth affect the recovery following a recession?
- Compare normal recession vs financial recessions (blue vs red) and recessions with *normal* credit vs *high* credit (solid vs dashed)



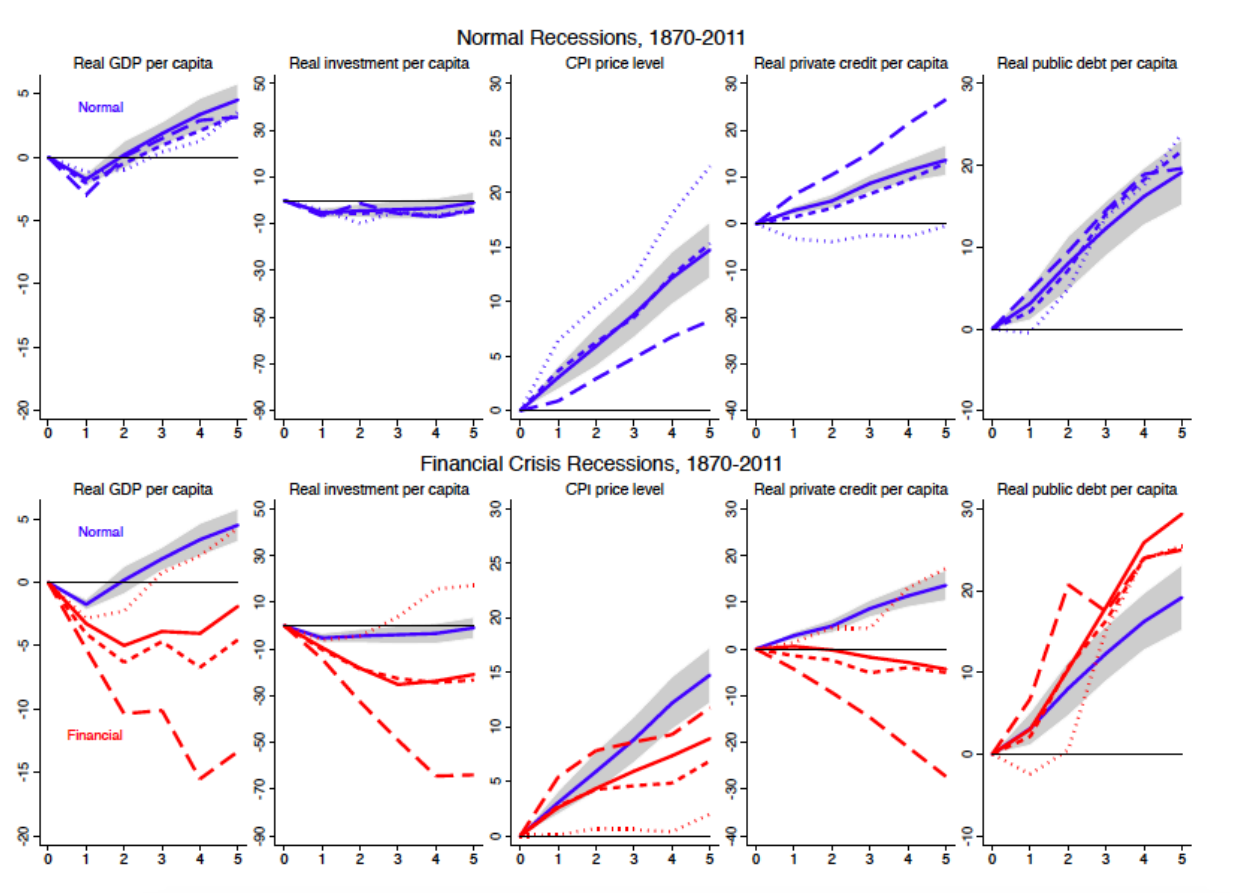
Recovery with public debt overhang

- Does + public debt make recessions worse?
- Experiment: Debt levels is $-1\sigma, 0, +1\sigma$ relative to mean.
- Average $D/Y = 0.5$ and $\sigma = 0.35$



Recovery with private and public debt overhang

- Interaction of public debt in the face of high private credit?
- Experiment: Solid lines: private credit + 1σ
- Dashed lines: *low*, *normal*, *high* levels of public debt



