

Credit, Financial Stability, Central Banks and Macroprudential Policy

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1st CBCS Banking Conference
Sint Maarten
March 31, 2016

Historical frequency of financial crises

- Definition: A **financial crisis** is an episode of financial market volatility marked by significant problems of illiquidity and insolvency among financial-market participants and/or by official intervention to contain those consequences. From Bordo et al (2001). *Is the crisis problem growing more severe? Economic Policy*.

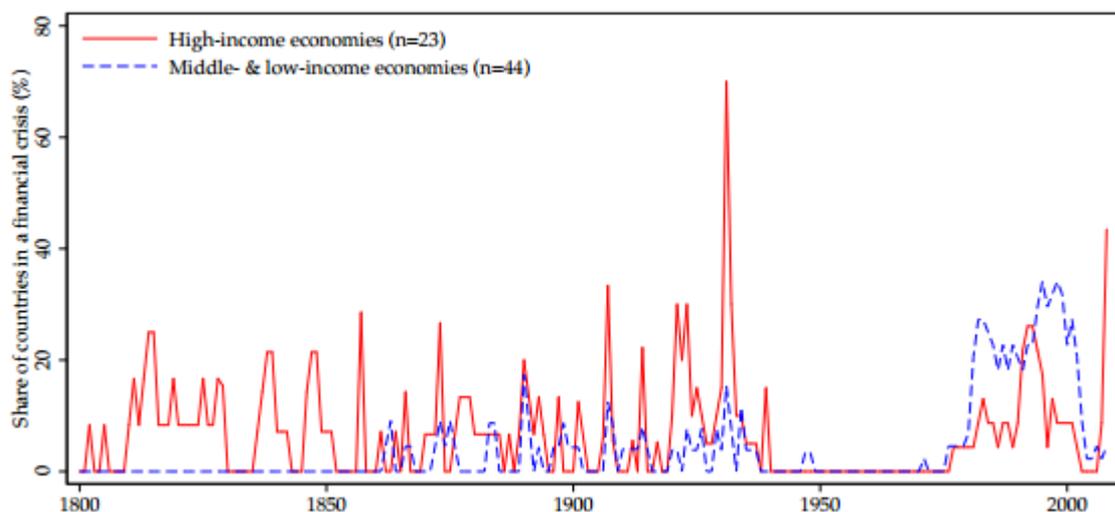


Figure 1: The percentage share of countries worldwide experiencing the onset of a financial crisis in each year since 1800 for both the advanced (high-income) and emerging (middle- and low-income) groups of economies. Figure reproduced from Qian et al. (2011).

Takeaways:

- Rare events, but not black swans.
- Similar frequency between advanced and emerging economies.
- Decades following WWII were unusually stable creating a false sense of security.

Diversity and prevalence of financial instability

Share of years since 1800 (or since Independence) and until 2010 in LAC-7 and G-7 countries that had experienced a crisis

LAC-7							
Country	Year of Independence	Currency Crisis	Inflationary Crisis	Stock Market Crash	Domestic Debt Crisis	Debt Crisis	Banking Crisis
Argentina	1816	22.1	25.6	14.4	8.2	32.3	7.7
Brazil	1822	32.8	25.9	4.2	2.1	27.0	8.5
Chile	1818	22.8	20.2	28.0	0.5	26.9	5.7
Colombia	1819	15.1	17.7	19.3	0.0	35.4	4.2
Mexico	1821	13.2	12.2	27.0	6.3	43.9	9.5
Peru	1821	13.7	13.2	20.0	5.8	40.0	7.4
Venezuela	1829	7.7	11.5	14.3	2.2	37.4	6.0
Average LAC-7		18.2	18.0	18.2	3.6	34.7	7.0

G-7							
Country	Year of Independence	Currency Crisis	Inflationary Crisis	Stock Market Crash	Domestic Debt Crisis	Debt Crisis	Banking Crisis
Germany		8.5	9.5	21.8	0.5	12.8	7.1
Canada	1867	1.4	0.7	8.3	0.7	0.0	6.9
United States	1776	14.2	1.4	25.6	9.5	0.0	14.7
France		9.0	5.7	26.5	0.0	0.5	7.6
Italy		6.2	10.4	19.0	0.0	3.3	8.5
Japan		5.2	10.9	14.7	1.4	5.2	8.1
UK		7.1	2.4	14.7	0.5	3.8	11.8
Average G-7		7.4	5.9	18.7	1.8	3.7	9.3

Source: data base from Reinhart and Rogoff (2011) available at <http://www.aeaweb.org/articles.php?doi=10.1257/aer.101.5.1676>

In LAC-7, combination of weak economic fundamentals and/or adverse external conditions.

