BANKING CRISES AND SOVEREIGN DEFAULTS: EXPLORING THE LINKS

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DISCLAIMER: The views contained in this presentation are the authors' and need not coincide with those of Banco de España or the Eurosystem.

STRUCTURE OF THE PRESENTATION

I. **Motivation and our contribution**

I. **Banking and sovereign distress: transmission channels**

II. **Data & preliminary statistics**

III. **"Independent" and "twin" crises: Event analysis**

Bank to Debt crises (BD) vs. Bank crises (B)

Debt to Bank crises (DB) vs. Debt crises (D)

IV. **Conclusions and way forward**

MOTIVATION

- ***The TWO-WAY interaction between fiscal and financial instability is at the core of the current turmoil in Europe (Acharya et al., 2011)***
  - **Despite the heterogeneous origins of the crises, similar responses across countries**
  - **EFSF-IM support to sovereign, public and ECB support for banks, fiscal and structural adjustment**
- **Nevertheless, the combination of extreme fiscal and financial distress (what we coin twin crises) is nothing new to EMs. Examples**
- **Lack of empirical research on if and how fiscal and financial distress transmit and combine.**
- **Few exceptions, with opposite findings: Reinhart and Rogoff (RR, 2011), Borenzstein and Panizza (BP, 2008)**

OUR CONTRIBUTION

The objective of this research agenda is to use historical evidence to provide: (i) a systematic analysis of the factors making likelier that either bank or debt crisis degenerate into a twin crisis (today) & (ii) 'food for thought' regarding what an adequate event-contingent policy to handle these situations is (ongoing work).

Today's paper:

- **Distinguish between "independent" crises and "twin" crises, and show that this distinction is relevant;**
- **Dig into the mechanisms through which distress is transmitted between the sovereign and the banking sector;**
- **Identify factors systematically linked to each type of crises;**
- **Emphasize the role of balance sheet inter-relations between the public and banking sectors of the economy.**

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Transmission from the banks to the sovereign

- ***Direct costs (Noyer, 2010 or Acharya et al., 2011):***
  - **Bailout & recapitalization money, Government deposits, CB's liquidity and the materialization of public guarantees/contingent liabilities**
- ***Indirect costs:***
  - **Credit crunch affects the economy and thus public revenues and expenses and debt (WEO, 2009)**
  - **Monetary authority's reaction might fuel inflation (Jacomé et al, 2011)**
  - **Fall in confidence- sudden stop of external financing (Broner et al, 2012)**
  - **Use of reserves for bailouts -> currency depreciation (RR, 2011)**
  - **Bank crises raise sovereign's borrowing costs (Candelon and Palm, 10)**
- **Might be worsened by too much foreign or short-term debt (Obstfeld, 2011)**

Transmission from the sovereign to banks

- **Holdings of defaulted public bonds generate capital losses (Noyer,10)**
- **Shock to banks' sources of funding:**
  - **Uncertainty fosters bank runs and disrupt interbank markets (BP, 08)**
  - **Sovereign defaults and rating downgrades limit access to foreign capital and lead to higher borrowing costs (Arteta and Hale, 08)**
- **Default's impact on economic activity affects banks' profits (BP, 08)**
- **Banks facing capital losses will opt for more conservative lending strategies, reinforcing the economic contraction (Gennaioli et al., 10)**
- **Fiscal reaction exacerbates economic downturn (Acharya et al, 11)**
- **Monetization might lead to out-of-control inflation**

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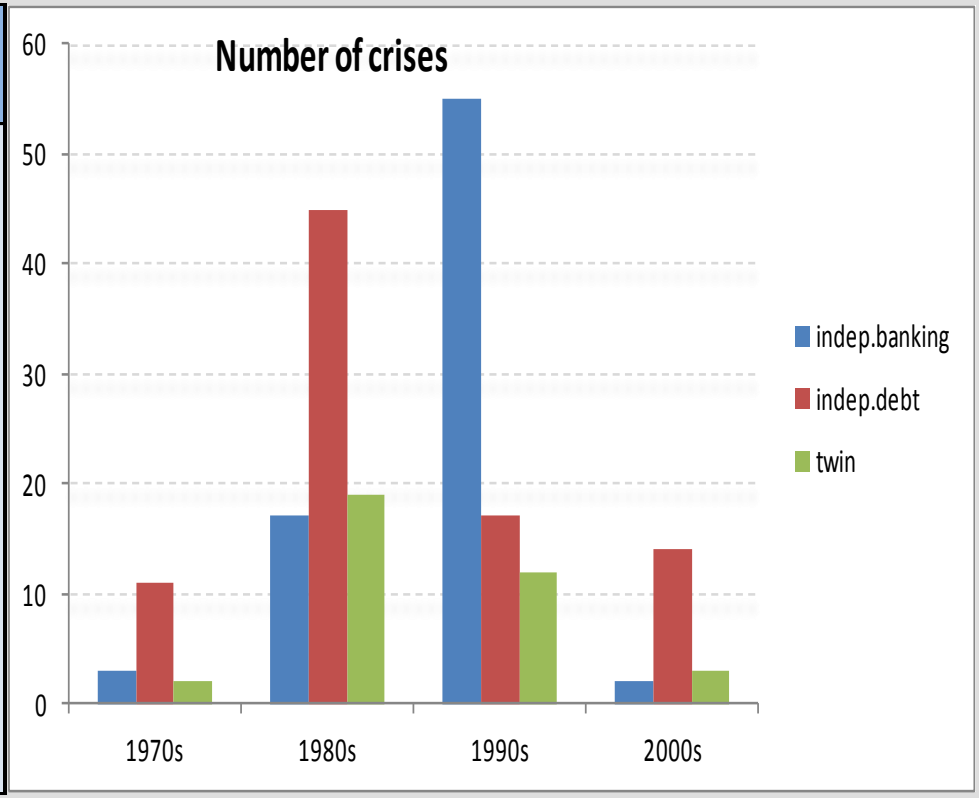
CRISES: DATA AND DEFINITIONS

- **Sample: 117 emerging and developing countries, over 1975-2007**
  - **In the econometric analysis we drop LICs – left with 78 countries)**
- Definition of defaults**: Standard & Poor's (domestic & foreign)**
- Definition of systemic banking crises**: Laeven and Valencia (2010)**
- We isolate **four types of events:**
  - **Independent debt crises**
  - **Independent bank crises**
  - **Twin debt-bank crises**
  - **Twin bank-debt crises**
- **Twin crises defined as those occurring within a 3-year window**

CRISES: TIME EVOLUTION

SUMMARY STATISTICS: CRISIS INDICATORS					
	1970s	1980s	1990s	2000s	Total
Indep.banking	3	17	55	2	77
Indep.debt	11	43	17	14	85
Twin	2	19	12	3	36
Twin bank-debt	0	9	6	2	17
Twin debt-bank	2	10	6	1	19
TOTAL	**16**	**79**	**84**	**19**	**198**
Total:banking crises	5	36	67	5	113
Total:debt crises	13	62	29	17	121



- **Little "action" in the second half of the 70s**
- **The 80's were the decade of debt crises, the 90's that of banking crises**

CRISES PROBABILITIES: UNCONDITIONAL versus CONDITIONAL

Unconditional and Conditional Probabilities	
P(bank)	2.93
P(debt)	3.13
P(bank/debt in t-3 - t)	15.70
P(debt/bank in t-3 to t)	15.04

- **In contrast to BP (08) or RR (11), neither crisis type seems to be more likely to trigger the other.**

BALANCE SHEET. DATA & DEFINITIONS

- **Data from the *"Monetary Survey" of the IMF's International Financial Statistics* (complemented with national sources)**

DEPOSIT MONEY BANKS (as in former IFS monetary statistics classification)	
ASSETS	**LIABILITIES**
Reserves (line 20)	Demand Deposits (line 24)
Claims on Monetary Authorities	Time, Savings and For. Cur. Deposits (line 25)
Securities (line 20c)	Money Market Instruments (line 26aa)
Other Claims on Monetary Authorities (line 20n)	Bonds (line 26ab)
Foreign assets (line 21)	Restricted Deposits (line 26b)
Claims on other resident sectors (line 22)	Foreign Liabilities (line 26c)
Central Government (line 22a)	Central Government Deposits (line 26d)
Deposit Money Banks (line 22e)	Credit from Monetary Authorities (line 26g)
State and Local Governments (line 22b)	Liabilities to Other Banking Institutions (line 26i)
Nonfinancial Public Enterprises (line 22c)	Liabilities to Nonbank Fin. Instit. (line 26j)
Private Sector (line 22d)	Capital Accounts (line 27a)
Other Banking Instititutions (line 22f)	
Nonbank Financial Institutions (line 22g)	

- **We look at both sides (gross positions) of the banks' balance sheets**
- **Focus on DMBs relation with CB, Government, private sector and ROW**

BALANCE SHEET. DATA and DEFINITIONS

- Construct the following indicators (as %GDP, % total assets):

Banks' assets vis-à-vis the GG= 22a + 22b + 22c

Banks' liabilities vis-à-vis the GG= 26d

Banks' assets vis-à-vis the CB= 20 + 20c + 20n

Banks' liabilities vis-à-vis the CB= 26g

Banks' assets vis-à-vis the ROW= 21

Banks' liabilities vis-à-vis the ROW= 26c

Banks' total assets

Banks' total liabilities

CAVEAT: recapitalization outlays can not be traced back with this dataset. Instead we use LV (2008) static data (for a subset of countries)

OTHER VARIABLES

VARIABLE	SOURCE
Budget deficit, revenues and expenses	EIU; IFS; WEO; Mitchell (2007); Art.IV reports
Public debt, public consumption & public investment	WDI
External debt (total, foreign & short term) (private, public)	WDI
Credit to the private sector/GDP	IFS
Banking sector's deposits	IFS
Inflation, unemployment, exchange rates	IFS
GDP and GDP growth	IFS
Capital flows (by residents and by foreigners)	IFS
Interest rates (official, interbank & DMB lending rates)	IFS