Summary

- Financial crises have longer lasting effects compared to normal recessions and recoveries are slower
- Financial recessions are about $\times 3$ worse than normal recessions
- High levels of public debt (overhang) do not substantially affect recovery, although reduce lending and constrain fiscal policy
- High public debt to GDP are (-) if when combined with private credit overhang
- Evolution of public and private debt are import both in absolute terms (trends) and relative terms (business cycles)

Currency Crisis

Definition and classification

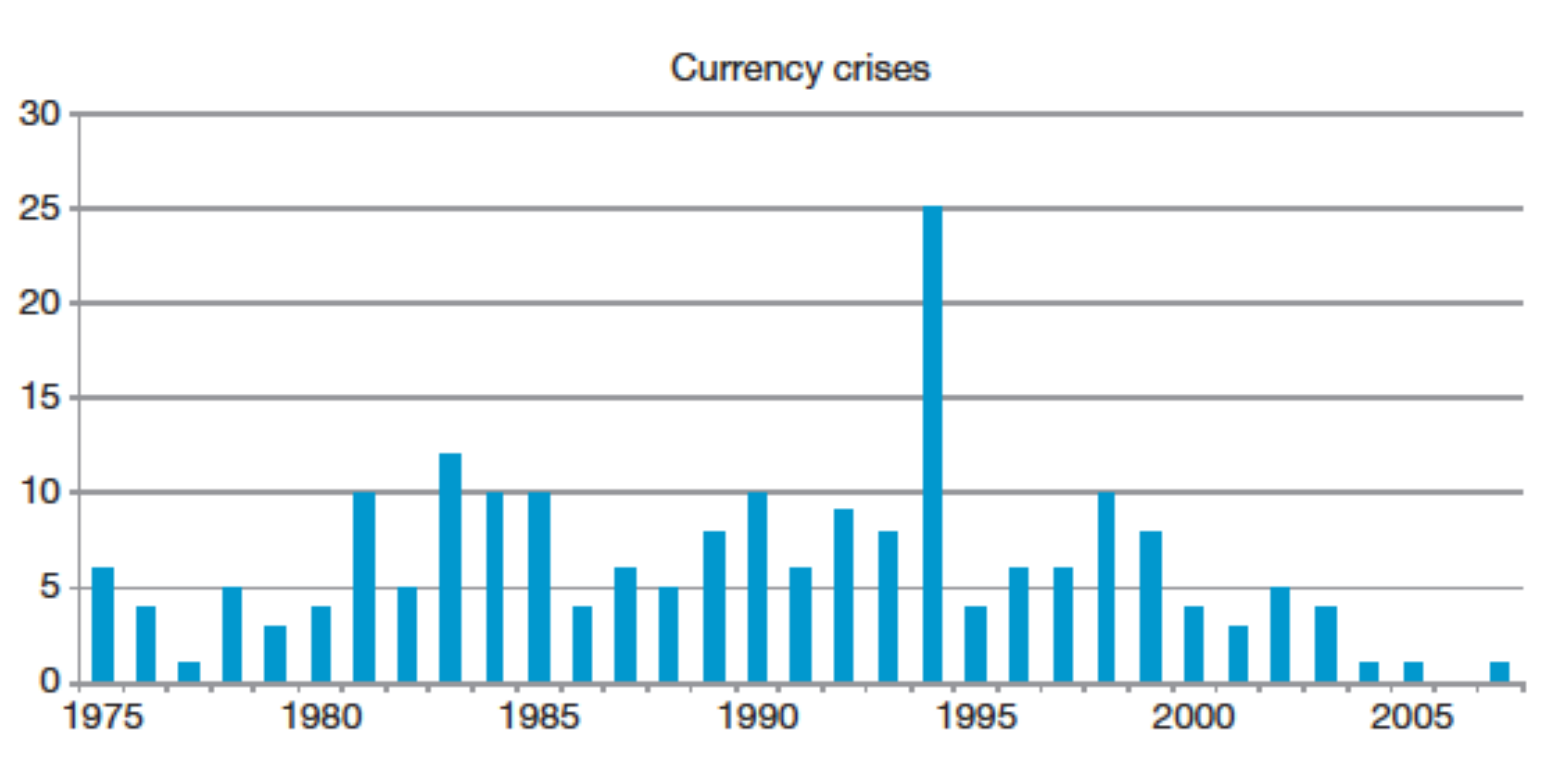
- *Speculative attack* on the foreign exchange value of the currency that results in:
  - Sharp depreciation
  - Depletion of NF and/or increase in interest rates
- Attacks may or may not be successful
- Examples

