Stories of the Twentieth Century for the Twenty-First

Pierre-Olivier Gourinchas and Maurice Obstfeld

UC Berkeley, NBER & CEPR

Financial Crises: Post-floating vs. Post-millennium

Before 2007, financial crises seemed mainly to afflict developing countries. Not really true:

- "Big Five" systemic banking crises.(Finland, Japan, Norway, Spain, Sweden)
- ERM currency crisis (1992-93)
- 1982 LDC debt crisis was a "near miss" for money-center banks.
- LTCM crisis was a near miss too.

But effects generally less devastating than in developing world. Until 2007....

Crisis Frequency in Advanced Countries vs. EMEs (through 2006) – Why the Difference?

	Currency	Banking	Default	# countries
Advanced	43	5	0	22
Emerging	84	57	74	57
Total	127	62	74	79

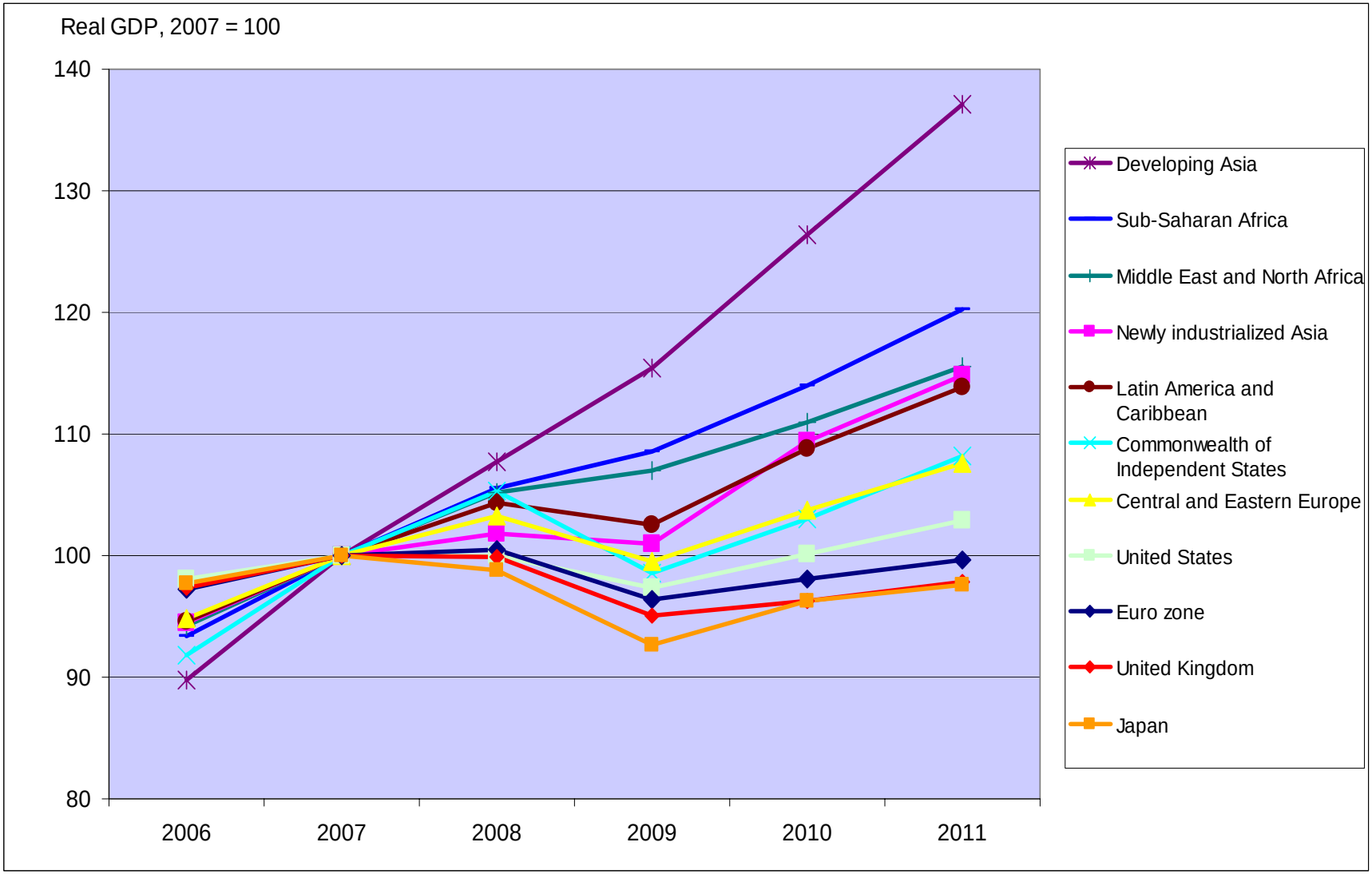
Structural Vulnerabilities of EMEs

- Political/economic instability (Acemoglu & al (2005), Kaminsky & al (2005), Rajan & Tokatlidis (2005))
- Undeveloped/unstable financial markets (Stulz (2005), Demirgüc-Kunt & Detragiache (2000), Honohan & Klingebiel (2003))
- Dollarization/original sin/currency mismatch (Eichengreen & al (2003), Nicolo & al (2005))
- Fear of floating (Calvo & Reinhart (2002), Hausman & al (2001))
- Sudden stops/debt intolerance (Calvo & Reinhart (2000), Forbes & Warnock (2011), Reinhart & al (2003))
- Other nonfinancial rigidities

The 2007-2009 Crisis: Several Surprises

- Came after a long period of seeming calm, in EMEs too.
- Originated in advanced financial markets, then spread.
- On average, EMEs were less affected, had faster recoveries.
- As a result of the crisis, some advanced countries now face government default fears.
- Unprecedented since interwar period (which also featured global imbalances, fixed exchange rates, unstable finance).

The Comparative Resilience of EMEs



Source: WEO April 2011 database; 2011 numbers are (ex post, overoptimistic) IMF projections.

Our Focus: Is This Time Different?

No and yes!

- 20th-century financial crises show build-up and response patterns that are quantitatively similar across advanced and EMEs.
- A main factor: increases in foreign and especially domestic leverage.
- For advanced economies, prologue to recent 21st-century crisis no different from the past.

Performance of EMEs

- EMEs (except perhaps emerging Europe) avoided credit booms.
- Entered crisis with stronger fundamentals–perhaps aided by earlier global boom:
  - High commodity prices.
  - Low real interest rates.
  - External surpluses; reserves.
  - Institutional and policy reforms.
  - Greater intra-EME trade; engine of China.
- "Undeveloped financial markets" may have been a blessing in this context.

Ireland

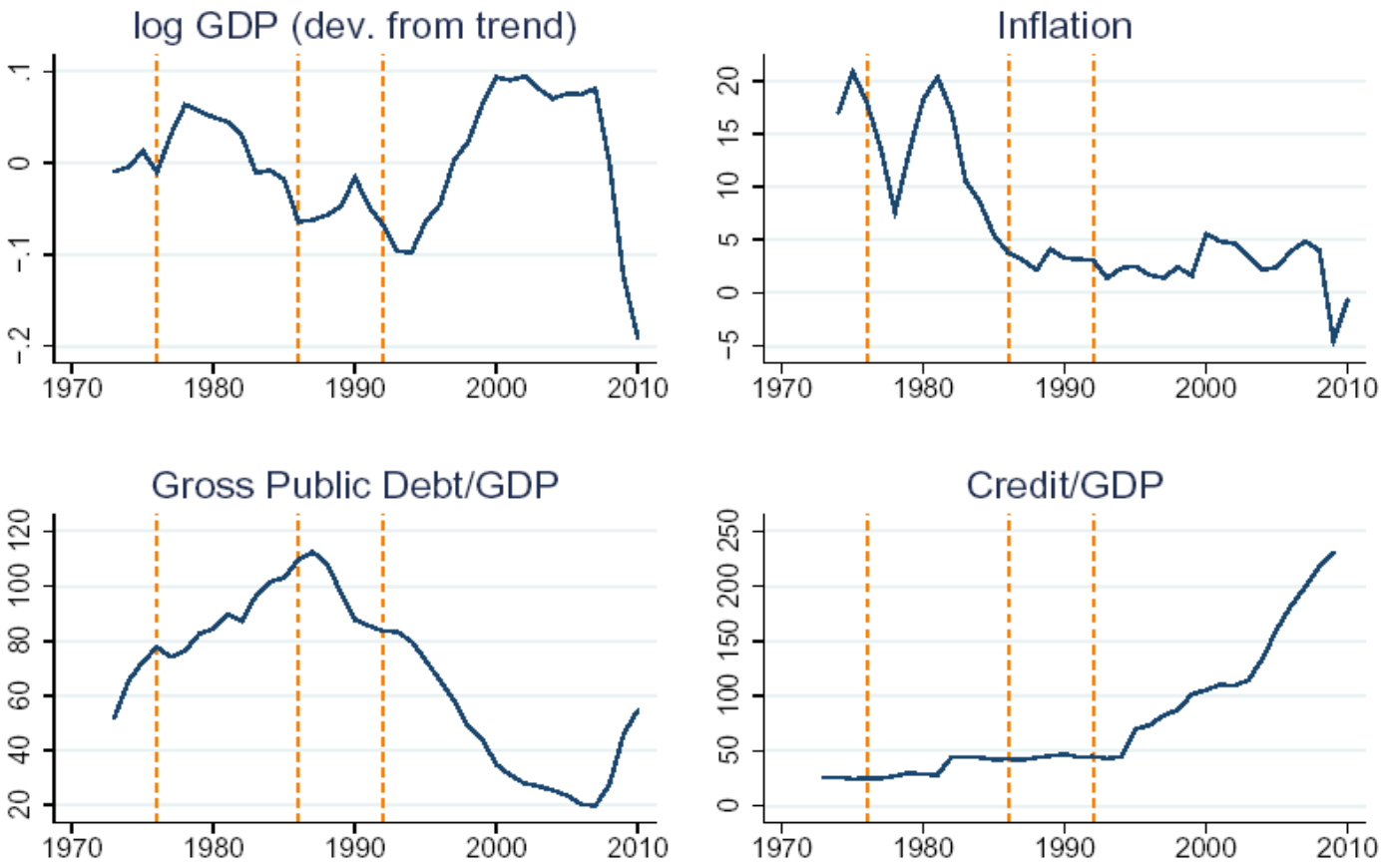


Figure: Macroeconomics Indicators

lines indicate different crisis: currency (- -), defaults (– –), banking (—),

Credit-boom Theme is a Familiar One

- Minsky, Kindleberger, Diaz-Alejandro, McKinnon
- Unheeded warnings in early 2000s from BIS (Borio and Lowe 2002, Borio and White 2004)
- More recent contributions (Schularick and Taylor 2009, Hume and Sentance 2009)
- A related literature empirically ties the depths of individual countries' recent slowdowns to economic preconditions …

Key Factors in this Literature

A few variables seem to stand out:

- Growth in credit.
- Short-term foreign debt.
- Current account surplus.
- Prior housing boom.
- Strenth of financial regulation.

Rose-Spiegel critique; diversity of experience; collinearity.