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METHODOLOGY

- We keep track of relevant variables around crisis dates
- Following Gourinchas and Obstfeld (2011) we use an ***event analysis methodology*** and estimate:

$$Z_{it} = \alpha_i + \sum_{e=\{B,D,BD,DB\}} \sum_{p=-3}^{p=3} \beta_{ep} \cdot D_{eit(t+p)} + \varepsilon_{it}$$

$D_{eit(t+p)}$: dummy is 1 if country *i* is *p* periods away from type *e* crisis

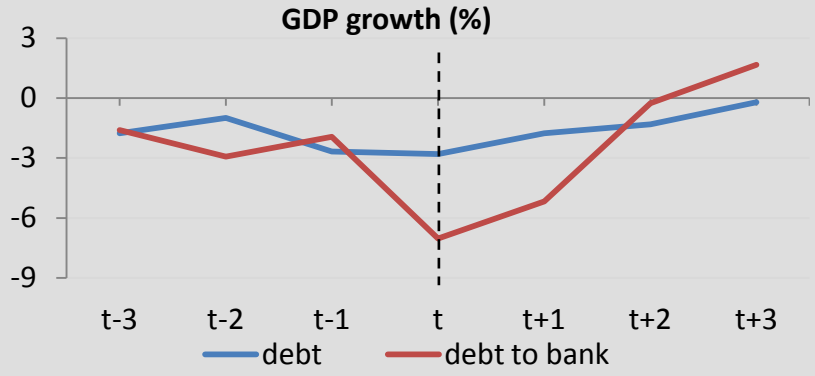
Fixed-effects panel with country specific trends (where required)

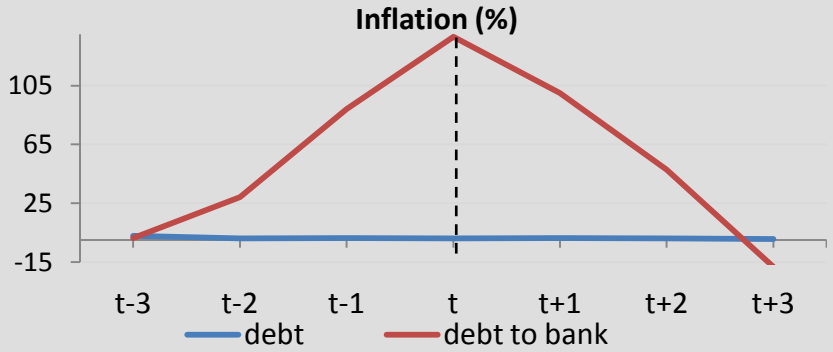
Time window of seven years around each crisis episode

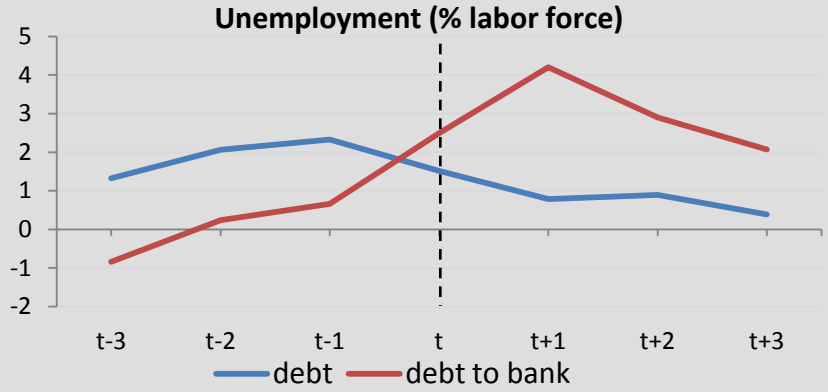
- By studying differences in the coefficients (and combinations of them) we can test for differences between twin and non-twin crises
- Plot the economic value of the estimated coefficients

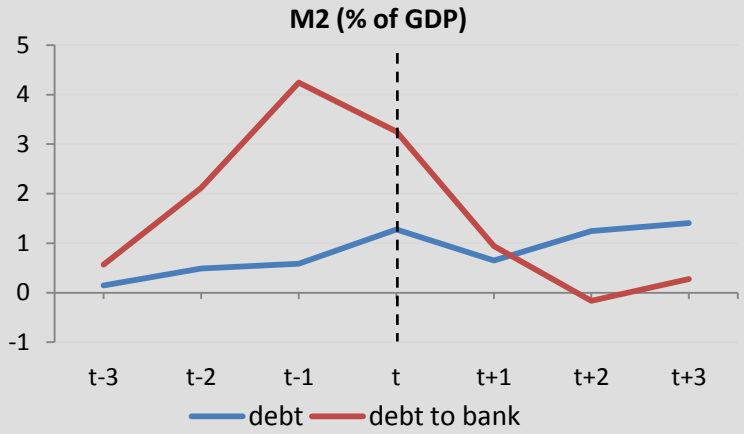
Debt crises versus Debt-to-Bank crises

DEBT vs TWIN DEBT-BANK CRISES: THE ECONOMY



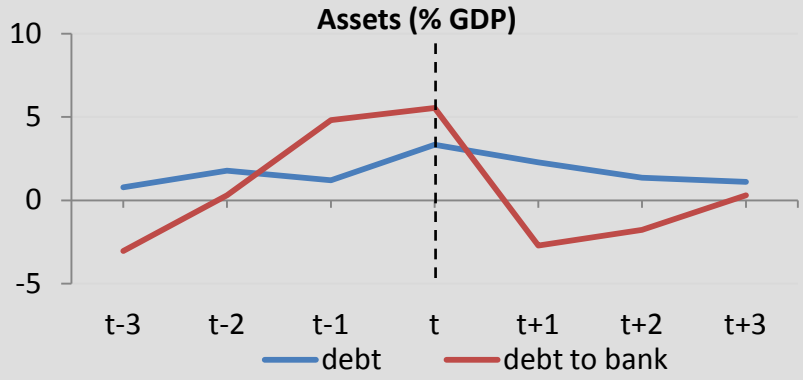


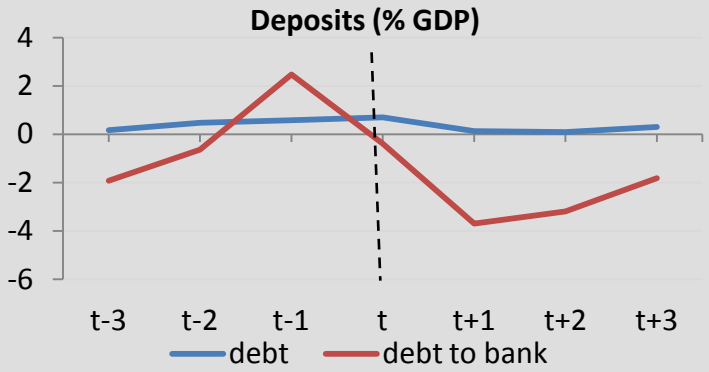


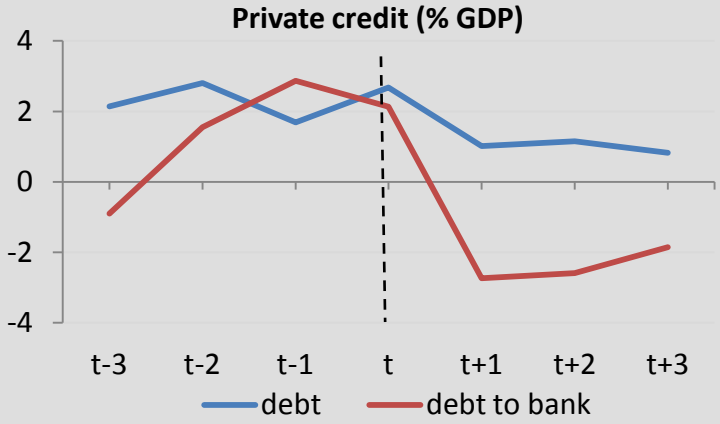


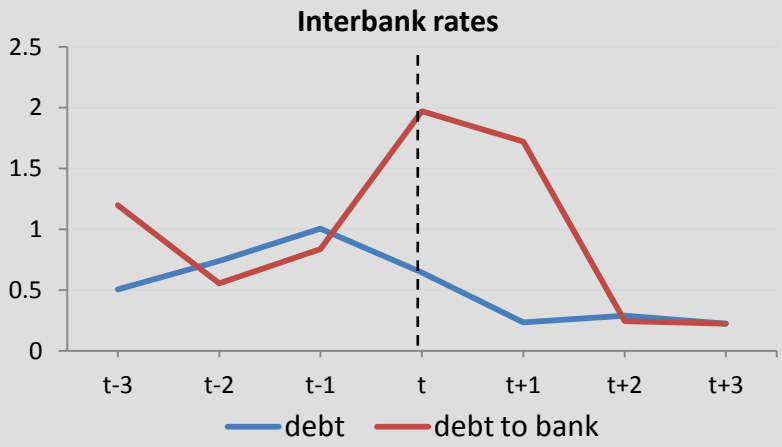
- Low growth ahead of both events but larger shock to growth and inflation in DB.
- Larger unemployment ahead of D. Diverging trends (significantly higher in DB)
- Broad money aggregate (M2) relatively stable in D but collapses in DB crises