Historical costs of financial crises (from Taylor 2015)

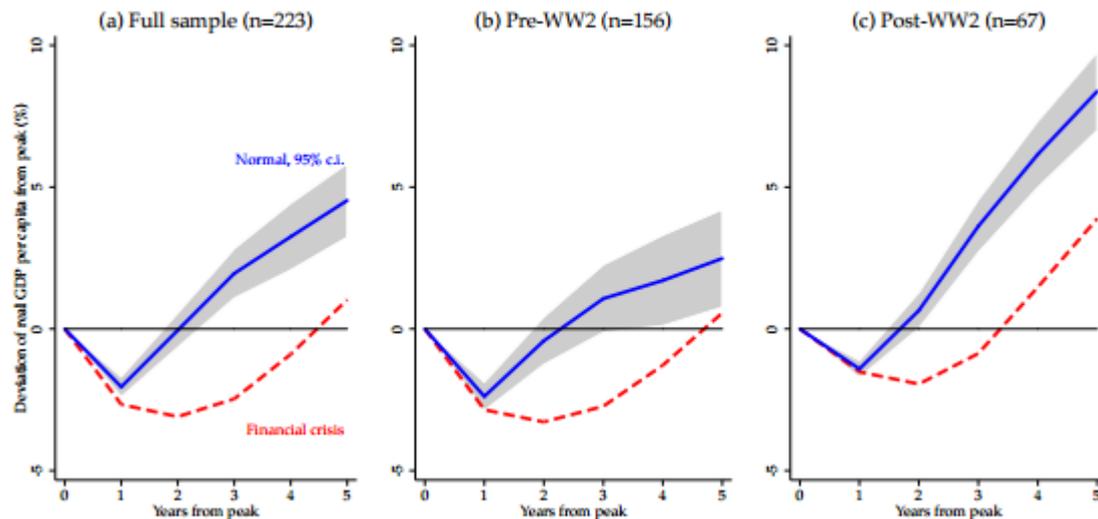


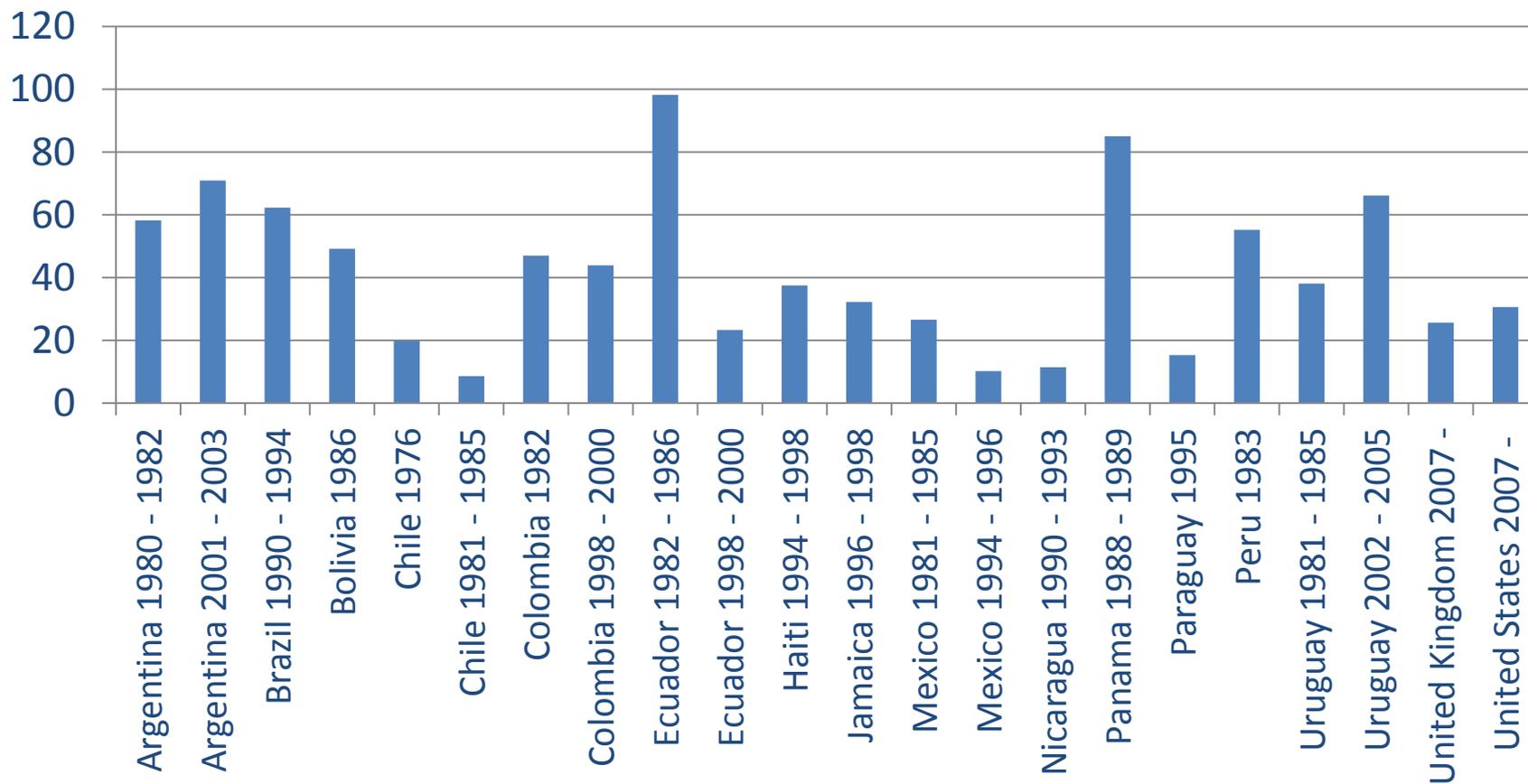
Figure 2: *The unconditional average path of real GDP per capita relative to the level in the peak year of the recession in both normal and financial crisis recessions in advanced economies for the (a) full, (b) pre–World War II, and (c) post–World War II samples. Author’s calculations are based on data from Jordà et al. (2013a). Abbreviation: CI, confidence interval.*

Takeaways:

- Financial crisis recessions are far deeper and longer than normal recessions.
- This is true for the distant pre-WWII era of the gold standard and hard money, fiscal orthodoxy, and no bailouts.
- But it is also true, and to an even greater degree, for the post-WWII era of activist central banks, fiat money, automatic stabilizers, and financial regulation and backstops.

Costs of systemic banking crises in Latin America and the Caribbean

Output loss (% of GDP) during systemic banking crises *



* Cumulative sum of the differences between actual and trend real GDP over the period ($T, T+3$), expressed as a percentage of trend real GDP, with T the starting year of the crisis.

Banking crisis outcomes, 1970 - 2011

Country	Output loss	Increase in debt	Monetary expansion	Fiscal costs	Fiscal costs	Duration	Peak liquidity	Liquidity support	Peak NPLs
Medians									
	% of GDP			% of financial system assets	In years	% of deposits and foreign liabilities	% of total loans		
All	23.0	12.1	1.7	6.8	12.7	2.0	20.1	9.6	25.0
Advanced	32.9	21.4	8.3	3.8	2.1	3.0	11.5	5.7	4.0
Emerging	26.0	9.1	1.3	10.0	21.4	2.0	22.3	11.1	30.0

Source: Laeven and Valencia (2013). Systemic banking crisis database. IMF Economic Review 61: 225-270

Resolution of banking crises (from Freixas et al 2015)

1. Macroeconomic stabilization

- Fiscal, exchange rate and monetary (conventional and unconventional) policies.