Our Empirical Approach

- In the spirit of ealier event-studies (Eichengreen et al 1995, Kaminsky & Reinhart 1999)
- Estimate conditional expectation of various macro & financial variables as a function of temporal distance from different types of crisis (treatment):
  - defaults (external and domestic) (Reinhart & Rogoff 2009)
  - systemic banking crisis (Laeven & Valencia 2010)
  - currency crisis (Frankel & Rose 1996, Bordo et al 2001)
  - 2008 global financial crisis
- Ask two main questions:
  - Is the 2007-09 crisis different from previous ones?
  - Are EME crises different from advanced economy crises?

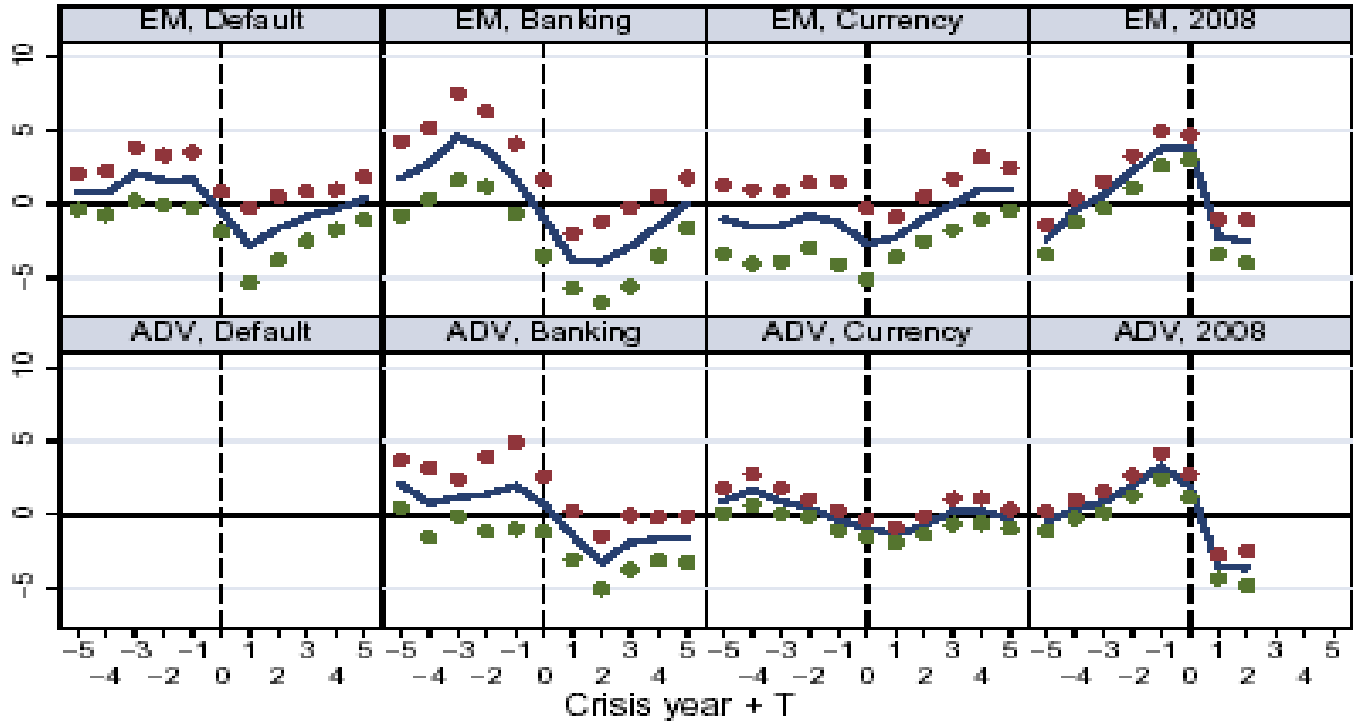
Our Empirical Approach

- Estimate panel fixed-effect model:

$$y_{it} = \alpha_i + \beta_{ds}\delta_{ds} + \beta_{bs}\delta_{bs} + \beta_{cs}\delta_{cs} + \beta_{gs}\delta_{gs} + \epsilon_{it}$$

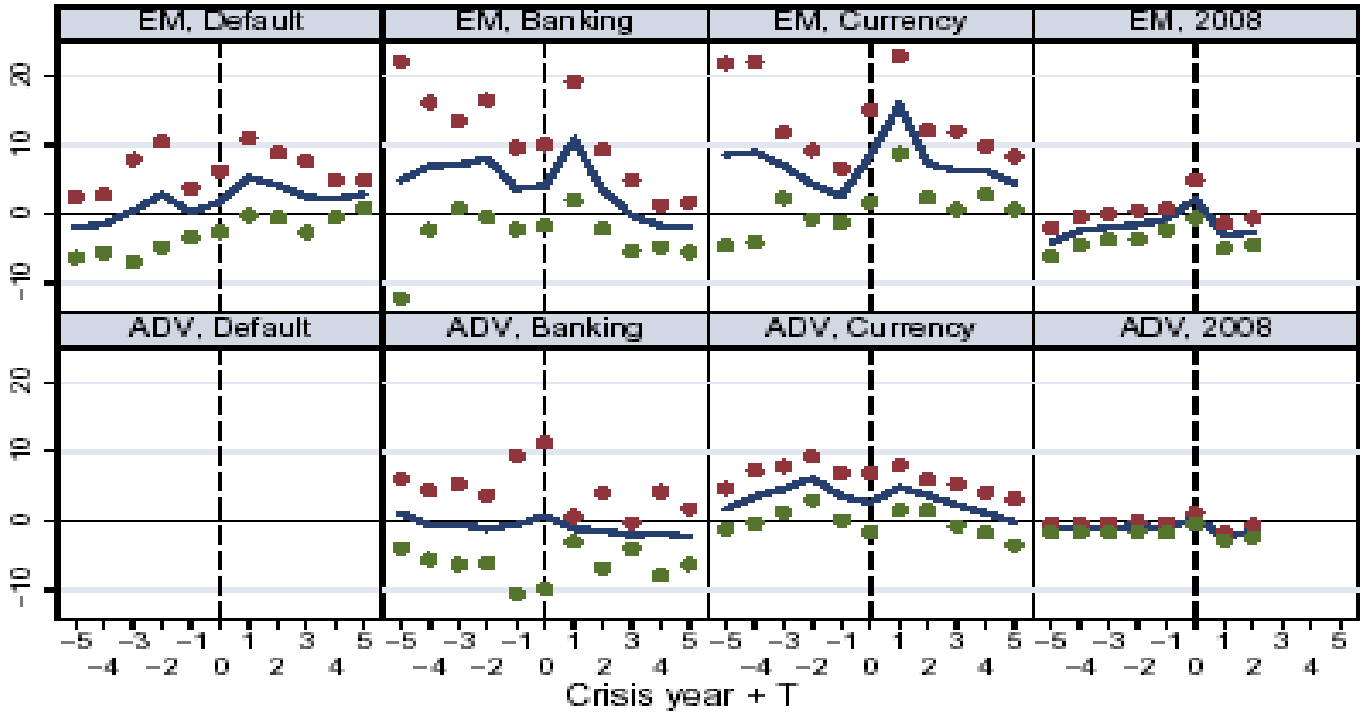
- $\delta_{js} = 1$ when country i is s periods away from crisis of type j
- Event window: 11 years, allowing for slow adjustment after financial crisis.
- Observe:
  - All treatments β_{js} relative to a common tranquil time baseline.
  - Additive approach handles simply multiple or repeat crises.
  - Estimate separately for advanced economies and EMEs, to allow for different dynamics.

Output Performance



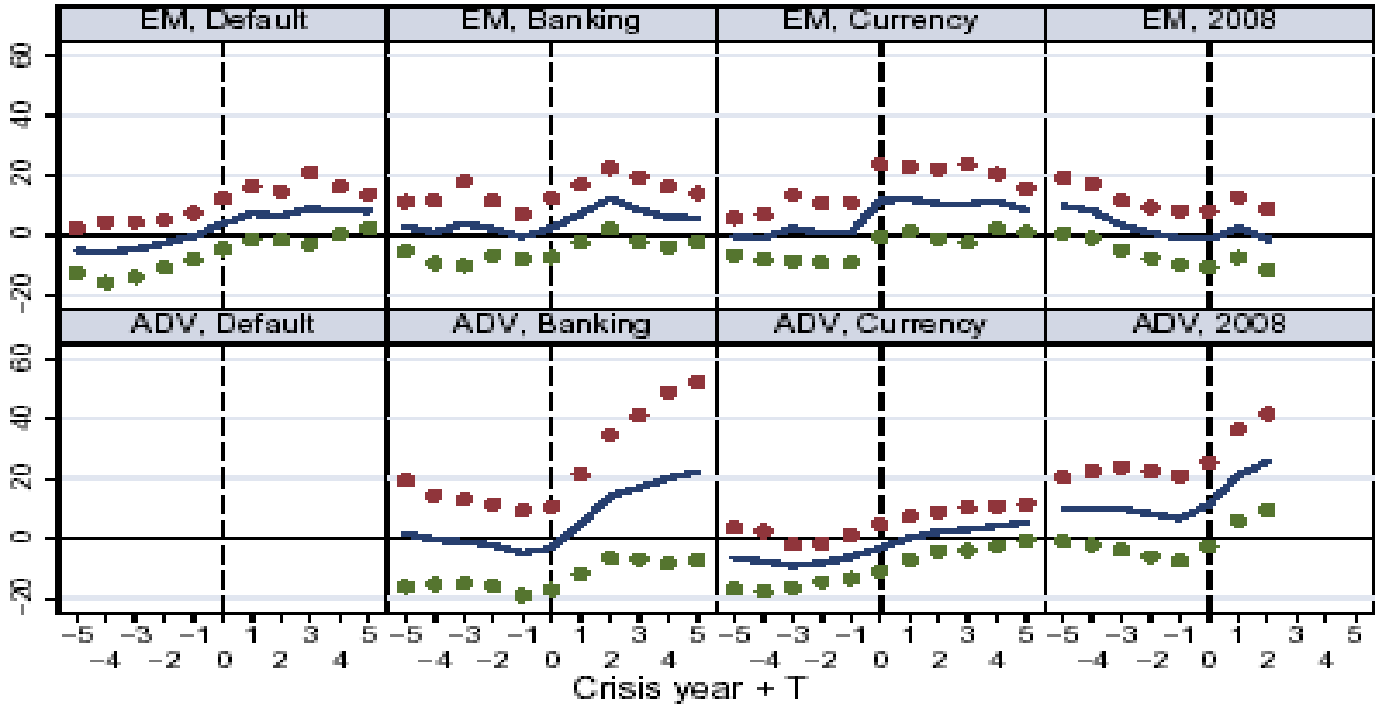
- elevated activity before banking and default crises, depressed before currency crises (EME)
- slower recovery from banking crises in advanced countries