DEBT vs TWIN DEBT-BANK CRISES: BANKING SECTOR



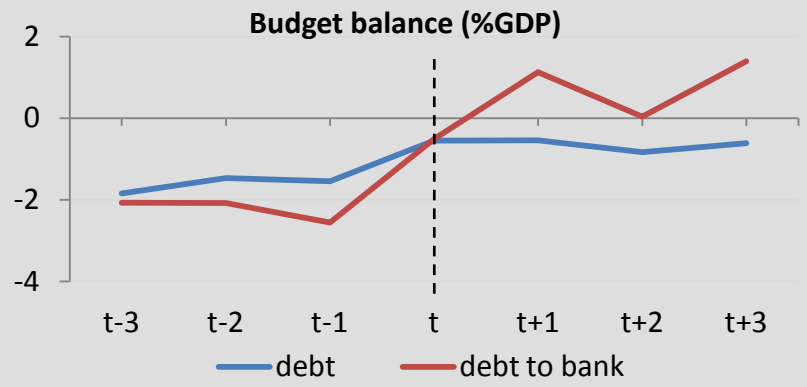


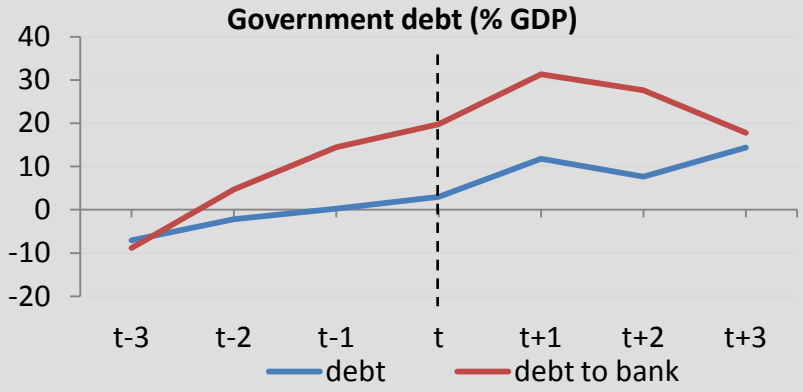


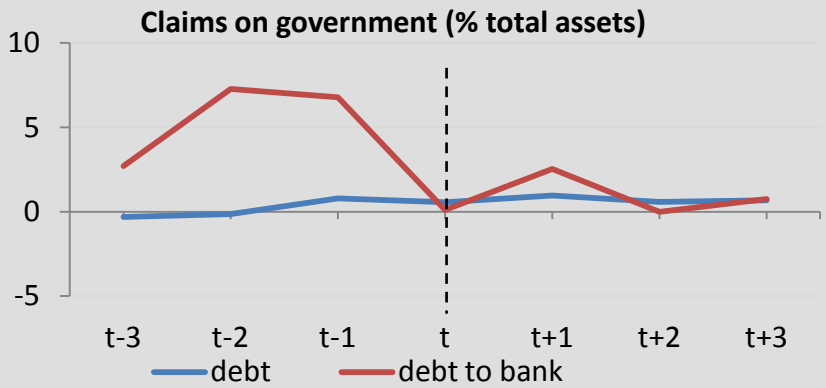


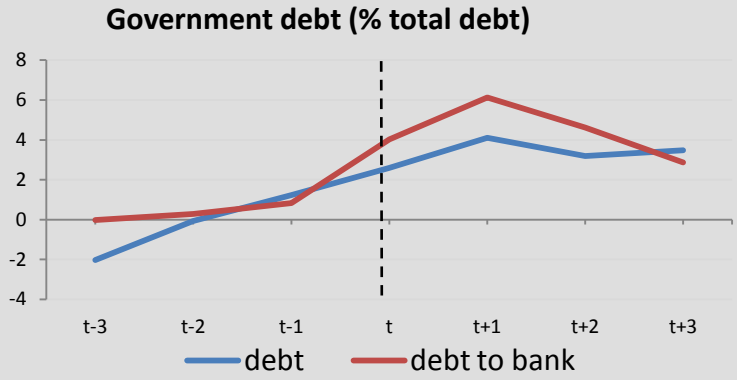
- "Normal" dynamics around D events vs. boom-bust pattern in DB
- Serious disruptions in interbank markets with significant rises in interbank rates during DB episodes

DEBT vs TWIN DEBT-BANK CRISES: PUBLIC FINANCES



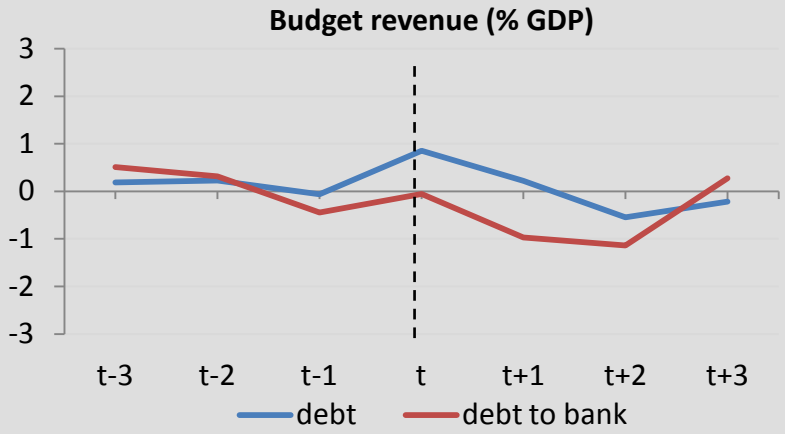


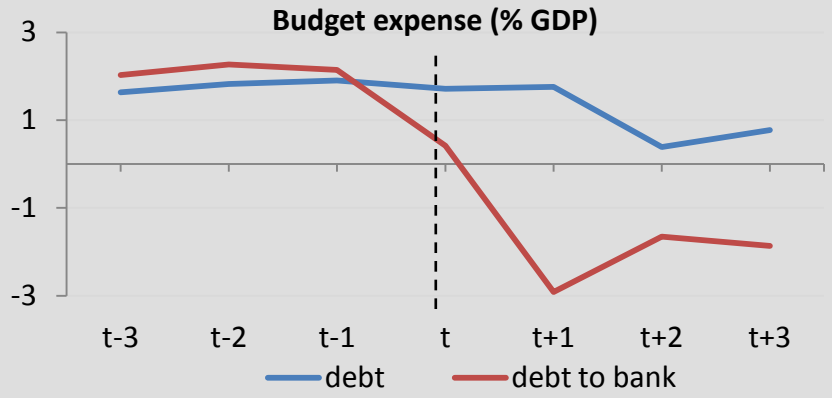


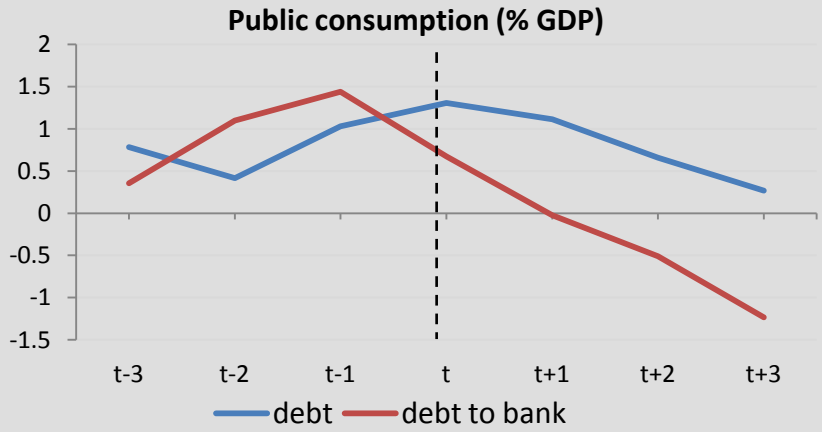


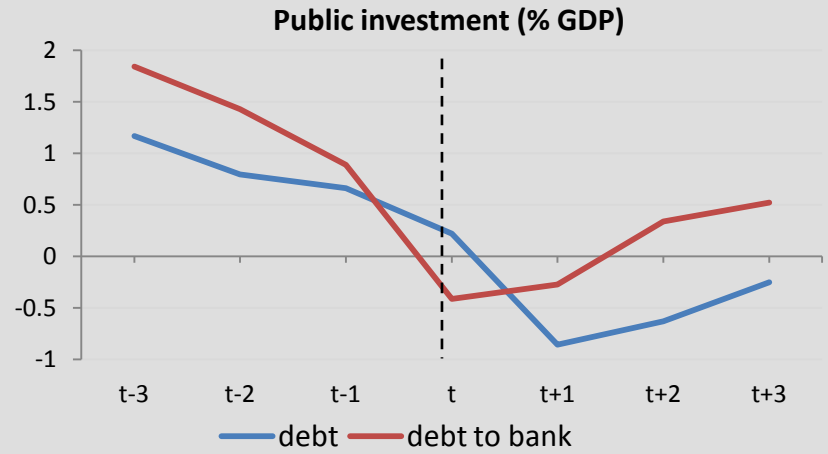
- Budget deficits large ahead of both events but flat in D vs. abrupt change in DB
- Government accumulates debt faster ahead of DB. Also falls more after the default
- Government reliance on domestic banks raises more ahead of DB events
- Government debt as becomes increasingly larger than private debt