Models of currency crisis

1. First generation (Krugman, 1979)
    - Inconsistency between a fixed exchange rate and an expansionary monetary policy driven by $G \uparrow$
    - Infeasible for the government to deplete reserves or borrow indefinitely $\rightarrow$ monetization of deficit
2. Second generation (Obtsfeld, 1986, 1994)
    - Optimizing decision of government
    - Self-fulfilling multiple equilibrium
    - Speculative attack can occur even if fundamentals are sound
3. Third generation
    - Financial market distortions (moral hazard, credit constraints, currency mismatches, sudden stops, etc)

Historical perspective

- Prevalence of the number of currency crisis



Currency crisis and capital flows

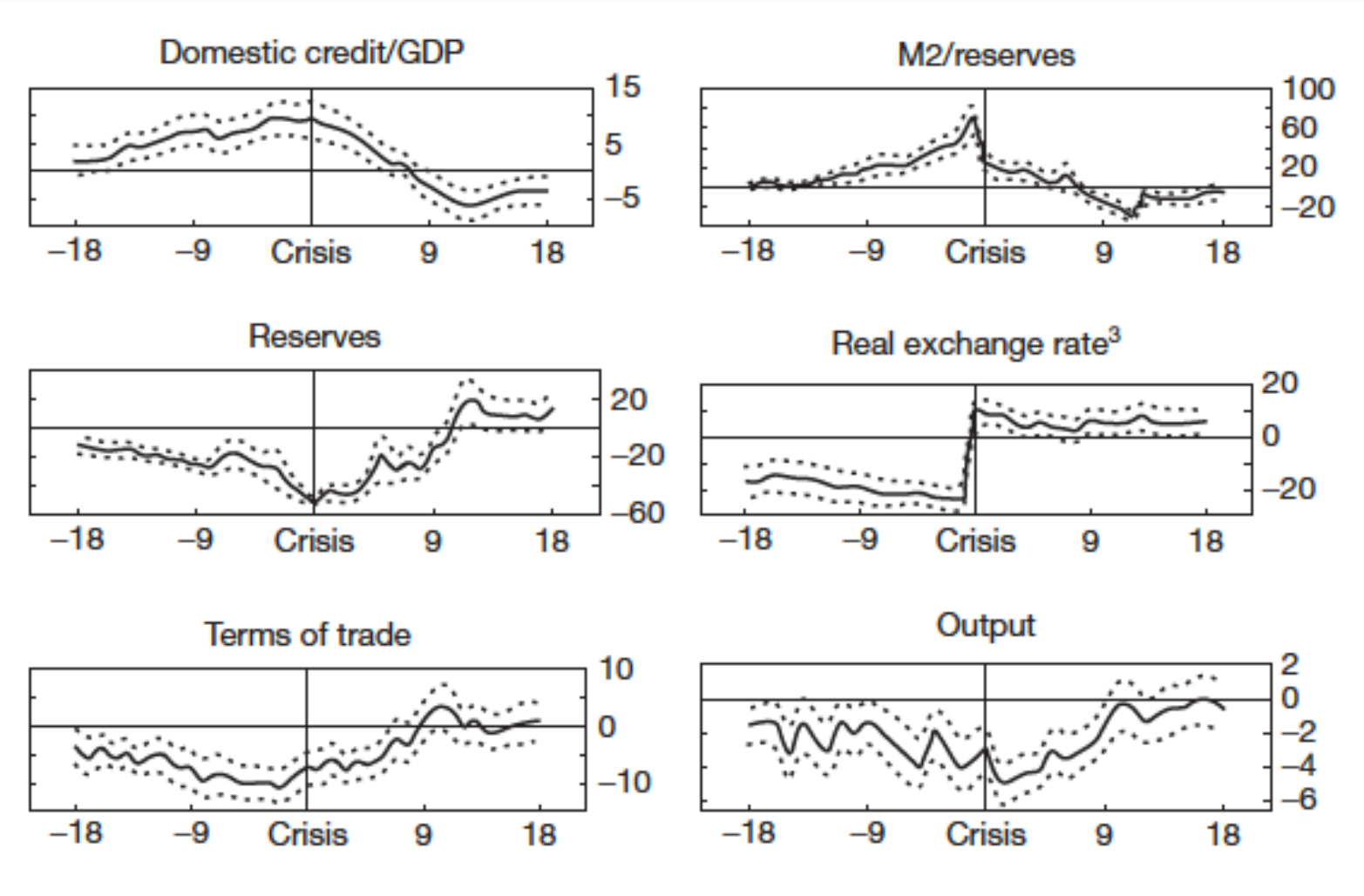
- Currency crisis associated with sudden stops
- not all currency crises occur in the context of a CF reversal
- not all CF reversals are accompanied by currency crises