Inflation



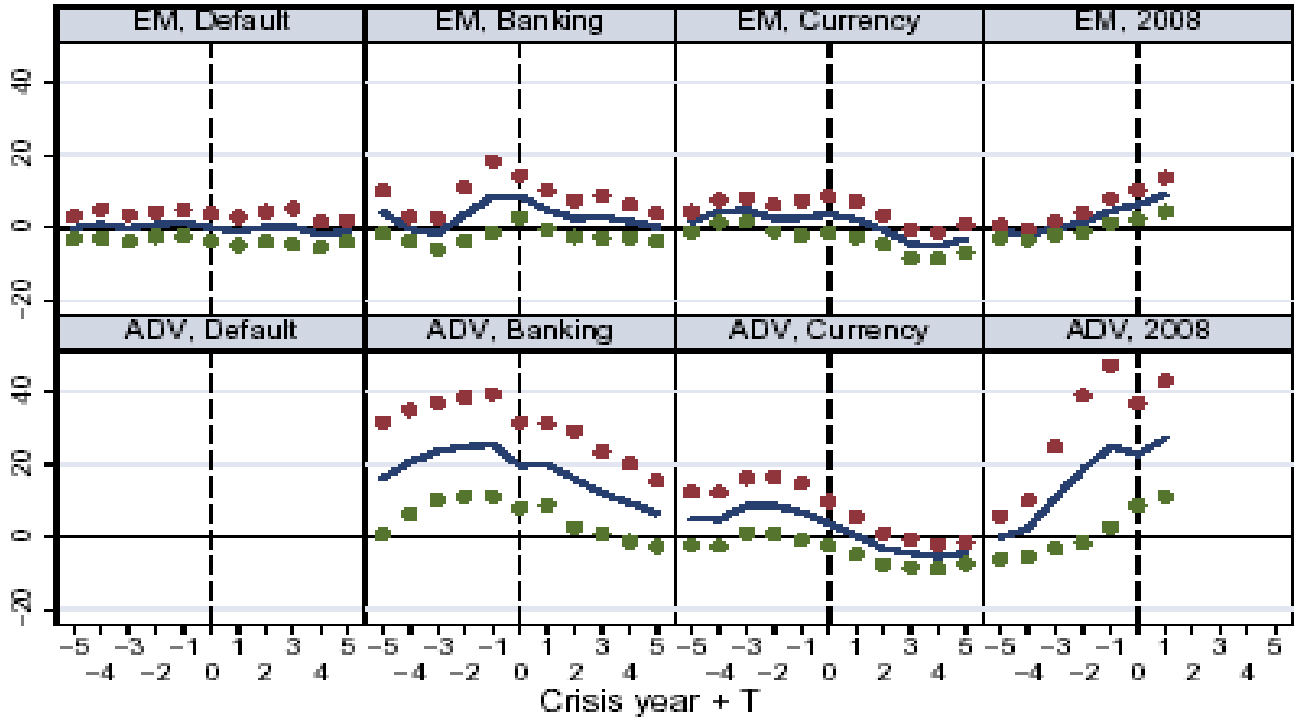
- median regression (to deal with high and hyper inflation)
- elevated for all earlier EME crises, but dramatically lower now (although rising again)

Public Debt



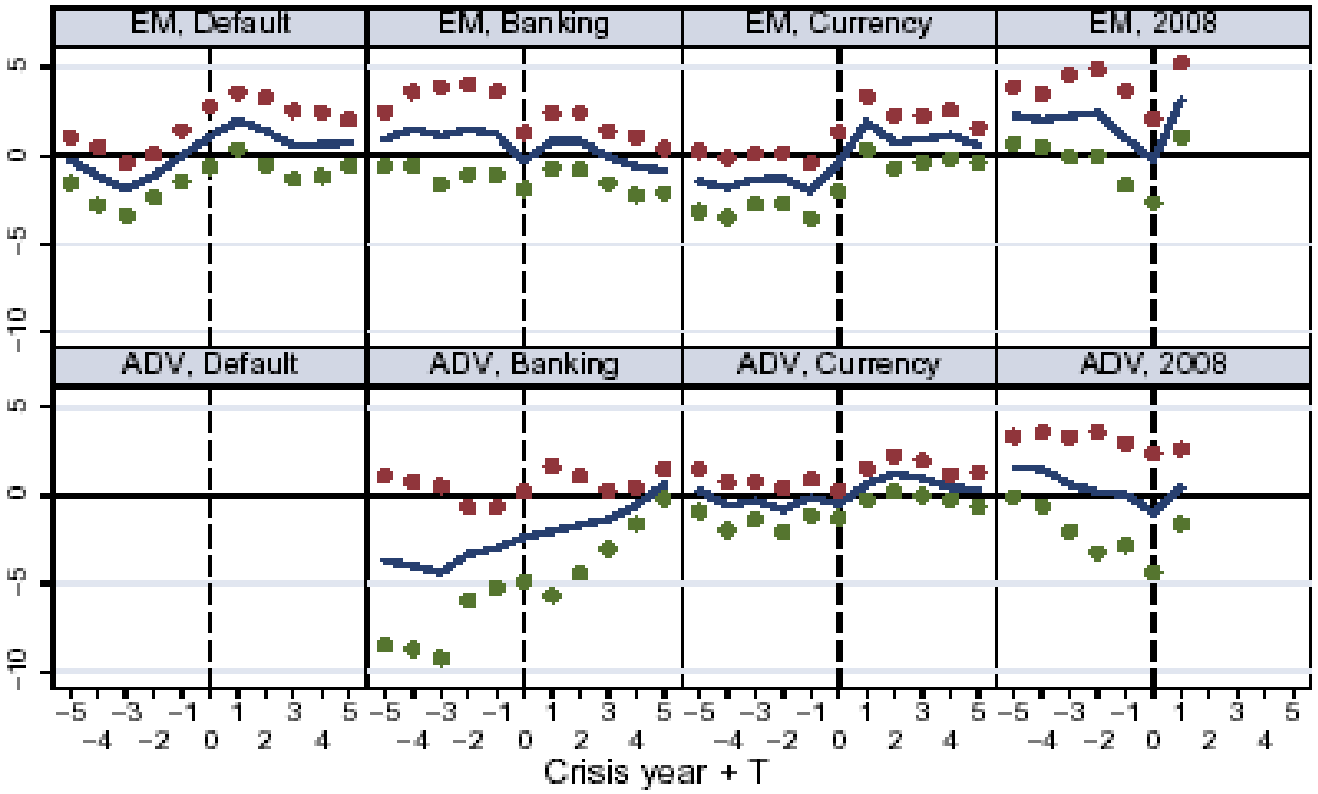
- fiscal position worsens after all crises, especially for advanced economy banking crises
- many channels: bailout costs, automatic stabilizers and (for EMEs) foreign currency denominated debt
- significant fiscal consolidation in EMEs before the 2008 crisis. The opposite appears to be true for advanced economies.

Domestic Leverage



- past banking crises preceded by credit booms (25% of GDP for advanced)
- global crisis also preceded by large credit boom for advanced countries (22%), but increase in EMEs almost entirely in Eastern European countries (related to the process of European integration?)

Current Account



- CA deficits prior to currency crises consistent with higher inflation, loss of external competitiveness and depressed output

Real Exchange Rate

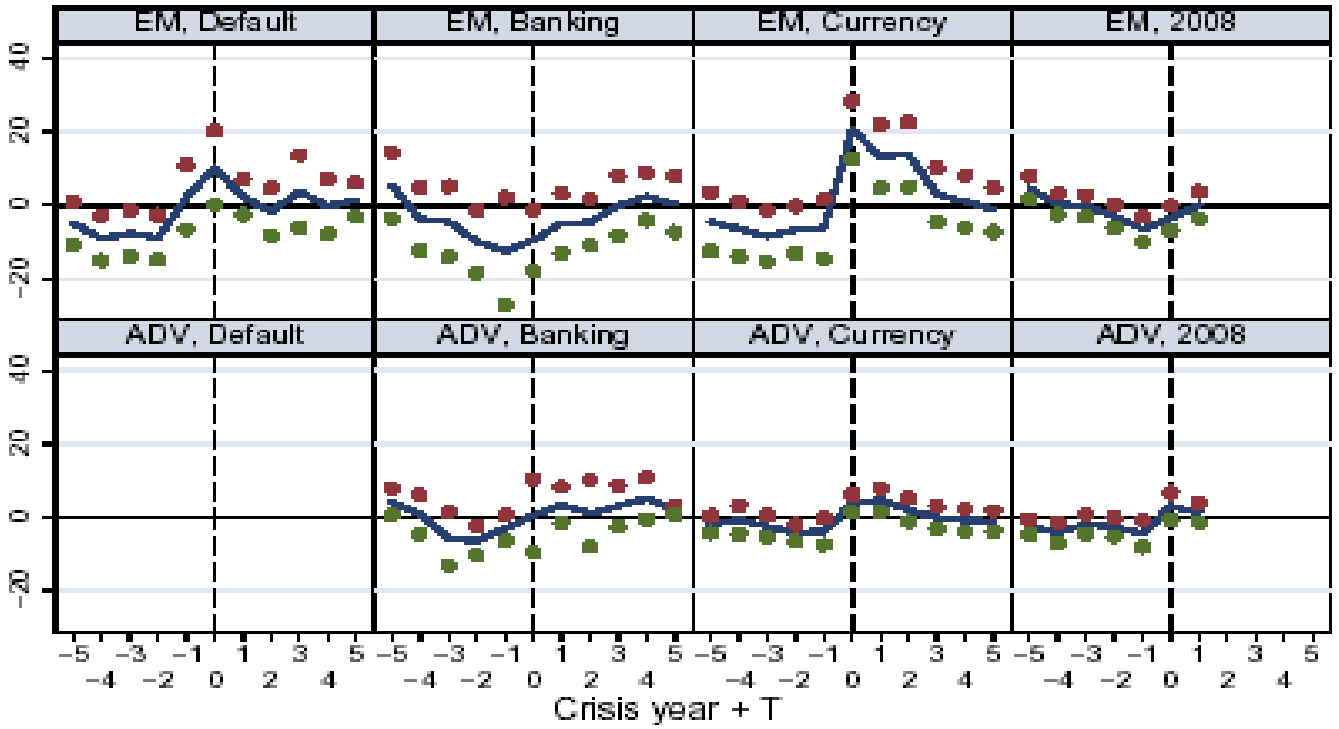


Figure: Real Exchange Rate (% log deviation from trend percent)

- Against a 'canonical' central currency
- EME currency crisis associated with large depreciations of the RER.