DEBT vs TWIN DEBT-BANK CRISES: FISCAL POLICY



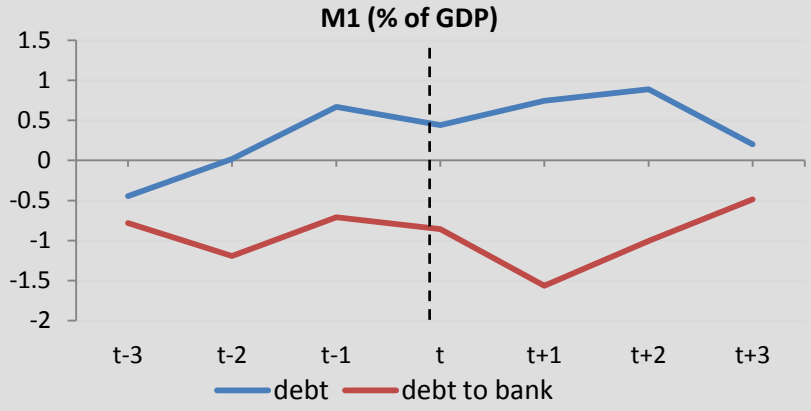


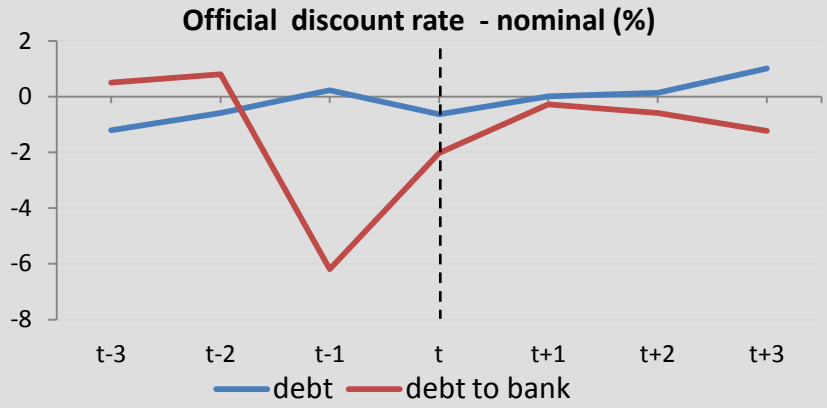


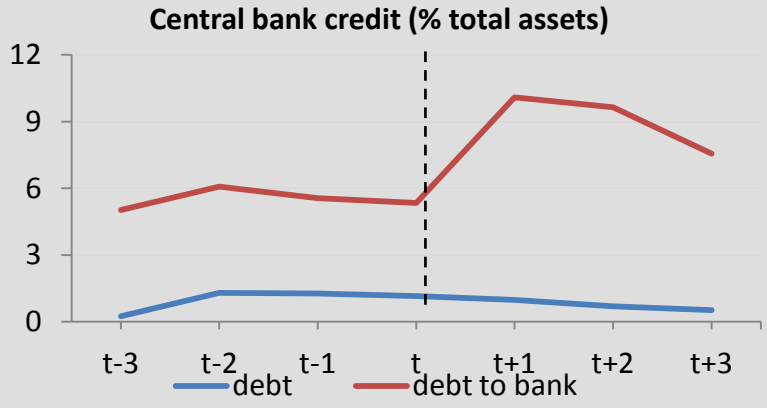


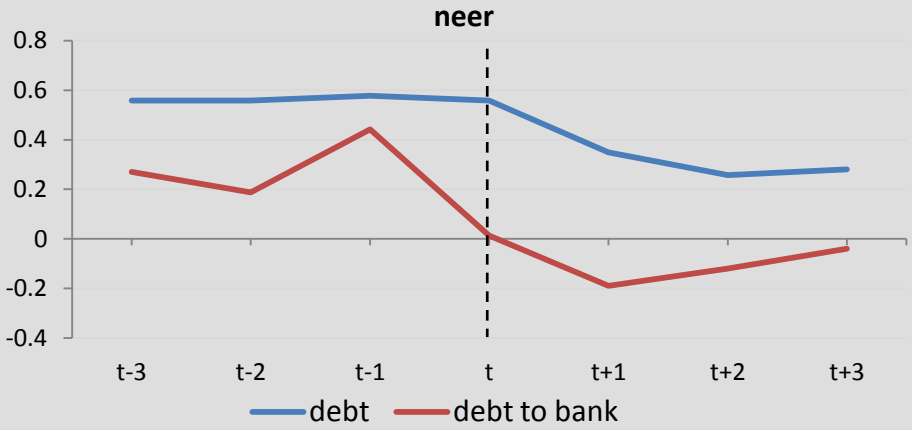
- Larger collapse in expenditures in DB events. In D revenues hold better
- The collapse is due to drops in public C and I. In D events public C falls less

DEBT vs TWIN DEBT-BANK CRISES: MONETARY POLICY



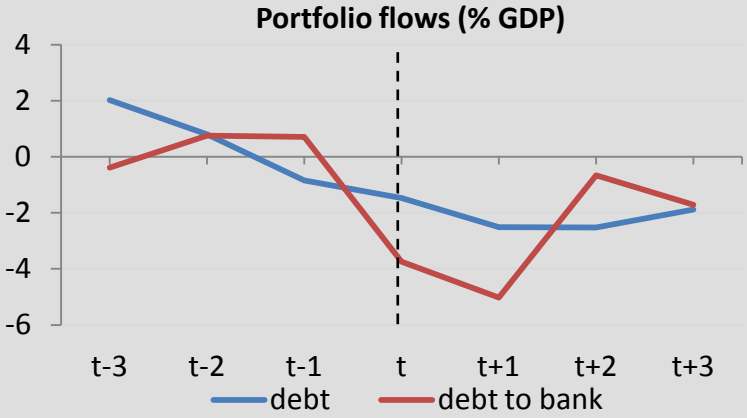


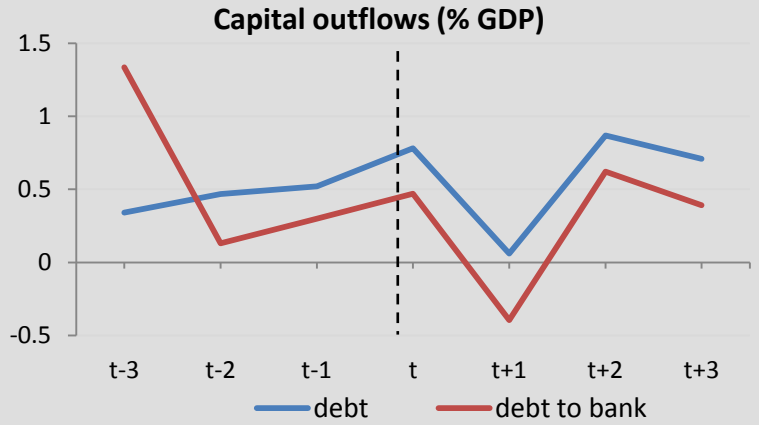


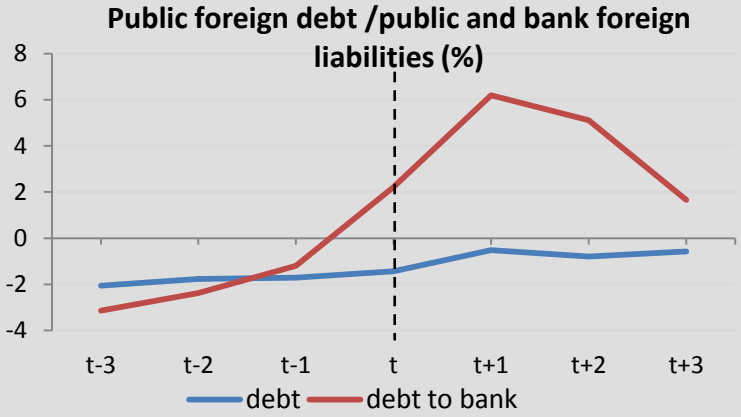


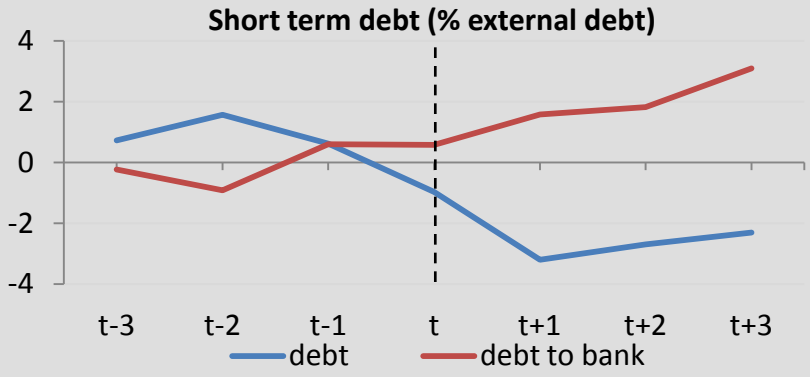
- M1 remains stable and similar until default in both events (despite deposit drops)
- The interest and the exchange rates fall significantly ahead of DB
- CB goes on support of the banking sector after the default in DB events

DEBT vs TWIN DEBT-BANK CRISES: EXTERNAL SECTOR









- Foreign capital flows out ahead of both events (stronger in DB)
- Domestic capital only flees during DB events
- Increasing importance of both short term debt and GG foreign debt in DB events

DEBT vs TWIN DEBT-BANK CRISES: SUMMING UP

- **Exposure to government higher and expanding faster ahead of DB**
  - **– big hit for the banks following the default.**
- **Central Banks attempt to cushion the impact of the default.**
- **DB defaults are more damaging to the economy in terms of growth, inflation and the effect on external confidence (stronger capital flihgt)**
- **Defaults that are part of DB are followed by an extraordinary fiscal adjustment, via a drastic cut in public expenditure (both C and I).**
- **Boom-bust dynamics within the banking system in DB episodes**
- **FP tightens more in DB**
- **MP loosens more in DB**

Bank crises versus Bank-to-Debt crises

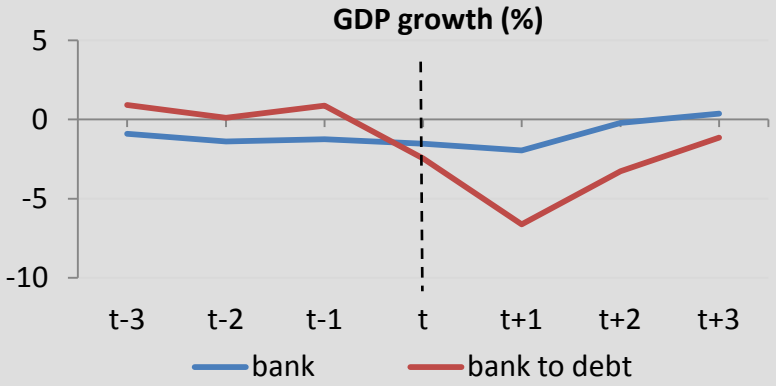
Are we talking size?
Static Indicators on bank crises intensity

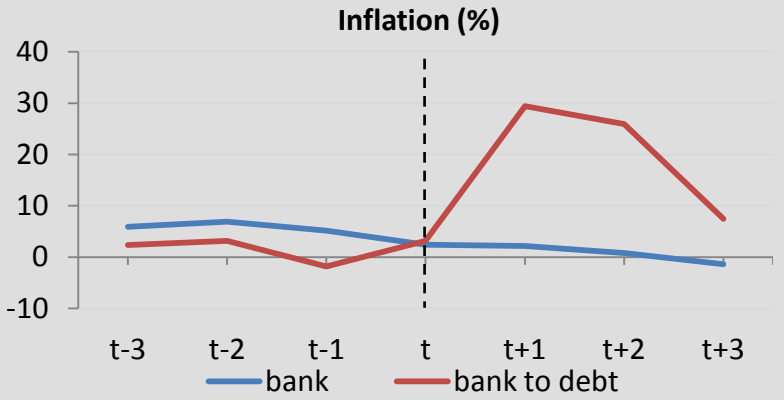
Intensity of banking crises. LV (2008) static indicators