TABLE 33.2 Currency Crises and Sudden Stops

	Currency crisis	No crisis
Normal crises and sudden stops		
Sudden stop	34 (6%)	85 (16%)
No sudden stop	26 (5%)	389 (73%)
Major crises and major sudden stops		
Major sudden stop	26 (5%)	49 (9%)
No major sudden stop	23 (4%)	436 (82%)

Anatomy of currency crisis

- Event study based on data for 20 emerging market countries over the period 1970–95 (Kaminsky and Reinhart, 1999)



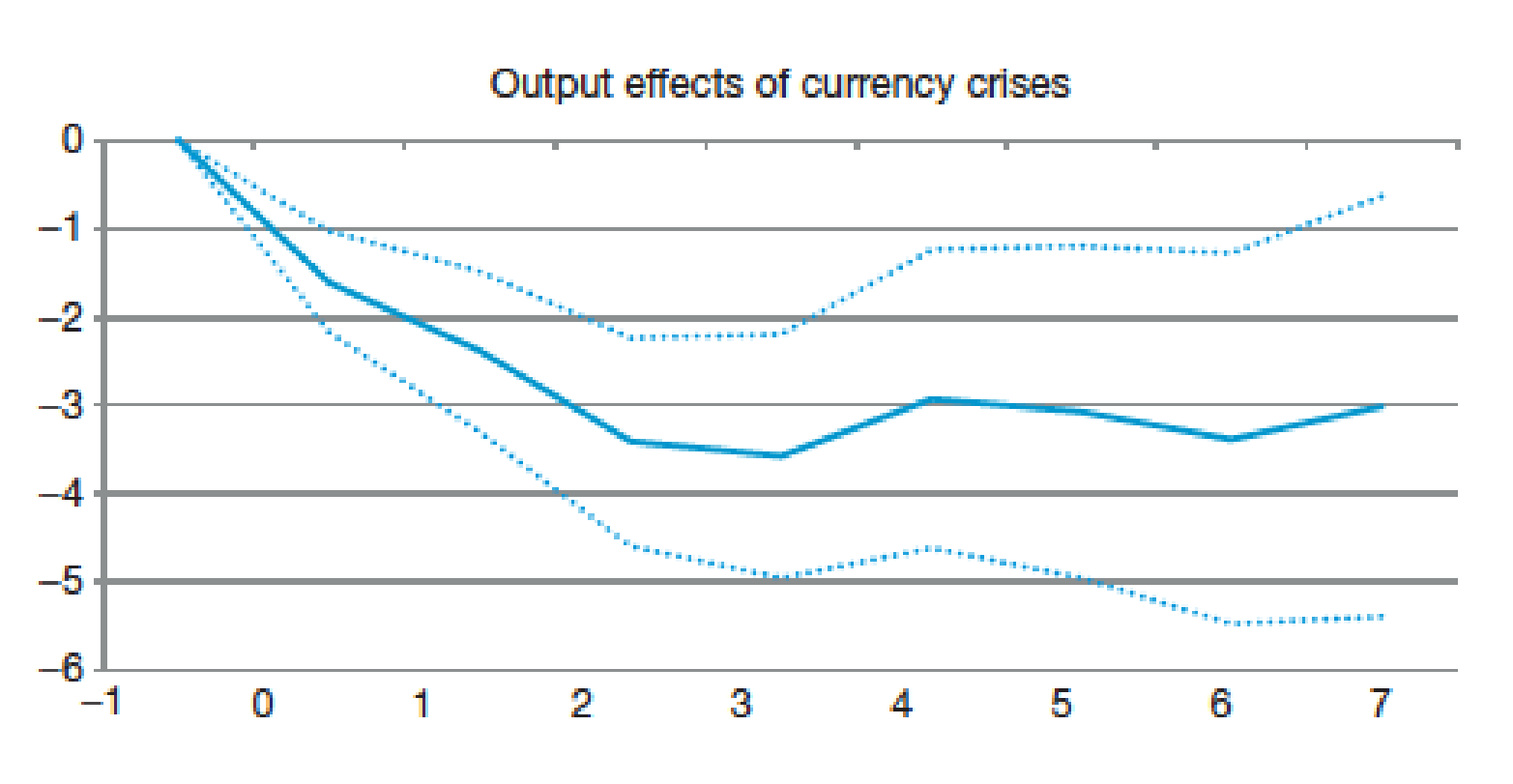
Anatomy of currency crisis

Before a currency crisis

- Faster credit and money growth
- Large real exchange rate overvaluation
- Decline in foreign exchange reserves
- Decline in GDP associated with adverse development of terms of trade

Effects of currency crisis

- Is a depreciation contractionary?
- If so, what are the costs?



Fiscal Deficits, Inflation and the Exchange Rate

A Monetary Approach to Exchange Rates

1. Interest-elastic money demand

$$\frac{M^d}{P} = L(C, i)$$

2. Purchasing power parity

$$P = \mathcal{E} P^*$$

3. Interest rate parity (UIP)

$$1 + i_t = (1 + i_t^*)\frac{\mathcal{E}_{t+1}}{\mathcal{E}_t}$$

4. Government budget constraint

$$\mathcal{E}_t(B_t^g - B_{t-1}^g) + P_t G_t = P_t T_t + (M_t - M_{t-1}) + \mathcal{E}_t i_t^* B_{t-1}^g$$

$$B_t^g - B_{t-1}^g = \frac{M_t - M_{t-1}}{P_t} - \left[G_t - T_t - i_t^* B_{t-1}^g\right]$$