Foreign Exchange Reserves

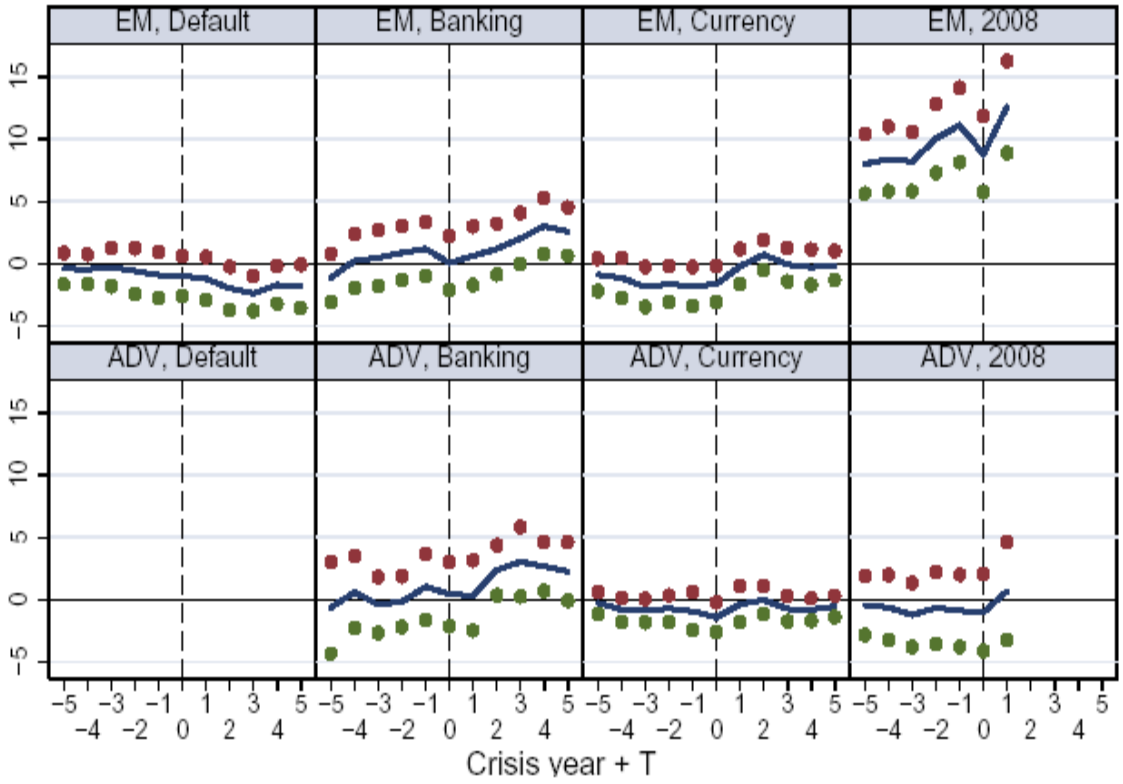


Figure: Foreign Reserves (percent of GDP)

- Striking difference between 2008 and earlier crisis.

Short-Term External Debt

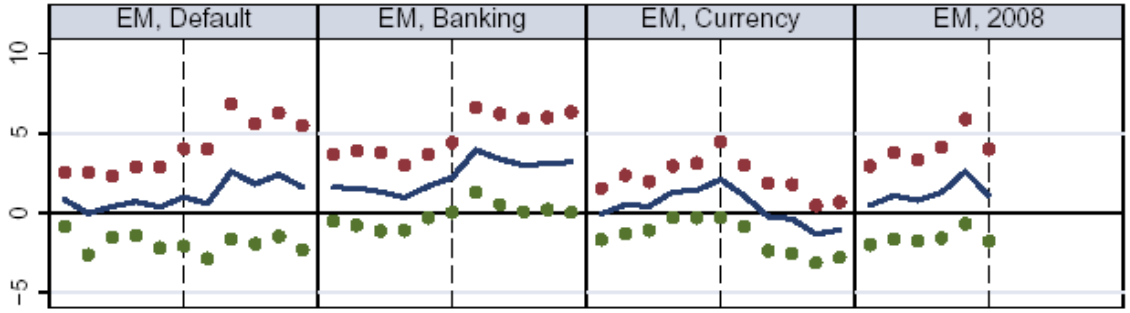
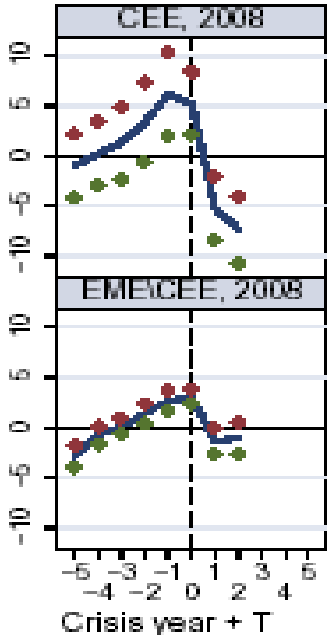


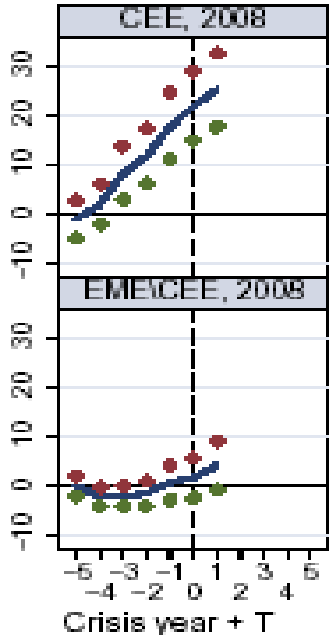
Figure: Short-Term External Debt(percent of GDP)

- Only for EMEs (World Bank data)
- Increase in ST debt after banking crisis and defaults.
- Why? Valuation effects, improvements in fundamentals or shortening of maturities

Central European Economies vs Other Emerging - I



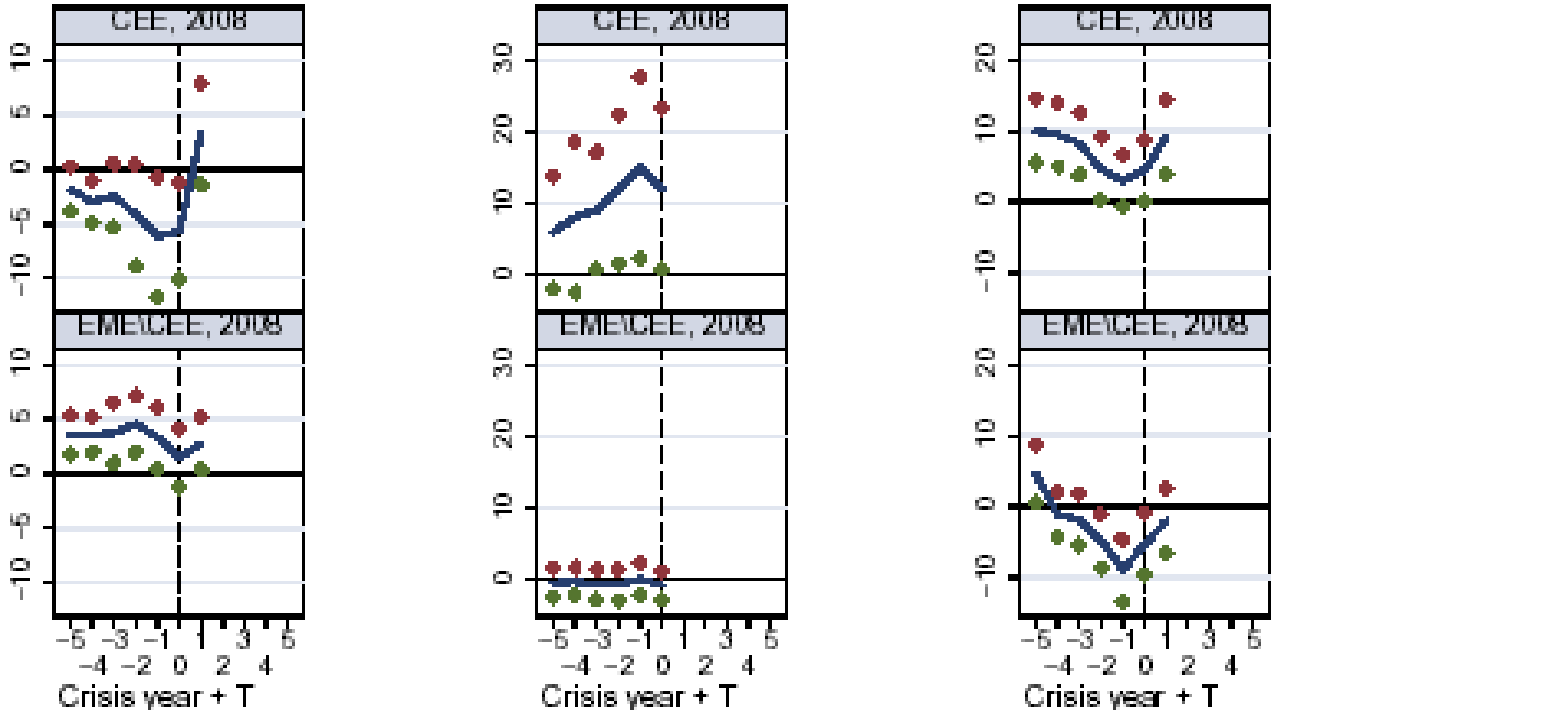
(a) Output Gap



(b) Domestic Credit

(a): % dev. from trend; (b): % of GDP

Central European Economies vs Other Emerging - II



(a) Current Account (b) Short-Term Debt (c) Real Exchange Rate

Figure: CEE vs other Emerging Market Economies

(a) and (b): % of GDP; (c): % dev. from trend

Which Variables Help in Prediction?

- Samuelson's stock market predicted 10 of the last 5 recessions.
- How sure can we be that, for example, a domestic credit boom will be followed by a crisis of some sort?
- To answer, we estimate panel logit regressions giving the probability of a subsequent crisis, over a 1-3 year horizon, as a function of trend deviations in fundamentals. (Sample is 1973 to 2010 – so includes recent crisis.)
- Key variables are *domestic credit*, *real exchange rate* (not for AE banking crises), *reserves*. (But higher reserves may lower crisis probability *or* be caused by same.)
- Large effects of credit and real appreciation on probabilities.

Performance of EMEs and Advanced Economies

EMEs improved performance along some key dimensions of prior vulnerabilities

- price stability
- sound fiscal position
- avoidance of credit-fueled boom (except Eastern Europe)
- reduced dependence on external debt financing
- balance sheet consolidation happened despite low world real interest rates

By contrast, advanced economies experienced

- deteriorating fiscal position
- increased internal and external leverage

Unlike the 1930s, when the decoupling of Latin American countries was at the expense of macroeconomic orthodoxy, the current resilience reflects beneficial institutional and economic reforms. Role of financial development?

Will recent capital inflows undermine EME financial stability?

Global Liquidity and the Reform of the International Monetary System

Pierre-Olivier Gourinchas
UC Berkeley, SciencesPo & IGC

IGC Growth Week, September 2011

[based on work with R. Caballero, E. Farhi, H. Rey, N. Govillot, K. Truempler, but mostly on "Reforming the International Monetary System," CEPR e-report with E. Farhi and H. Rey]

The International Monetary System

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- A non-system that emerges from the ashes of the Bretton Woods system of fixed but adjustable rates, with:
  - Current account convertibility,
  - Increasing but incomplete financial account convertibility,
  - A focus on internal objectives in advanced economies, with floating exchange rates,
  - A 'fear-of-floating' in emerging market and developing economies.

A Currency at the Center: the US Dollar

- Dominant currency for all three currency functions: medium of exchange, unit of account and store of value.

The Dollar and the Euro in International Exchanges

	US dollar		Euro	
	1999	2009	1999	2009
Stock of global foreign exchange reserves				
(countries reporting to the IMF)	71.0	62.1	17.9	27.6
Currency anchor, *de facto*				
(trade-weighted)	32.4	38.3	6.6	6.2
FX turnover*				
(out of 200%)	90.3	84.9	37.6	39.1
Stock of international debt securities				
(narrow measure**)	49.0	45.8	20.7	31.4
Stock of cross-border loans***				
(narrow measure**)	n.a.	53.8	11.8	20.3
Denomination of trade with non euro-area countries†				
Euro-area exports			45.4	56.9
Euro-area imports			44.4	46.7

Sources: Bracke and Bunda (2011), Dorrucci and McKay (2011), Goldberg and Tille (2009), BIS (2010), ECB (2009).
Notes: * April 2001 and April 2010 data. ** The narrow measure refers to issuance of international bonds and loans in foreign currency by non-residents of the country issuing the currency in which the issuance is denominated. *** At constant end-2009 exchange rates. † Unweighted average for eight countries, 2001 and 2007.