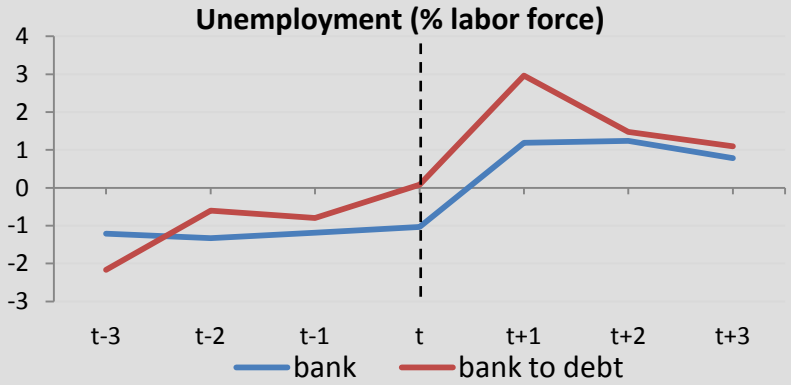
Crises types	NPL at peak	fiscal costs	recapitalization costs (net)	recapitalization costs (gross)	change in number of banks (T to T+3)
Bank crises	27.59	12.99	0.06	0.05	-18.90
Debt crises	.	.	.	.	.
Bank to debt crises	35.34	25.51	0.14	0.09	-22.00
Debt to Bank crises	35.90	4.87	0.02	0.02	-43.40
Total average	30.02	14.21	0.07	0.05	-23.31

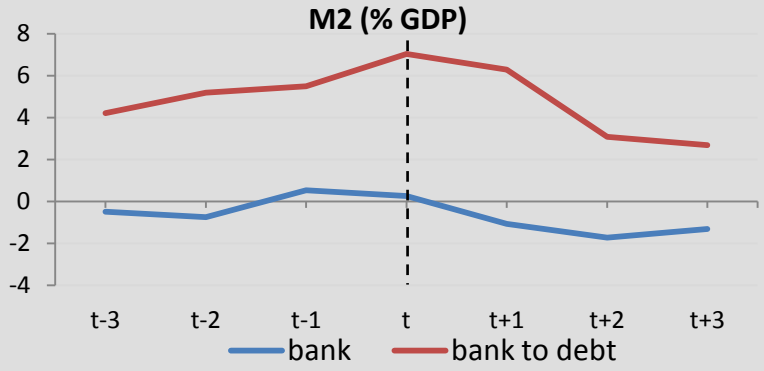
- **Although bank to debt crises seem more pronounced in terms of the impact on the banks the difference is not dramatic.**
- **Main difference lies in the much higher fiscal costs of DB crises**

B vs TWIN BD CRISES: THE ECONOMY



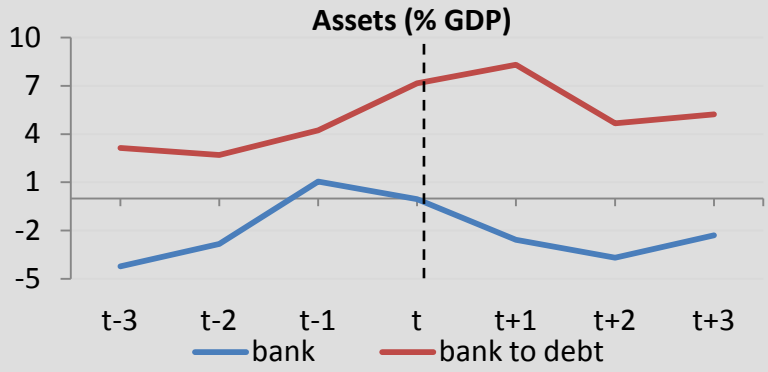


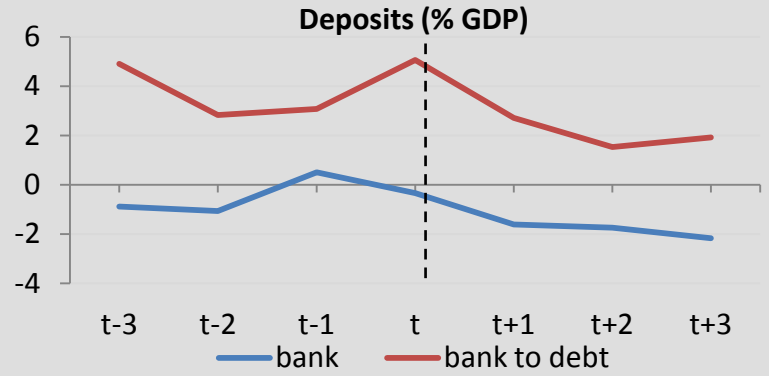


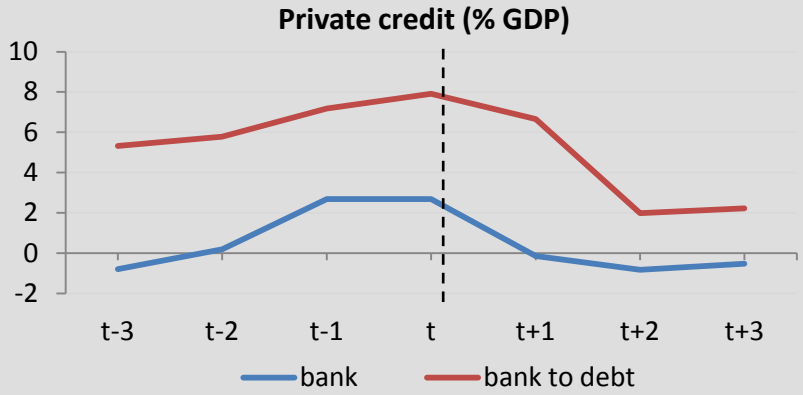


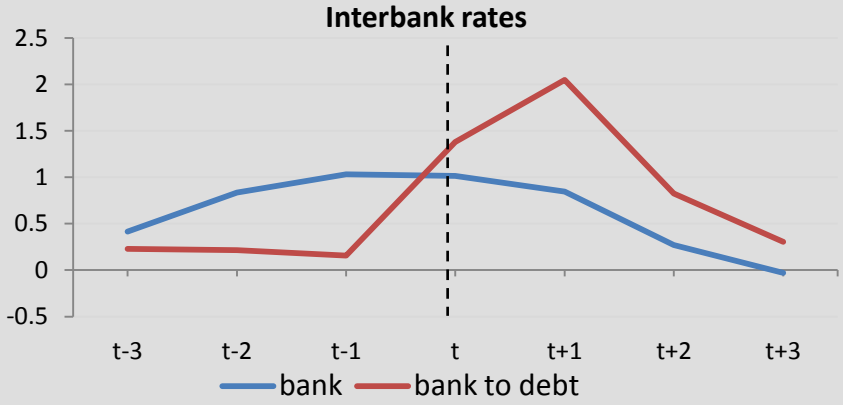
- Low growth and high inflation ahead of B, but quick recovery afterwards.
- Not significantly different than “normal” levels ahead of BD, but in the aftermath: growth collapses and inflation shoots up
- Unemployment raises during both episodes.
- Broad money aggregate larger in DB. Fall in both events

BANK vs TWIN BANK-DEBT CRISES: BANKING SECTOR



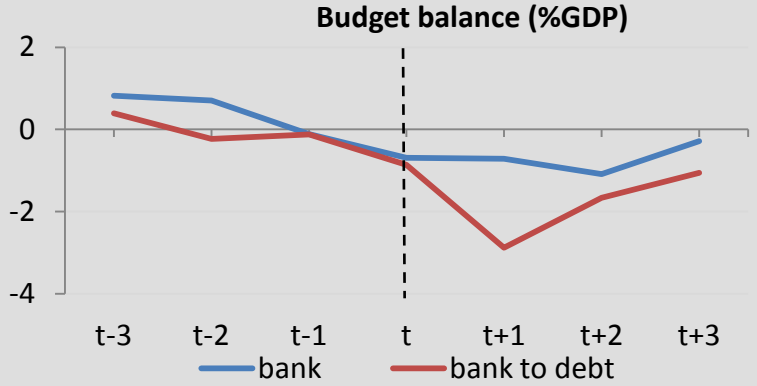


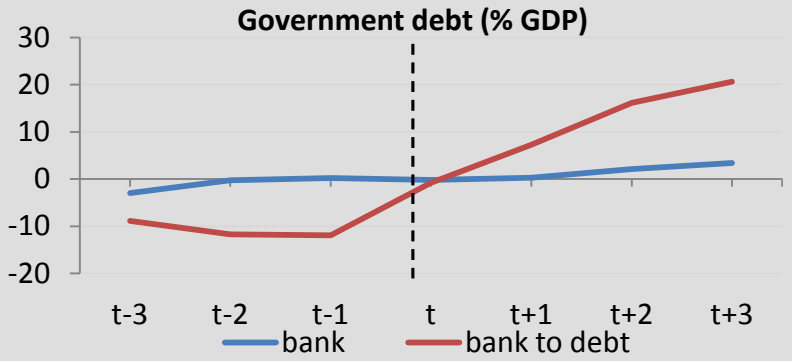


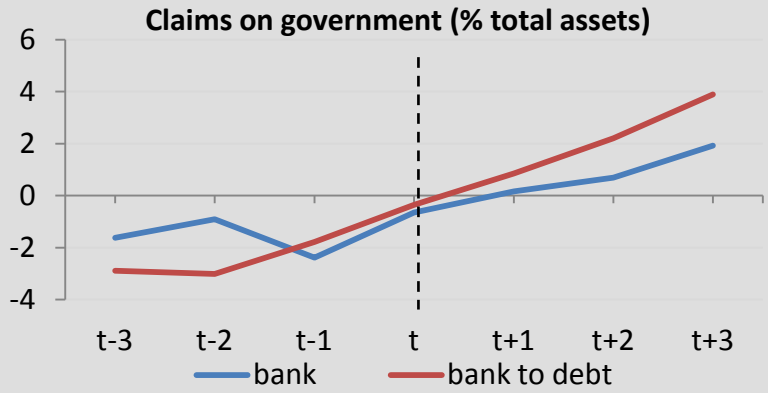


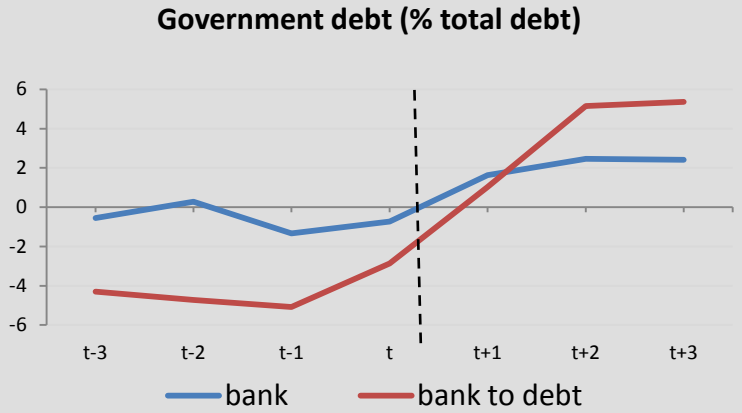
- Banking sectors of similar sizes. Deleveraging starts earlier in B (in BD not until default)
- Deposit runs during both crises, larger in BD.
- Credit crunch stronger in the aftermath of BD (huge price effect as sovereign fails)
- In BD episodes interbank tensions escalate until the default