2. Restructuring policies

- Recapitalization and reorganization of financial intermediaries (including nationalization, mergers and asset management companies) to deal with the recovery of bad assets and generalize debt relief programs.

3. Institutional reforms

- Reforms in deposit insurance and bank resolution together with structural measures to improve the stability of the financial system.

Successful crisis resolutions have been characterized by transparency and resoluteness in terms of resolving insolvent institutions, thus removing uncertainty surrounding the viability of financial institutions.

Positive experiences: Sweden in the early 1990s.

Negative experiences: Japan in 1990s and Europe today.

Explicanda from Alan Taylor (2015): Credit, Financial Stability and the Macroeconomy

- **Facts** about financial crises:
 - Recurring phenomena.
 - Associated with costly recessions.
 - Equally likely in emerging and developed countries.
- Can we **identify** any economic **factors** that can help us understand the **probability of financial crisis** events occurring?
 - **Credit buildup** has always been a powerful warning signal of rising financial instability risk.
- Can we **find** any **factors** that can help us to understand **why, conditional on a financial crisis** event, the subsequent **macroeconomic performance is so much worse** than that in a normal recession and is characterized by large output losses and sharp deviations in other macroeconomic variables?
 - **Overhang from the credit buildup** is strongly associated with worse recovery performance, explaining a substantial fraction of the economy's inferior performance after the crisis events.

Historical evolution of credit

Credit: total domestic currency lending by private banks to the nonfinancial sector. Includes loans to households and businesses. Excludes loans to government, interbank lending, foreign currency lending, and non-bank sources of funding.

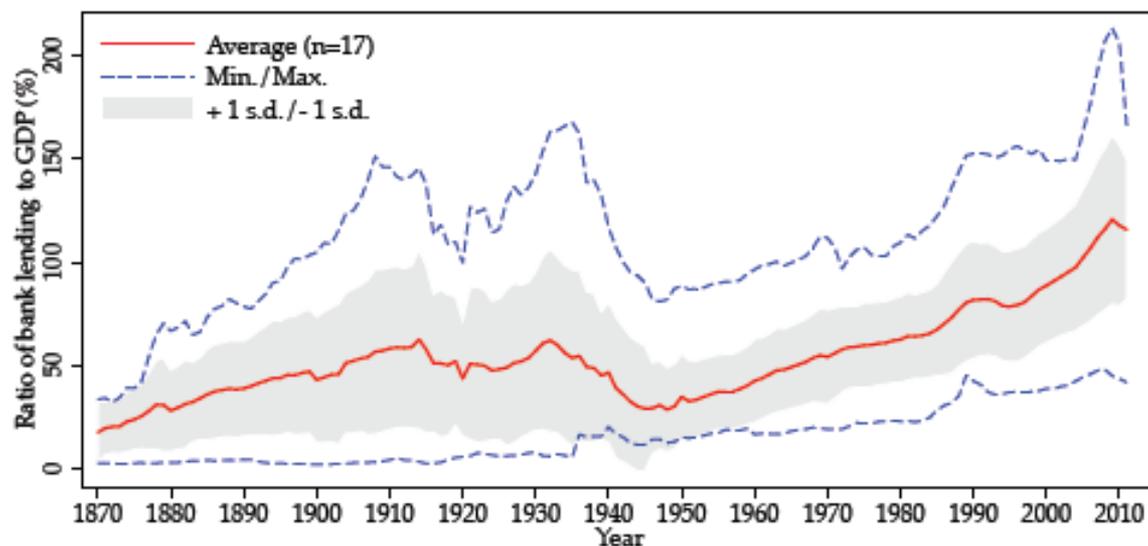


Figure 4: The average ratio of bank lending to GDP in 17 advanced economies for each year since 1870, as well as the minimum-maximum and 1 standard deviation (SD) ranges. Author's calculations are based on data from Jordà et al. (2013a).

Takeaways:

- With the exception of the 1930-1950 period, increasing levels of leverage.
- Rapid growth since 1970.
- Relative to money, credit was relatively constant until WWII, but then credit decoupled from money.