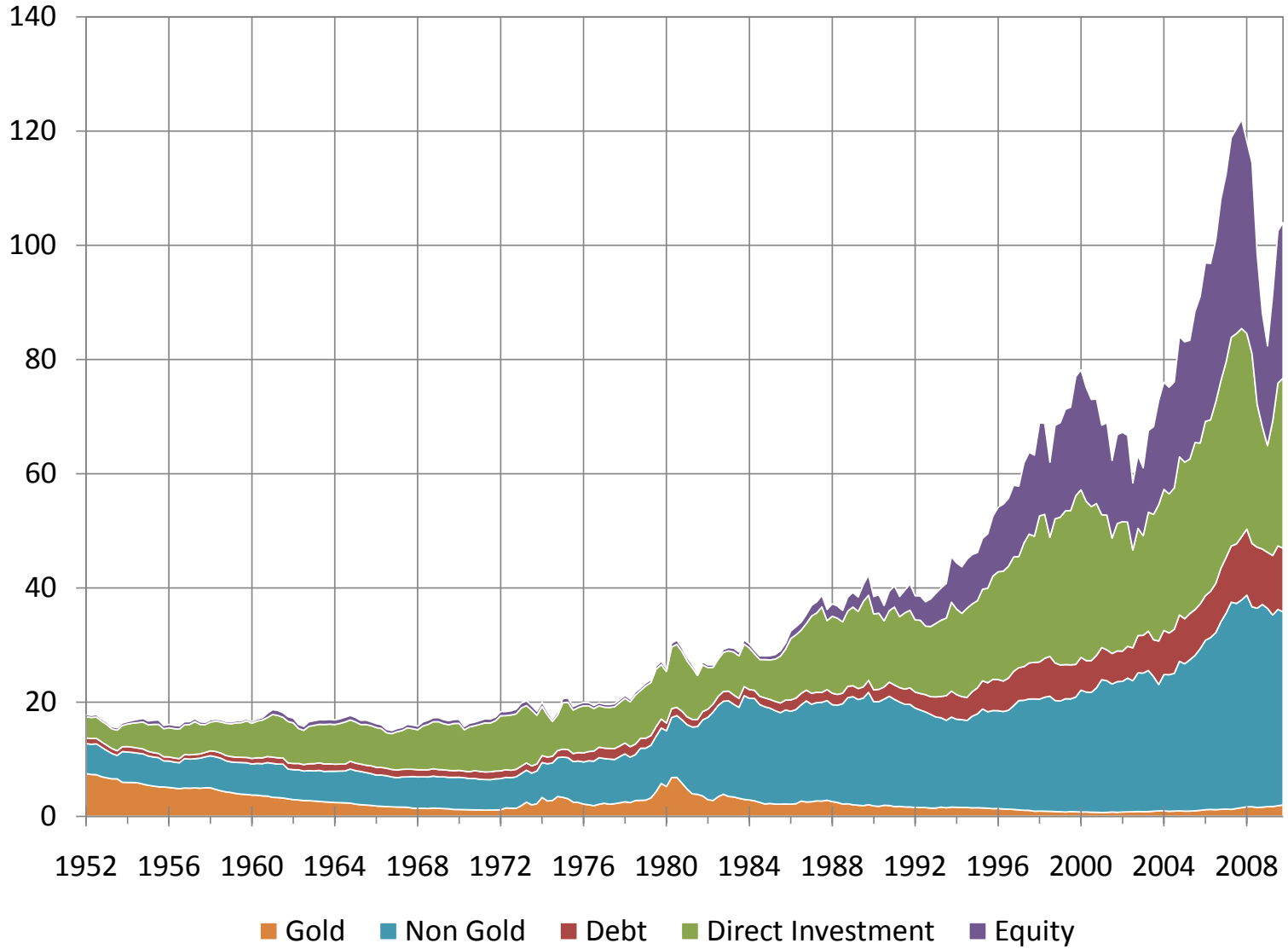
Source: Angeloni et al (2011)

A Currency at the Center: the US Dollar

- Dominant currency for all three currency functions: medium of exchange, unit of account and store of value.

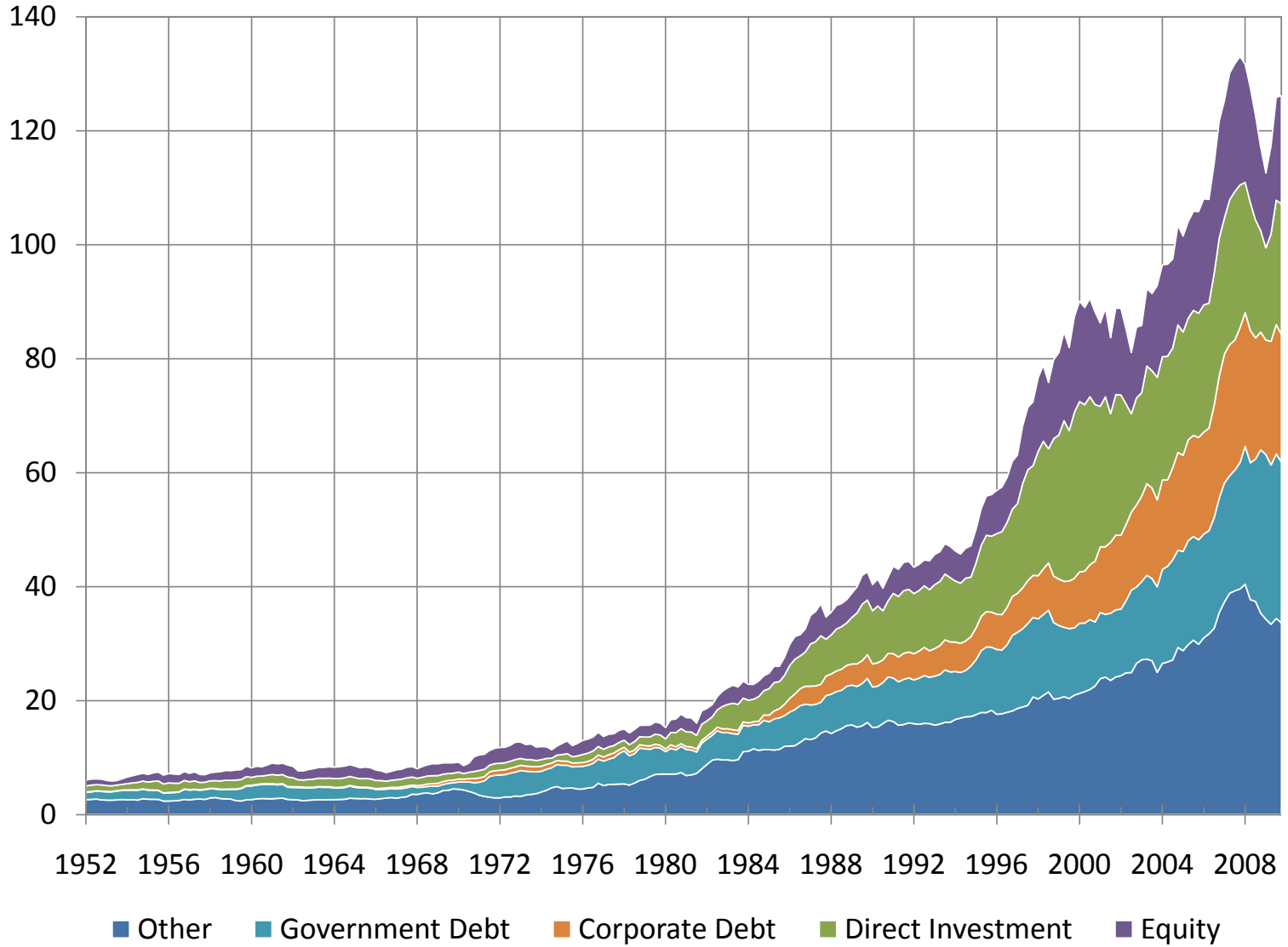
- Costs and Benefits of an International Currency
  - Seignorage (minimal)
  - Global liquidity provider: Issues reserve asset (asset which does not lose its value and whose value can be quickly realized).
  - Earns excess return (Exorbitant Privilege) (Gourinchas & Rey (2008))
    - issues low-risk assets (T-bills)
    - invests in high risk foreign assets (foreign equity and DI)

US Gross Asset Position (percent of output)



Source: Gourinchas, Rey & Govillot (2011)

US Gross Liabilities Position (percent of output)



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Asymmetric External Adjustment

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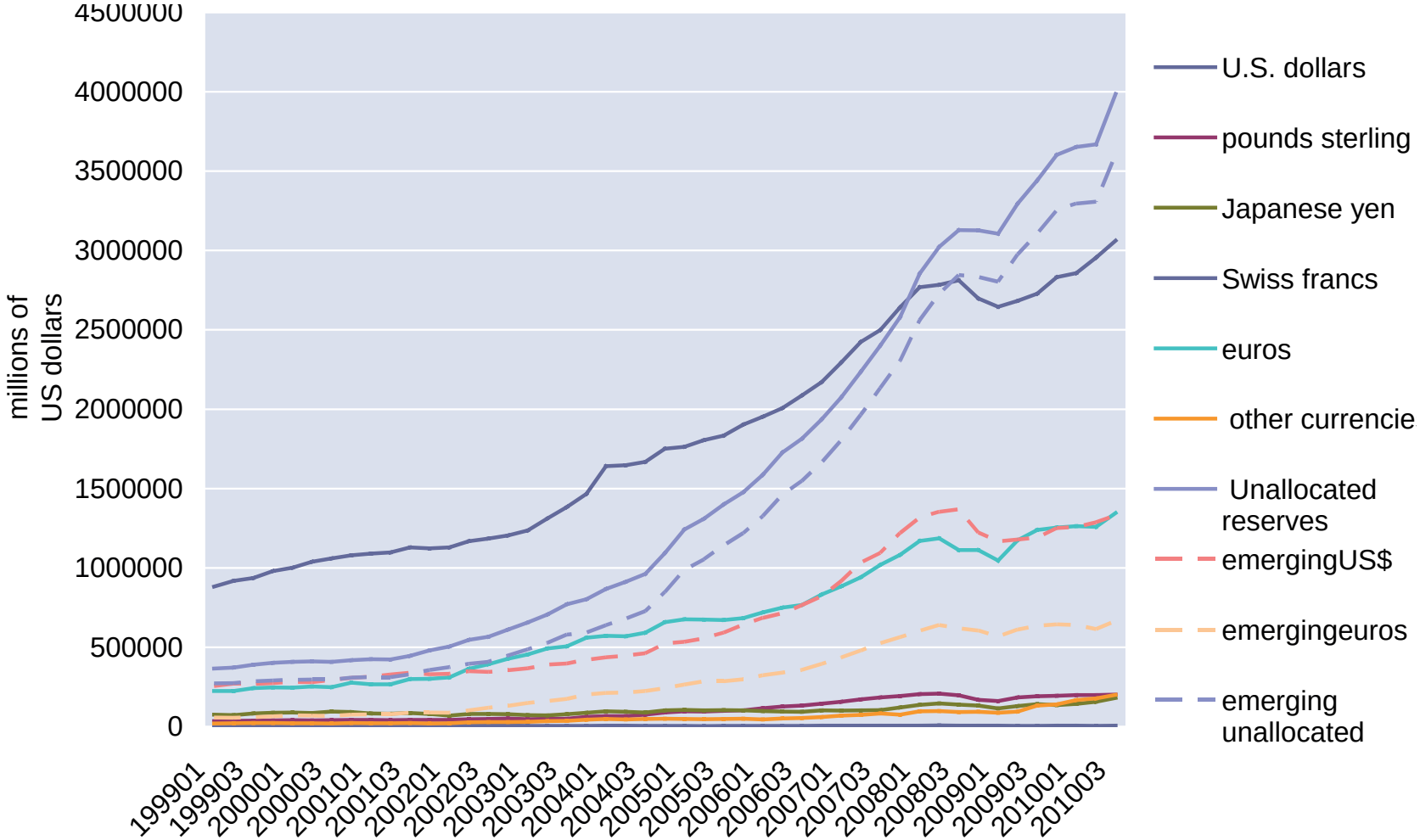
- Self-Insurance: many developing and emerging market economies try to self insure through the accumulation of international reserves to offset potentially damaging sudden stops. This precautionary demand correlates with:
  - levels of external short term debt (Greenspan-Guidotti rule)
  - trade openness (imports relative to output)
  - the financialization of the domestic economy (M2/output) [Obstfeld, Shambaugh and Taylor (2010) rule]

Breakdown of Global Reserves Outstanding by Currency



Source: Gourinchas, Farhi & Rey (2011)

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- Crucial issue for Emerging and Developing economies!