BANK vs TWIN BANK-DEBT CRISES: PUBLIC FINANCES



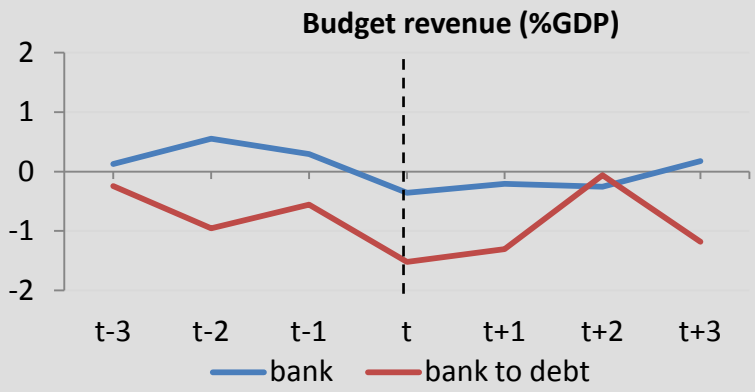


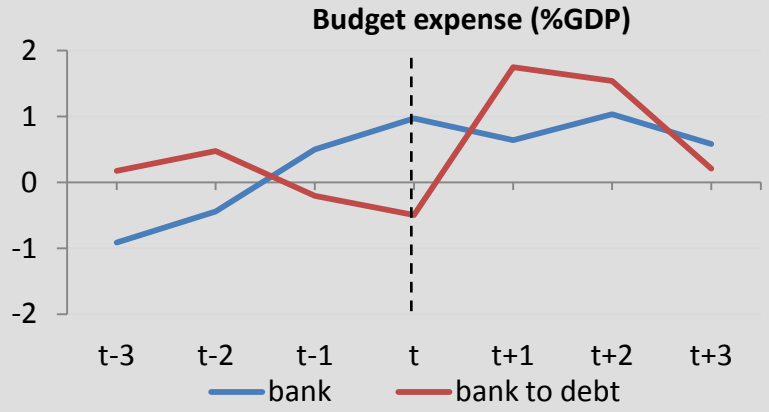


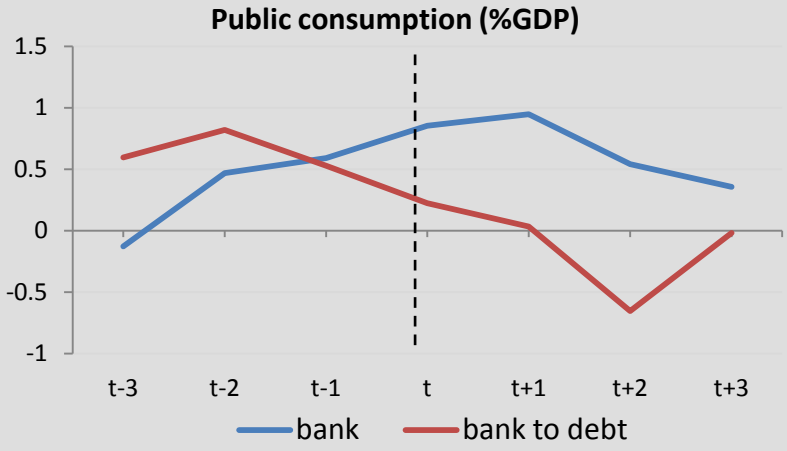


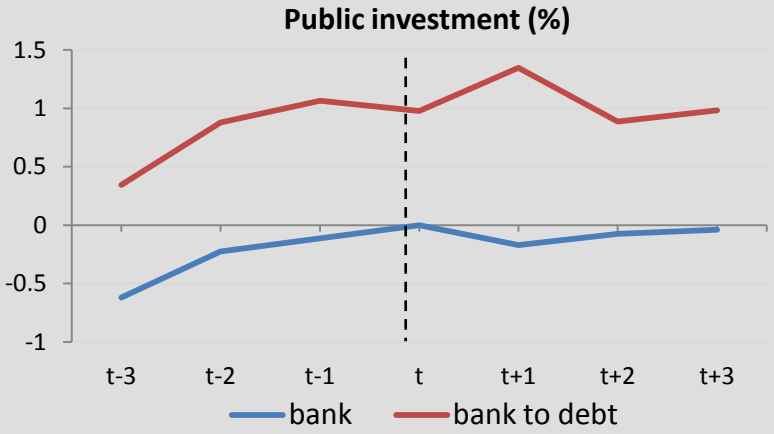
- Similar initial deficits; gradual worsening in B vs. large drop in BD at t+1
- Flat government debt/GDP in B vs. sharp increase in BD from t-1 onwards.
- Recourse to domestic banks in both events
- Public debt as a % of total debt raises much more during DB events (RR, 11).

B vs TWIN BD CRISES: FISCAL POLICY



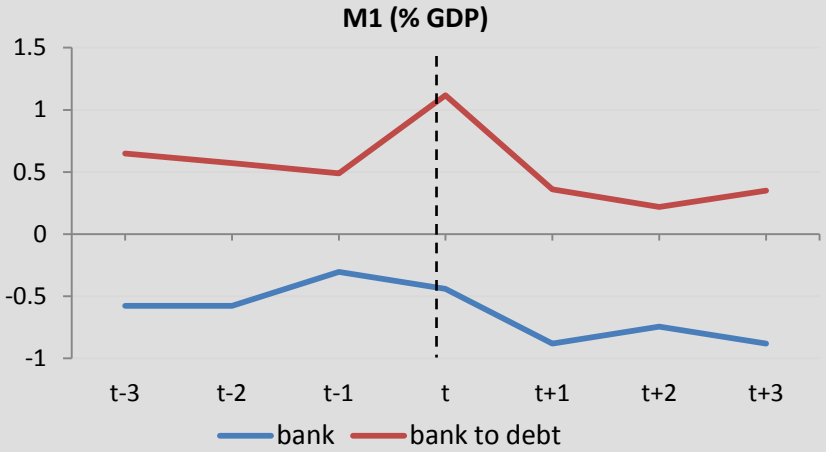


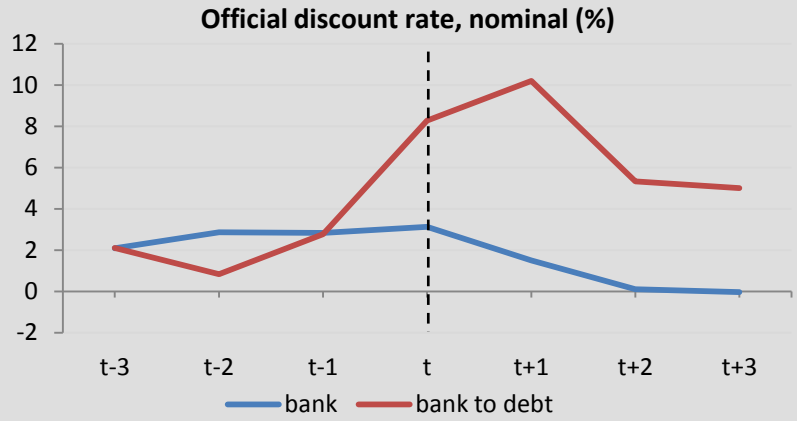


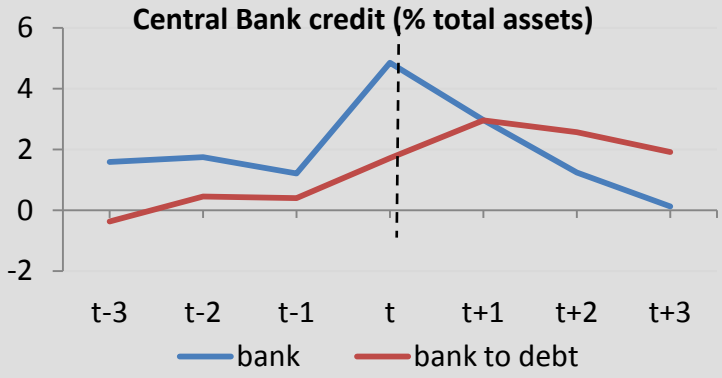


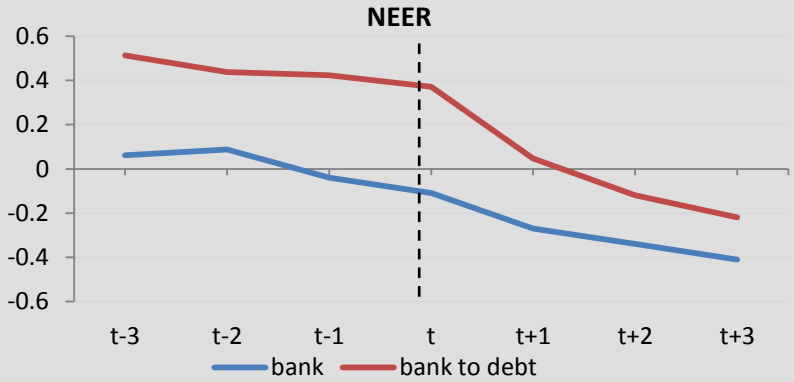
- Stronger fiscal stimulus in BD comes mainly from huge raise in expenditures
- The government in BD seems to sustain I while reducing C (missing expenditure might relate to bank bailout). In B public C increases