Deficit Financing Under a Peg

Secondary Deficit: $DEF \equiv \left[G_t - T_t - i_t^* B_{t-1}^g\right]$

$$DEF = \frac{M_t - M_{t-1}}{P_t} - \left(B_t^g - B_{t-1}^g\right)$$

When $DEF > 0$

- Money growth increases $\frac{M_t - M_{t-1}}{P_t} > 0$
- Government asset position decreases $\left(B_t^g - B_{t-1}^g\right) < 0$

Under a peg:

- $P_t = \mathcal{E}$
- $i_t = i_t^*$
- $M_t = \mathcal{E} L(C, i^*)$
- $B_t^g - B_{t-1}^g = -DEF$

Sustaining the peg

Sustainability of the peg depends on fiscal discipline. If $DEF > 0$

- Even with $B^g_{t-1} > 0$
- $B^g_t - B^g_{t-1} = -DEF < 0$ country looses assets
- At some point $B^g_t < 0$
- If there is a borrowing constraint $B^g_t > -\bar{B}$ then $DEF > 0$ will push economy to its borrowing limit.
- What to do at the borrowing limit?

Fiscal Consequences of a Devaluation

- What happens if $\mathcal{E}' > \mathcal{E}$
- P_t jumps from $\mathcal{E}$ to $\mathcal{E}'$, why?
- What happens with i_t
- $M' = \mathcal{E}' L(C, i^*) > M$

Combining with the government budget constraint:

$$B'^g - B^g = \frac{\mathcal{E}' L(C, i^*) - \mathcal{E} L(C, i^*)}{\mathcal{E}'} - DEF$$

Relative to baseline, a surprise devaluation increases **seigniorage** for the government

What happens after the devaluation?