Is the IMS Efficient?

- Demand for safe assets:
  - Precautionary insurance is imperfect because non-contingent. Mobilizes resources that could be usefully employed, especially by EMEs and developing countries;
  - Depresses real interest rates (Aiyagari (1995)). Pecuniary externality.
  - Brings the world economy closer to a liquidity trap

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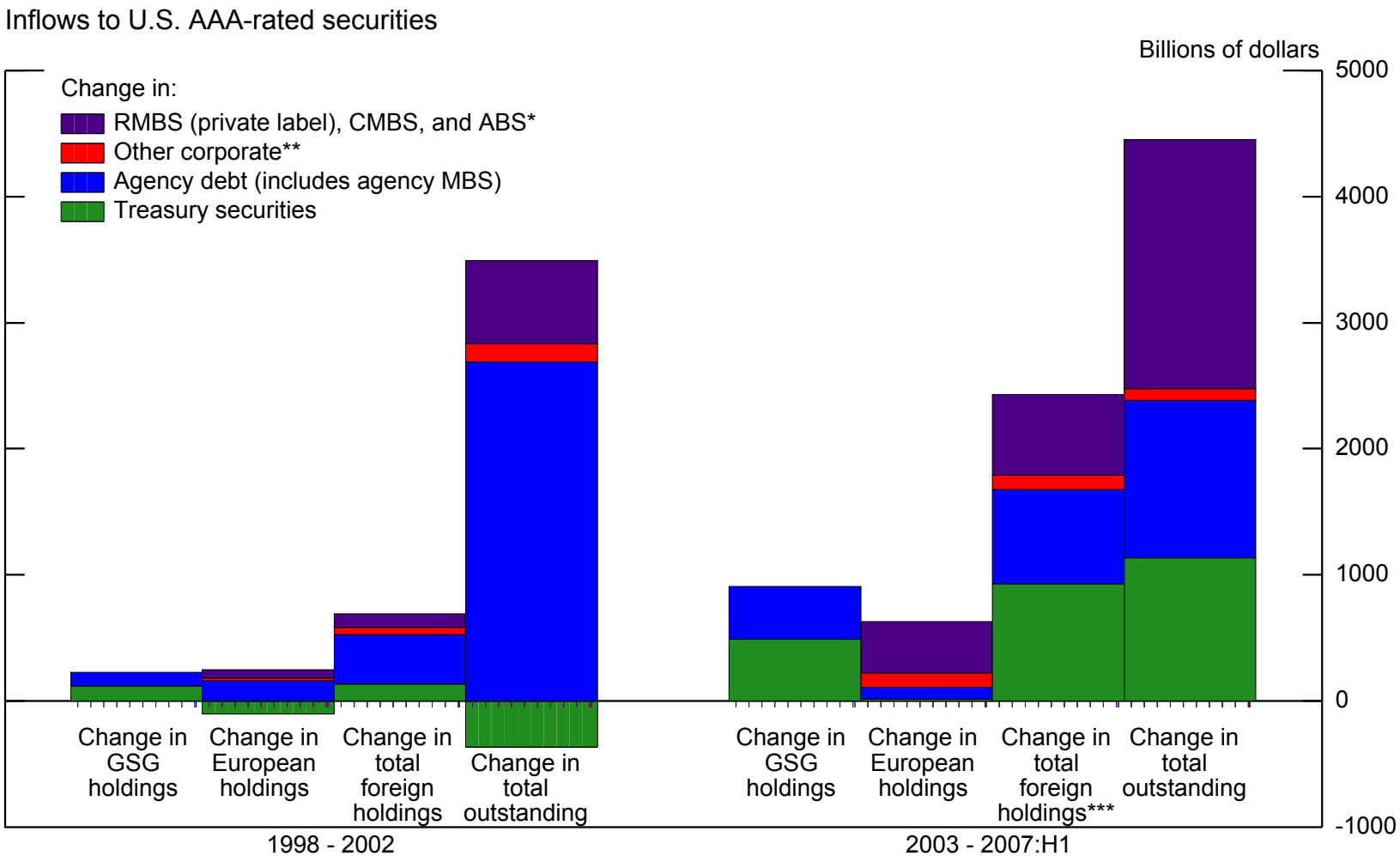
  - Brings the world economy closer to a liquidity trap
- Supply of safe assets:
  - Low interest rates can encourage leverage, the search for yield and the emergence of financial bubbles (Caballero and Krisnamurthy (2009), Diamond and Rajan (2010), Caballero, Farhi and Gourinchas (2008))
  - Encourages the emergence of 'quasi' safe assets (private label) whose resistance to aggregate shocks is limited (Structured credit products, Greece, Commodities...), increasing financial fragility.

Inflows to U.S. AAA-rated securities



Source: Bernanke, Bertaut, Pounder DeMarco and Kamin (2011)

How Well Did the IMS Perform During the Crisis?

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  - Increase in IMF resources
  - Central bank swap lines

Bilateral Central Bank Swap Lines (Angeloni et al (2011))

Dollar swaps (USD billions)	
Federal Reserve	
Euro area (ECB)	Without limit*
Japan	Without limit
United Kingdom	Without limit
Switzerland	Without limit
Australia	30
Canada	30
South Korea	30
Mexico	30
Singapore	30
Sweden	30
Brazil	15
Denmark	15
Norway	15
New Zealand	15

Euro swaps (EUR billions)	
European Central Bank	
United States	80*
Denmark	12
Sweden	10

Euro repos (EUR billions)	
European Central Bank	
Poland	10
Hungary	5

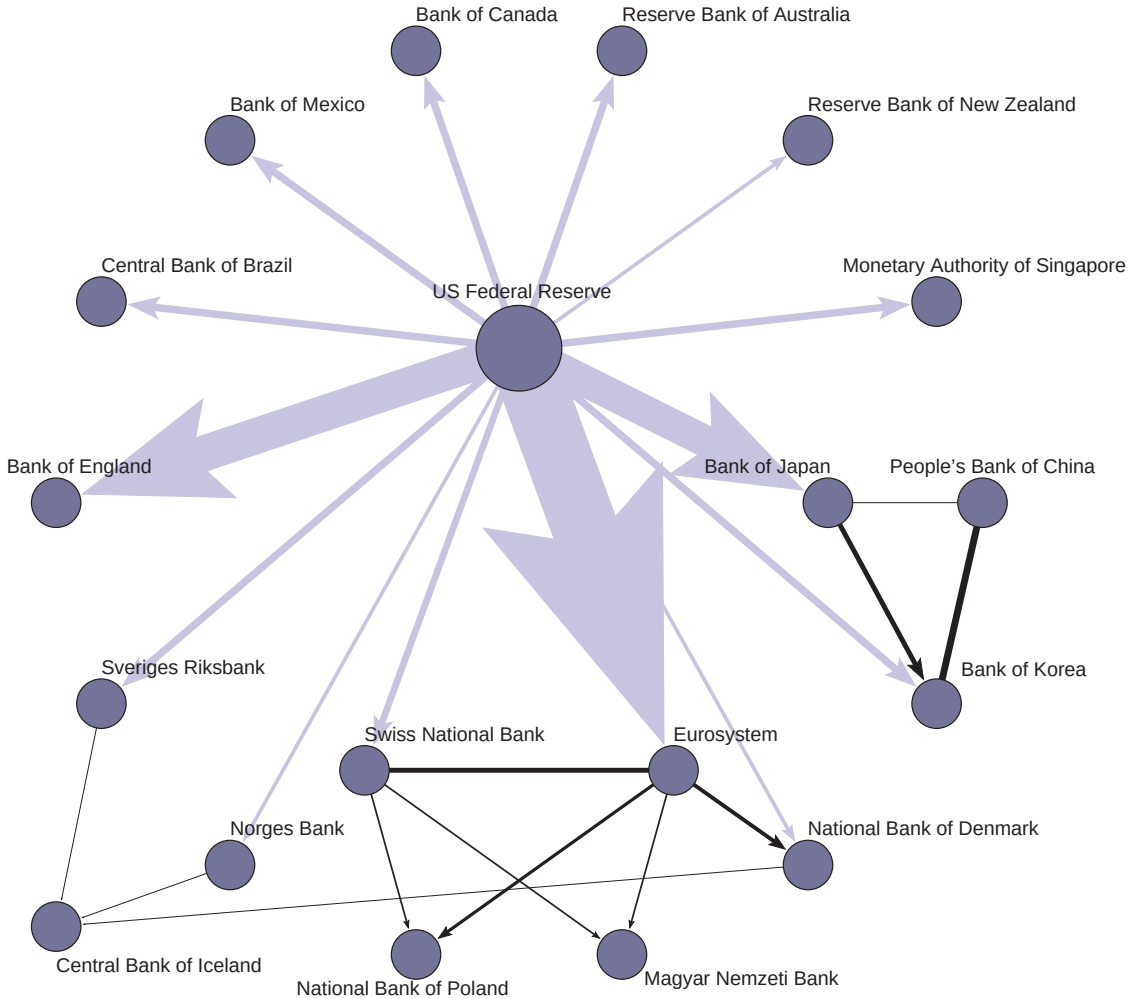
Euro swaps (EUR billions)	
Nordic countries	
Iceland	1.5
Latvia	0.5

Swedish krona swap (SEK billions)	
Sveriges Riksbank	
Estonia	10

Renminbi swaps (RMB billions)	
People's Bank of China**	
Hong Kong	200
South Korea	180
Indonesia	100
Malaysia	80
Argentine	70
Belarus	20

Source: Amended from Allen and Moessner (2010) using data from central banks. Notes: * The 'unlimited' supply of dollars by the Fed is from 13 October 2008, while the €80 billion from the ECB is from April 2009. ** People's Bank of China entered swap agreements with four other countries in 2010-11 (Iceland, Singapore, New Zealand and Uzbekistan), see Vallée (2011).