B vs TWIN BD CRISES: MONETARY POLICY



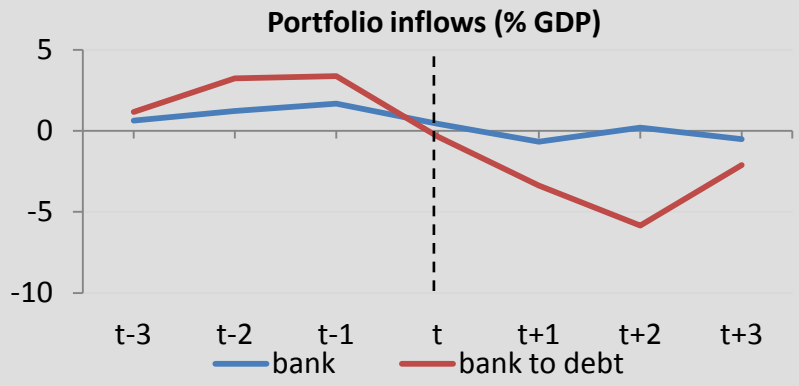


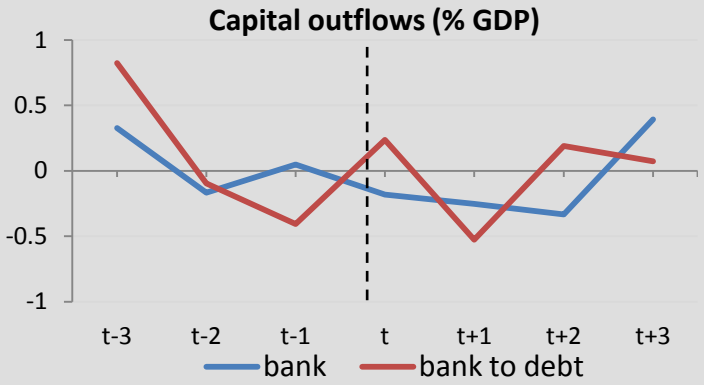


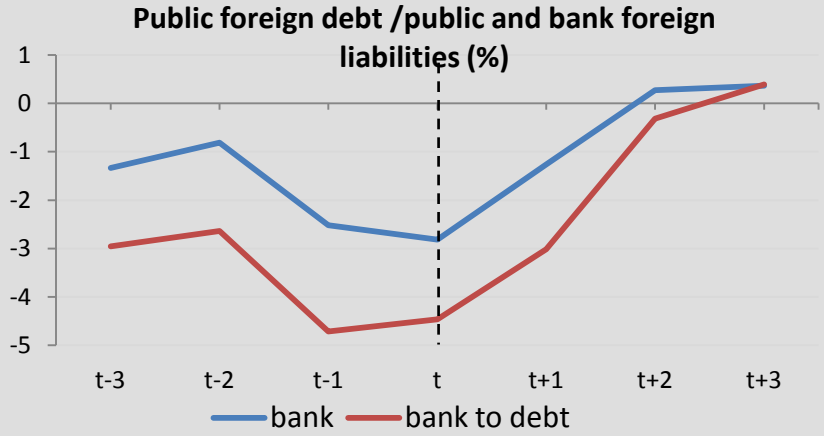


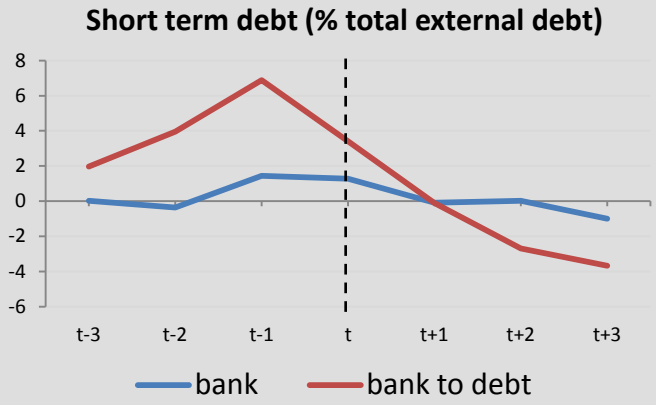
- Large, early liquidity support in B vs. last-minute support in BD
- M1 stable in both episodes. Discount rates jump up in BD (but fall in B)
- Nominal exchange rate declines in both B and BD

B vs TWIN BD CRISES: EXTERNAL SECTOR









- Large build up of short term debt ahead of BD crises
- Public sector absorbs an increasing portion of foreign liabilities (faster in BD)
- Capital inflows react significantly during BD but not in B (outflows stable in both)

BANK vs TWIN BANK-DEBT CRISES: SUMMING UP

- Large inter-connection between the banking and public sectors in both B and BD, although of different nature and dynamics.
- In DB events, the banking sector only starts to de-lever as the sovereign enters into troubles
- Economy recovers relatively quickly after B Instead, banking crises in BD are followed by sharp negative dynamics of growth, inflation, debt and deficits, and foreign capital inflows.
- Boom-bust pattern stronger in BD episodes
- FP response more accommodative in BD episodes
- MP response more accommodative in B episodes

STRUCTURE OF THE PRESENTATION

I. **Motivation and our contribution**

I. **Banking and sovereign distress: transmission channels**

II. **Data & preliminary statistics**

III. **"Independent" and "twin" crises: Event analysis**

Bank to Debt crises (BD) vs. Bank crises (B)

Debt to Bank crises (DB) vs. Debt crises (D)

IV. **Conclusions and way forward**

CONCLUSIONS

- **Distinguishing the timing within twin crises matters**
- **Systematic differences between independent and twin crises across many dimensions:**
  - **High and growing interconnection between the banking sector and the sovereign during twin episodes**
  - **Economic contraction more severe during twin episodes**
  - **Marked differences in fiscal and monetary policy instances**
  - **External financing dries out ahead of twin events**
  - **Boom-bust cycle in the banking sector accompany twin events**
- **Previous literature may have assigned to "simple" crises effects that mostly arise during combined episodes**

WAY FORWARD

- **Event studies very useful in uncovering important stylized facts – particularly nonlinear relationships – but no causal implications.**

- **Necessary next step is to examine formally:**
  - **which variables are significant predictors of twin crises**
  - **Which factors drive the transmission of distress**
  - **which are the "true costs" of bank and debt crises**