Network of CB Swap Lines (Mc Guire et al (2009))



The arrows indicate the direction of flows (where known); light shaded arrows represent US dollars provided to other central banks, dark arrows represent other currencies (evaluated at the average exchange rate during Q4 2008). The thickness of the arrows is proportional to the size of central bank swap lines, as announced; where swap lines are unlimited, the figure shows maximum usage instead, derived from auction allotments (Figure 8). The ASEAN swap network is not shown.

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  - Increase in IMF resources
  - Central bank swap lines
- Center country (US) suffered disproportionate losses on external wealth
  - exorbitant duty (Gourinchas, Rey & Govillot (2011))
  - but some losses in *other potential* reserve currency issuers (Gourinchas, Rey & Truempler (2011))

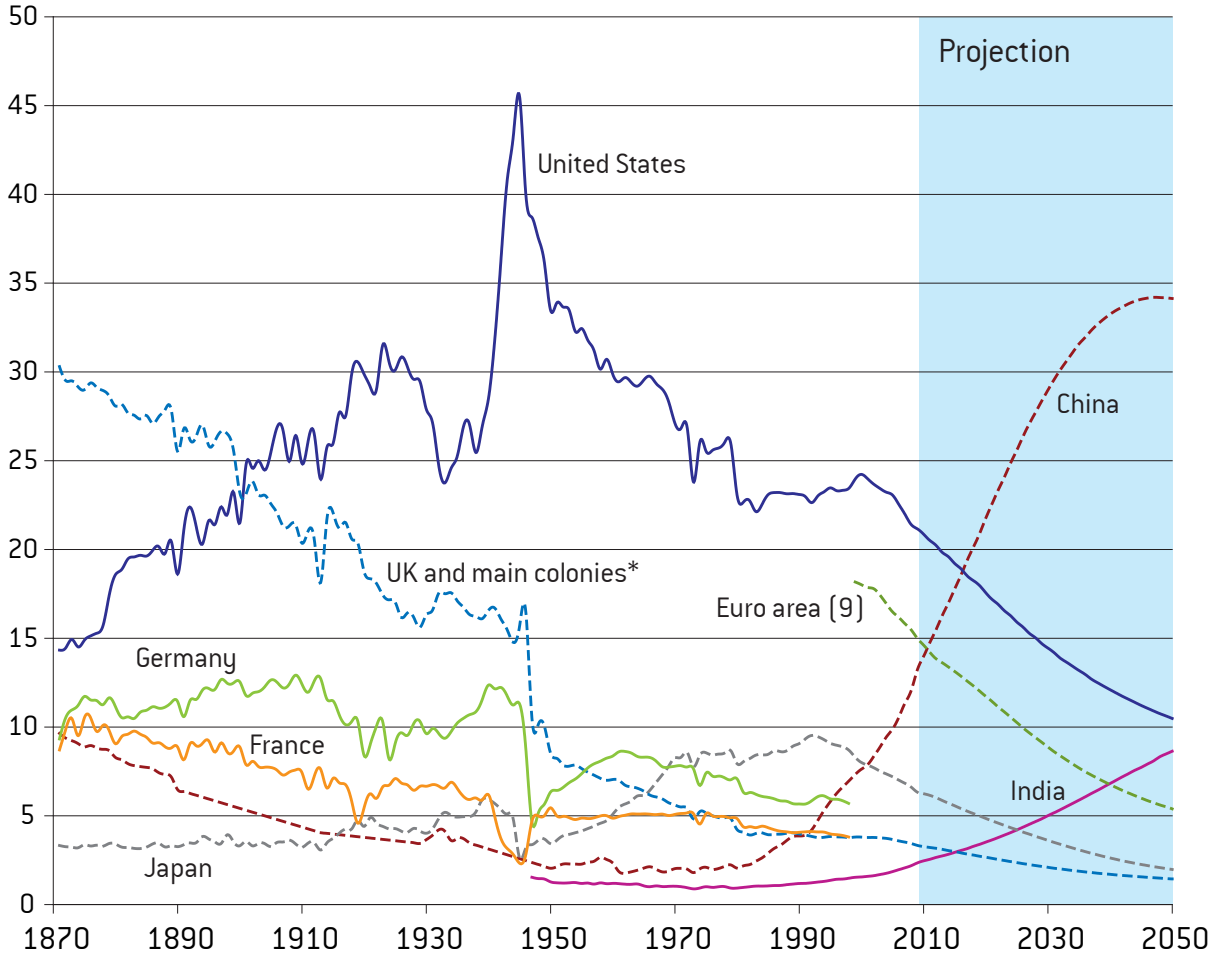
Heat Map of Valuation Gains and Losses, 2007-2009

The figure reports total valuation gains/losses. **Dark red**: losses in excess of \$600bn. Light red: losses smaller than \$600bn. Light green: gains smaller than \$400bn. **Dark green**: gains in excess of \$400bn. Source: Gourinchas, Rey and Truempler (2011)

Shortage of Safe Assets and New Triffin Dilemma

- Great Convergence
  - rapid growth in EMEs
  - adverse demographic trends and exhaustion of fiscal space in advanced countries

Share of Selected Countries in World GDP, 1870-2050



Sources: Angus Maddison's historical statistics and CEPII projections. Notes: * Australia (up to 1900), New Zealand (up to 1939), India (up to 1946). Canada is not included as it was already granted significant autonomy in 1867. Euro area (9): Austria, Belgium, Germany, Spain, Finland, France, Italy, the Netherlands, Portugal. Since data for some small economies are not available for some earlier years before 1980, the world total suffers from compositional changes. However, since the share of these countries is small, the bias in shares before 1980 is also small.

Source: Angeloni et al (2011)

Shortage of Safe Assets and New Triffin Dilemma

- Great Convergence
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- Modern version of Triffin (1960) dilemma:
  - Triffin dilemma arises when increasing demand for a reserve asset strains the ability of the issuer to supply sufficient amounts while still credibly guaranteeing the asset's value in terms of an acceptable numeraire
  - Backing of the Dollar reserve assets becomes gradually smaller in a larger world
  - Fiscal capacity of the dollar is not unlimited

A Multipolar International Monetary System

- Eventual Emergence of a Multipolar World, with Euro (?) and Renminbi as prime global candidates

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- Is a multipolar world more or less stable?
  - Avoid Triffin dilemma: expansion in global supply of reserve assets
  - Near perfect substitution: large capital flows have only minimal impact on currency rates
  - but: fiscal competition to secure status as a reserve issuer
  - and possibility of self-fulfilling crisis (what backs the backers?)

What Reform for the International Monetary System?

1. Develop alternatives to US Treasuries as the dominant reserve asset, accelerating the transition to a multipolar system.
   - the issuance of mutually guaranteed European bonds
   - opening of the Chinese capital account, convertibility of the yuan, and development of a yuan bond market

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4. Establish a foreign exchange reserve pooling mechanism with the IMF that will provide participating countries with more liquidity and, incidentally, allow reserves to be recycled in the financing of productive investments.

Preventing Moral Hazard

- Systematising bilateral swap lines, expanding IMF loan facilities and pooling reserves involve moral hazard risks.
- Credit lines can be adjusted by tweaking qualification criteria. Also possible to adjust the levels of compliance, the insurance premia, and/or the seniority of credit lines.
- Financial sectors of insured countries may be more inclined to rely too much on unhedged foreign currency financing. Need to set up surveillance indicators to monitor international funding risks.

SDRs are not the solution

- SDRs do not solve the problem of contingent liquidity that we identified.
- SDRs do not have an explicit fiscal backing.
- There is currently no market for SDRs.

Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data

Veronica Rappoport
Columbia Business School

with Daniel Paravisini (Columbia), Philipp Schnabl (NYU),
and Daniel Wolfenzon (Columbia)

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Agenda: Connection between financial and productive sectors

1. How do shocks to banks affect the real economy?
   - How does credit supply affect firms' outcomes?

2. Do banks provide services apart from credit intermediation?
   - Can healthy banks or government credit lines freely replace distressed financial institutions?

3. How do firms use external credit?
   - Expand to new markets, increase physical capital, finance working capital?

$\rightarrow$ We need detailed data, not only to answer these questions but to quantify them

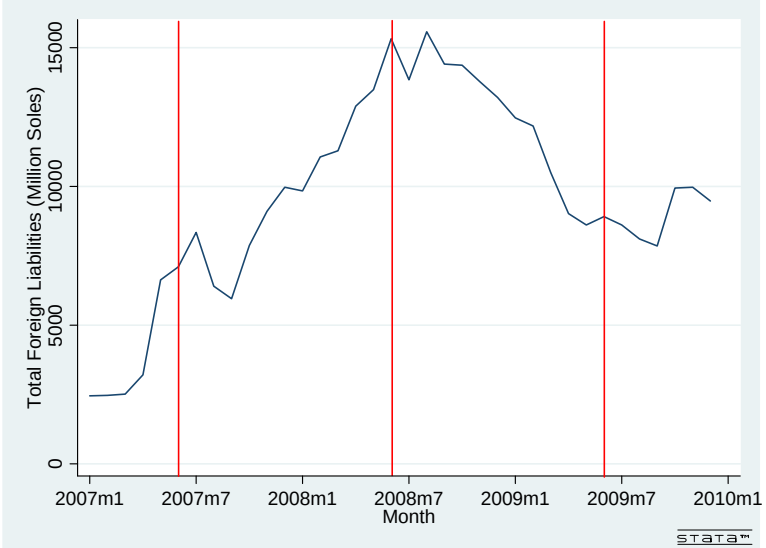
This Project: Effect of shocks to banks on real economy

- When do shocks to banks affect real activity?
  - Banks cannot offset shock with other sources of funding
    - → Negative shock to banks' balance sheet implies drop in lending
  - Firms cannot substitute banks in the short term
    - → Drop in overall credit supply to the firm
  - Firms need external finance in the short term
    - → Firms lower investment and production in downturns; they may need less credit

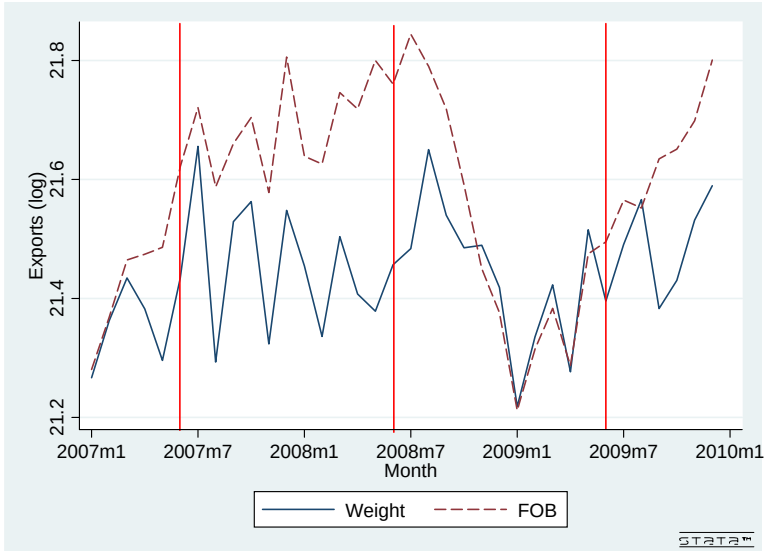
  Shocks to banks affect real activity only if these frictions exist

- Why focus on trade?
  - 2008 crisis opened this debate in international trade
    - → World exports fell 23% in 2009 (WTO)
  - Data allow to control for changes in demand
    - → Detailed information on product and destination

Setting: Peru during 2008 financial crisis



(a) Peruvian Bank Foreign Liabilities



(b) Peruvian Exports

- Banking sector
  - Peruvian banks not directly affected by U.S. real estate value
  - Banks with foreign liabilities adversely affected by capital flow reversals
- Exports
  - Drop in international demand for Peruvian products
  - Drop in commodity prices
- Data: customs data matched with credit registry at the firm level

Data

- Bank Balance Sheets
- Credit Registry
  - Firm-bank-month panel
  - Outstanding debt every firm with every domestic bank
- Customs Data (SUNAT)
  - Product (11 digits), destination, volume, value, price, shipment
  - US$ 20,252 Millions FOB in 2009 (57% manufactures)

Mining and derivatives	61.0
Oil and derivatives	10.8
Agriculture	9.2
Fishing and derivatives	8.3
Textile	5.7
Metallurgy	3.2
Other	5.0

(c) Main Sectors (%)

United States	17.0
China	15.3
Switzerland	14.8
Canada	8.6
Japan	5.2
Germany	3.9
Other	35.3

(d) Main Destinations (%)

Role of banks in the international transmission of crises

- International capital flow reversal affected banks with high share of foreign liabilities

Bank (top 10)	For.Liabilities/Assets 2007-S2
HSBC	0.177
Mibanco	0.168
Continental	0.122
Citibank	0.103
Interamericano	0.075
Financiero	0.073
Credito	0.062
Wiese	0.060
Interbank	0.055
Santander	0.022

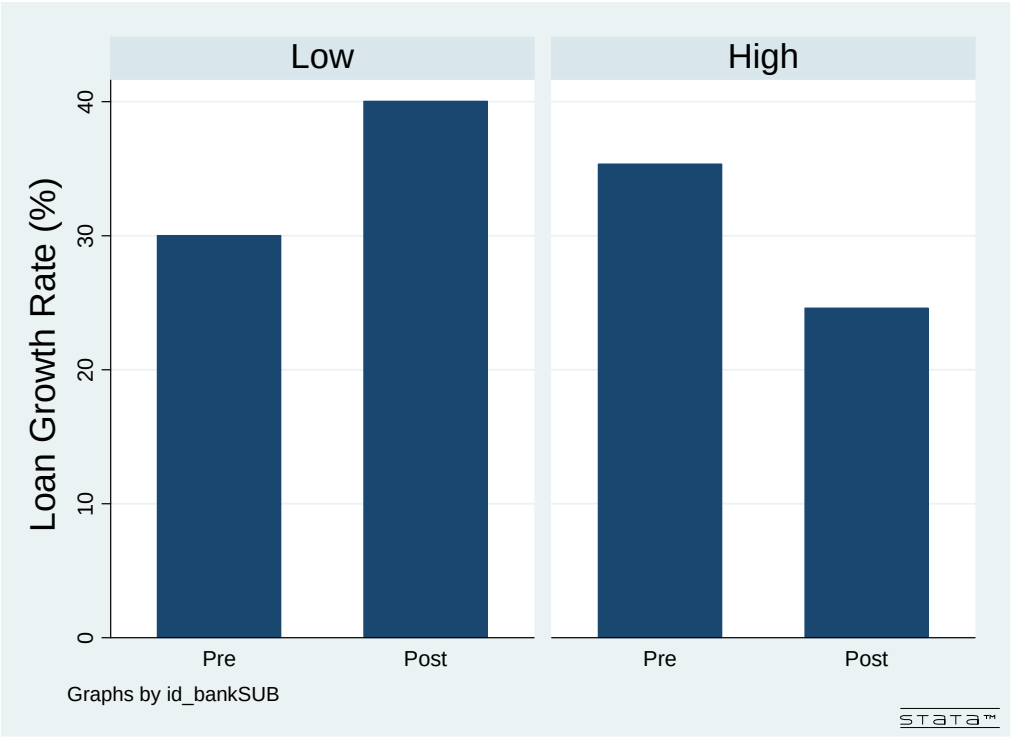
- Prudential Regulation in Peru:
  - Higher reserve requirements on foreign-currency denominated domestic liabilities
  - Higher reserve requirements for short-term foreign debt

$\rightarrow$ Objective: Serve as LOLR and inject liquidity

General injection of liquidity partially solved the problem

- Injection of liquidity worked in reducing domestic interest rate
- But could not solve the heterogenous impact across banks
  - Banks with high foreign liabilities reduced credit supply relative to other banks

    (loans by banks with high foreign liabilities were growing faster prior to crisis)



Why do shocks to individual banks have real effects?

- Banks develop expertise:

Bank (top 10)	For.Liabilities/Assets 2007-S2	
HSBC	0.177	31% of exports by related firms goes to U.S.
Mibanco	0.168	
Continental	0.122	
Citibank	0.103	
Interamericano	0.075	
Financiero	0.073	
Credito	0.062	
Wiese	0.060	
Interbank	0.055	
Santander	0.022	3% of exports by related firms goes to U.S.

- Knowledge on clients

  $\rightarrow$ firms cannot substitute banks in the short term

- Specialization on markets

  $\rightarrow$ heterogenous impact on products/destinations

Quantitative Results

- Credit supply by banks with above average foreign liabilities drops 17%
  - Banks play a role in the international transmission of financial crises
  - In this crisis multinational banks were equally vulnerable

- Export elasticity to credit
  (% change in 1 year exports for every 1% change in credit stock)
  - Quantities exported for continuing export lines: 0.23
  - Number of continuing export lines: 0.36
  - Number of new export lines: inconclusive

- Why is the Central Bank interested in these elasticities?
  - Simulate different scenarios of credit shortages

How much of drop in Peruvian exports was due to credit shortage?

- Compare $t = \{Pre, Post\}$: 12 months before and after July 2008
  - Computed credit supply shock on banks with high liabilities (30%): 17%
  - Computed sensitivity of exports to credit supply

	Value (FOB)		Volume (kg)			
	t=Pre	t=Post	t=Pre	t=Post	Missing Trade	Finance
Total	10.9%	-22.4%	3.2%	-9.6%	-12.8%	15%
Quantity	10.6%	-15.7%	2.1%	-2.2%	-4.3%	27%
# Firms-Markets	0.3%	-6.6%	1.2%	-7.4%	-8.6%	8%

- Credit shock had first order effect on exports, but most of the drop was due to reduction in international demand and prices

Heterogeneous effects of credit shocks

- How do credit shocks affect exports across firms' characteristics?
  - Size, age, number of banking relationships
  - $\rightarrow$ Small firms are not more sensitive to credit, but small firms suffer larger shocks

- How do credit shocks affect exports across flows' characteristics?
  - Size, frequency and size of shipments, distance to destination
  - $\rightarrow$ Exporters to neighboring countries are typically smaller and suffer larger credit shocks
  - $\rightarrow$ Small export flows are more likely to be abandoned after a negative credit shock

- How do credit shocks affect exports across sectors?
  - We can compute the response to credit of exports by industry
  - $\rightarrow$ Some evidence that differentiated products are more sensitive to credit shocks

Agenda: Connection between financial and productive sectors

1. How do shocks to banks affect the real economy?
2. Do banks provide services apart from credit intermediation?
3. How do firms use external credit?

1. How do shocks to banks affect the real economy?

- Banks are global players
  - $\rightarrow$ role in international transmission of crises
- Credit shocks affect quantities exported for continuing lines and increase exit for small lines
- Quantification of the elasticities to simulate different scenarios

★ Design of prudential bank regulation:
(Peru's experience)

- Reserve requirements for external short-term liabilities
  - $\rightarrow$ Reduce magnitude of shocks to banks
  - $\rightarrow$ Construct countercyclical fund to inject international liquidity

Reduced domestic spreads ... but did not solve heterogeneous impact across bank

2. Do banks provide services apart from credit intermediation?

- Banks have knowledge on clients
  - Firms cannot easily substitute banks in the short term
- Banks specialize in certain export markets
  - Expertise in product/destinations make substitution harder

★ Design policy for distressed banks:

- We still need to identify the sources of expertise

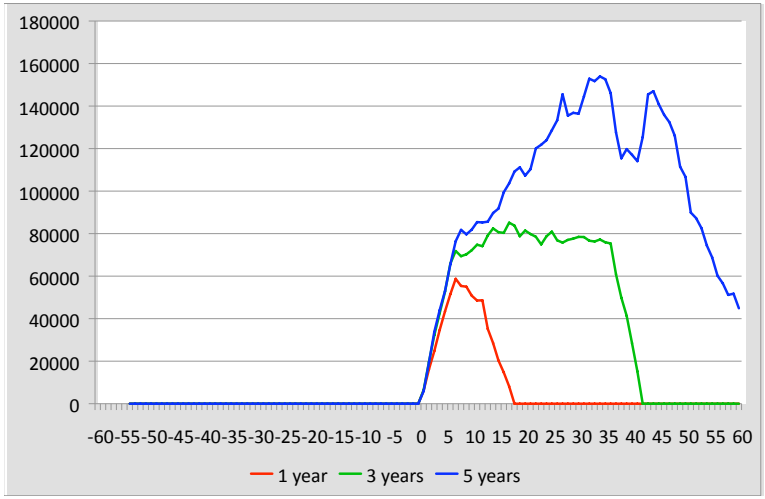
  Examples:
  - Products are geographically concentrated within the country
  - Banks have connections with foreign counterparts
    (IDB program on letters of credit)

3. How do firms use external credit?

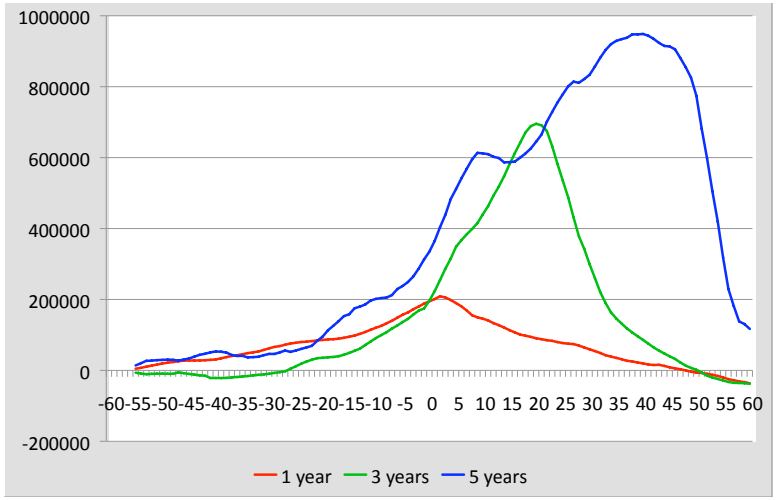
- Firms use external credit to finance working capital
  - Strong reaction of quantities to short-term credit shocks
  - No evidence that short-term credit shocks affects entry of firms or new markets
- Still need to understand usage of credit in long-term exports dynamics

★ Access to credit as industrial/export promotion

Dynamics of Exports and Credit by Exporting Life



(e) Dynamics of Exports



(f) Dynamics of Credit