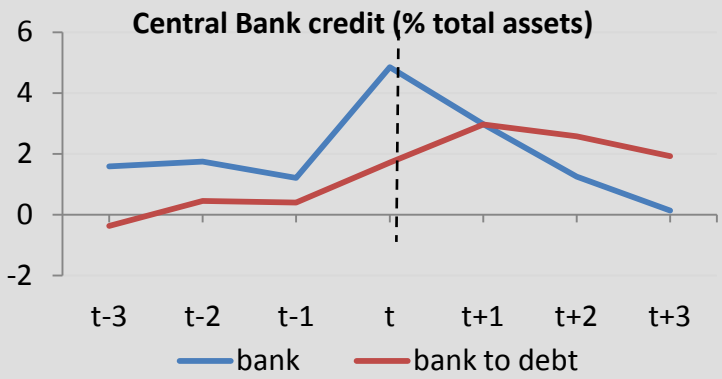
MUCHAS GRACIAS POR VUESTRA ATENCION

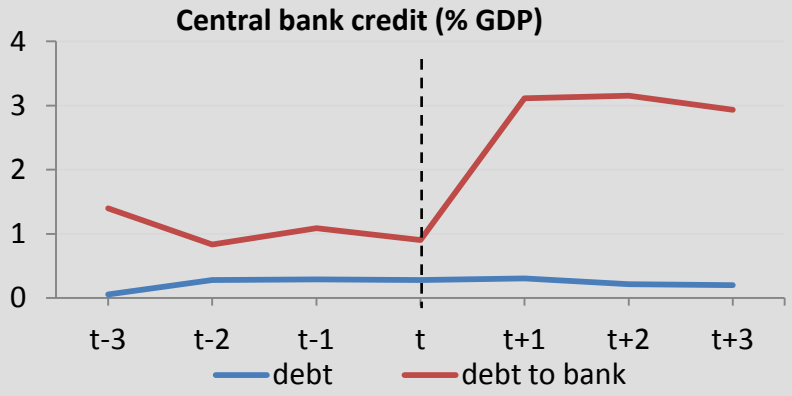
Aitor Erce

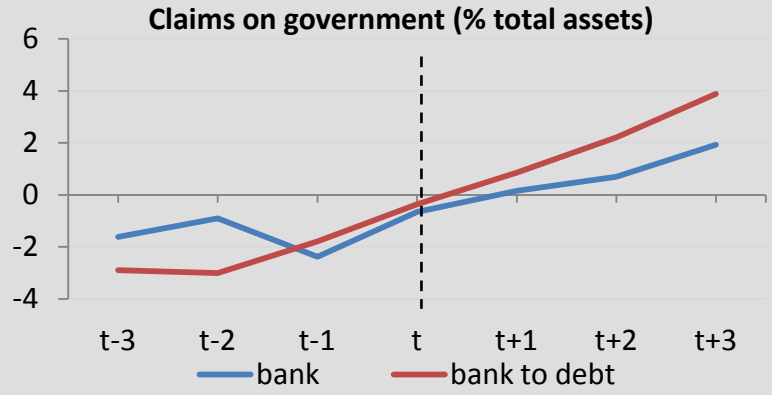
BANCO DE ESPAÑA
Eurosistema

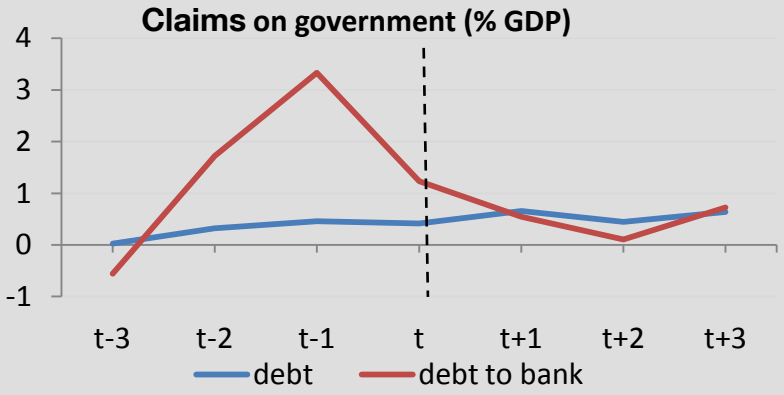
A-DG INTERNATIONAL AFFAIRS

BALANCE SHEET INTERCONECTION

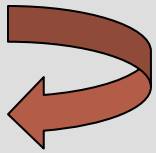






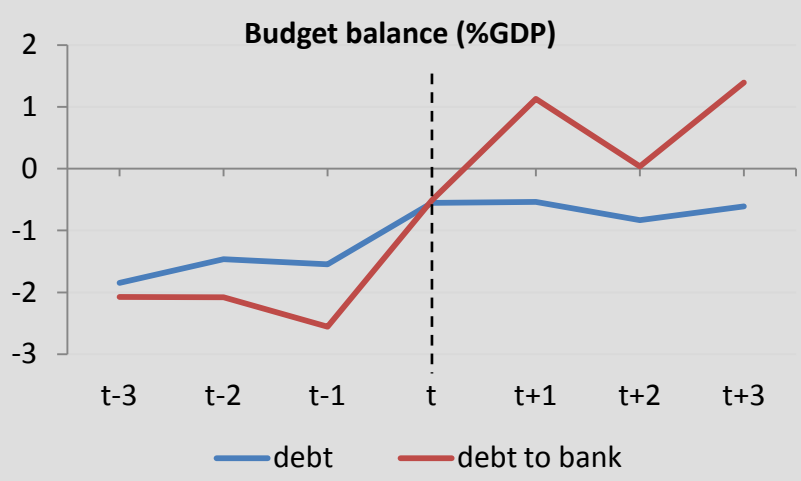


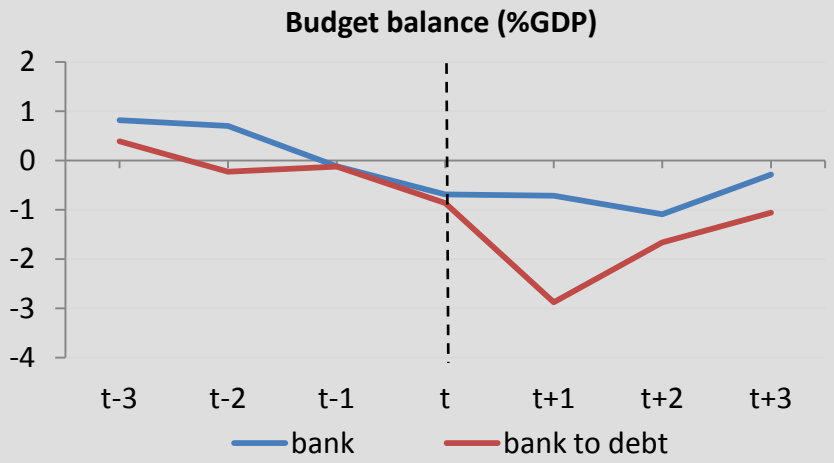
- **DMBs increasingly important source of sovereign funding**
- **CBs increasingly important source of funding for DMBs**



TIMING MATTERS

- A variety of papers have studied the combination of crises
  - De Paoli et (2008) or Gourinchas and Obstfeld (2011)
- Our results show that for some variables the behavior differs greatly depending on the timing of the events…
  - For example, see the budget balance…

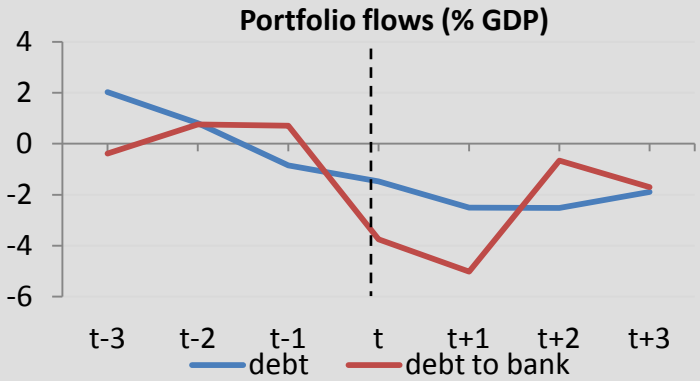


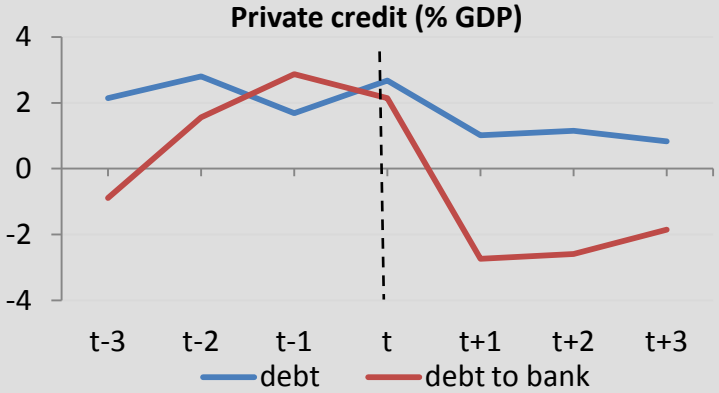


- Jointly analyzing DB and BD events would lead to insignificant results

ON THE ECONOMIC EFFECTS OF CRISES

- Literature has studied impact of sovereign or banking crises on economic variables. Our results show that:
  - some effects assigned to "simple" crises mainly arise during twins
  - Sandleris (2010), Gennaioli et al. (2010), Das et al. (2010)…Sovereign defaults restrict both external and internal credit





- Similar results for the impact of banking crises on economic activity or external financing (See Dell'Ariccia et al, 2004)
- Our results could indicate the channels through which these effects play out

MOTIVATION: Twins in advanced economies

The current crisis provides numerous examples of the TWO-WAY relationship between banking and sovereign distress:

- **Portugal/Greece/Italy have financial systems under huge stress, mostly due to their poor economic performance and public sector weaknesses.**

- **Ireland/Iceland/Spain have fiscal authorities overburdened by the "rescue" of their financial systems and the support of the economy**

BACK

MOTIVATION: Twins in emerging economies

The combination of fiscal and financial distress is nothing new. Emerging markets have been plagued by this phenomenon.

- **Dominican Republic (2003) and Ecuador (1999) saw their governments defaulting after mishandling espisodes of systemic banking crises.**

- **Russia (1999) and Argentina (2001-2002) suffered systemic banking crises immediately after their governments defaulted on their debts.**

BACK

Literature review. What has been said?

- ***Reinhart and Rogoff (2011):*** banking crises are significant predictors of sovereign defaults, but not the other way around.

- ***Borenzstein and Panizza (2008):*** P(banking crisis/default) > P(banking crisis), but not the other way around.

- ***Gennaioli et al (2010):*** government defaults are followed by large declines in private credit, and these contractions are larger in countries where banks hold more public debt (and financial institutions are stronger).

- ***De Paoli et al. (2009):*** two thirds of sovereign defaults overlap with banking crises, and almost half with both banking and currency crises.

- **Erce and Diaz-Cassou (2010):** Event analysis shows that: (i) gambling for redemption may spillover fiscal problems to the financial sector, and (ii) mishandling of banking crises may lead to fiscal sustainability issues

- ***Acharya et el. (2011):*** Two-way relation in the context of the Euro crisis. Bailout funds prop up banks but can lead to lower growth if tax-financed.

BACK

Twin crises: Debt to bank			
Country	**Debt crisis**	**Bank crisis**	**Source**
Albania	1991	1994	S&P and L&V
Argentina	1989	1989	S&P and L&V
Argentina	2001	2001	S&P and L&V
Bolivia	1986	1986	S&P and L&V
Brazil	1990	1990	S&P and L&V
Costa Rica	1981	1987	S&P and L&V
Cameroon	1985	1987	S&P and L&V
Ghana	1979	1982	S&P and L&V
Guinea*	1991	1993	S&P and L&V
Jordan	1989	1989	S&P and L&V
Macedonia	1992	1993	S&P and L&V
Niger*	1983	1983	S&P and L&V
Panama	1987	1988	S&P and L&V
Peru	1976	1983	S&P and L&V
Tanzania*	1984	1987	S&P and L&V
Turkey	1982	1982	S&P and L&V
Togo*	1988	1993	S&P and L&V
Russian Federation	1998	1998	S&P and L&V
Ukraine	1998	1998	S&P and L&V

Source: Laeven and Valencia (2008), S&P(2009)

* Lowest income country (according to World Bank)

BACK

Twin crises: Bank to debt

Country	Bank crisis year	Debt crisis year	Source
Algeria	1990	1991	S&P and L&V
Argentina	1980	1982	S&P and L&V
Chile	1981	1983	S&P and L&V
Dominican Republic	2003	2005	S&P and L&V
Ecuador	1982	1982	S&P and L&V
Ecuador	1998	1999	S&P and L&V
Guinea	1985	1986	S&P and L&V
Indonesia	1997	1998	S&P and L&V
Kenya*	1992	1994	S&P and L&V
Mexico	1981	1982	S&P and L&V
Morocco	1980	1983	S&P and L&V
Philippines	1983	1983	S&P and L&V
Nigeria	1991	1992	S&P and L&V
Senegal	1988	1990	S&P and L&V
Uruguay	1981	1983	S&P and L&V
Uruguay	2002	2003	S&P and L&V
Venezuela, R.B.	1994	1995	S&P and L&V

Source: Laeven and Valencia (2008), S&P (2009)

*Lowest income country (according to World Bank)

BACK