What drives credit booms?

1. Lower credit standards
2. Liability structure
3. Monetary expansion and low interest rates
4. Bubbles, herding and collateral prices
5. Capital inflows
6. Corporate governance
7. Competition
8. Political economy

Changes in risk-taking due to:

- a) Changes in preferences – behavioral motive as in Keynes’ “animal spirits” (Akerlof and Shiller 2009)
- b) Time-varying risk aversion (Campbell and Cochrane)
- c) Lower financial intermediaries net worth (Adrian and Shin 2011)

Crisis reduce the risk appetite of lenders and investors alike.

Credit: Risk of financial crises

Jordà, Schularick and Taylor (2013) long-spanned panel data set allows them to perform quantitatively analysis.

First task: assess the robustness of the credit signal as a forewarning signal of incipient financial crises in advanced economies.

$$\text{logit}(p_{it}) = \beta_{0i} + \beta_1(L)\text{CREDIT}_{it} + \beta_2(L)X_{it} + e_{it}$$

	Full sample		Pre-World War II sample		Post-World War II sample	
	FE null	FE + credit	FE null	FE + credit	FE null	FE + credit
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes
Change in bank lending/GDP (5-year lagged moving average)		27.42*** (5.13)		54.30*** (13.74)		34.32*** (8.77)
AUC	0.61 (0.03)	0.72*** (0.03)	0.63 (0.04)	0.76*** (0.04)	0.62 (0.05)	0.75** (0.05)
Number of observations	2,040	1,818	1,003	790	976	967

Takeaway:

- The credit signal is seen to have predictive value at the 95% confidence level.

Table 1: Simple logit models of financial crises. The dependent variable is the CRISIS binary indicator of a financial crisis. The null model is a fixed-effect (FE) logit model with no regressors other than country intercepts. In all cases (full, pre-World War II, and post-World War II samples), the null is rejected, and the credit-based prediction model is found to be informative. The area under the curve (AUC) tests against the FE null. Standard errors are in parentheses. ** for $p < 0.05$ and *** for $p < 0.01$. Author's calculations are based on data presented in Jordà et al. (2014).

Credit: Costs of financial crises

What makes the recessions associated with financial crises so painful?

$$y_{i,t+h} - y_{i,t} = \alpha_{ih} + \theta_{Nh}N_{it} + \theta_{Fh}F_{it} + \beta_{Nh}N_t EXCESS_{Nit} + \beta_{Fh}F_t EXCESS_{Fit} + \Gamma_h(L)X_{it} + u_{it}$$

Log real GDP per capita (relative to year 0, × 100)	Year <i>h</i> = 1	Year <i>h</i> = 2	Year <i>h</i> = 3	Year <i>h</i> = 4	Year <i>h</i> = 5
Normal recession	-1.271** (0.360)	0.693 (0.644)	3.179** (0.869)	3.838** (1.122)	4.813** (1.197)
Financial crisis recession	-2.828** (0.574)	-4.135** (1.027)	-3.586** (1.386)	-2.751 (1.791)	-1.365 (1.910)
<i>EXCESS_N</i> (credit/GDP, demeaned) normal recession	-0.264 (0.166)	-0.684** (0.297)	-0.771* (0.401)	-0.932* (0.518)	-0.711 (0.552)
<i>EXCESS_F</i> (credit/GDP, demeaned) financial crisis recession	-0.401* (0.213)	-0.991** (0.381)	-0.374 (0.515)	-1.298* (0.665)	-0.895 (0.709)
<i>F</i> -test equality of coefficients, normal = financial (<i>p</i>)	0.01	0.00	0.00	0.00	0.00
<i>F</i> -test equality of coefficients, interaction terms (<i>p</i>)	0.57	0.47	0.49	0.62	0.82
Number of observations	121	121	121	121	121

Table 2: Local projection (LP) conditional paths of real GDP per capita in recessions. Shown is the LP conditional cumulative average path of real output per capita relative to the level in the peak year of the recession in both normal and financial crisis recessions in the advanced economies in the full sample. The dependent variable is (change in log real GDP per capita from year 0 to year *h*) 100. Cluster-robust standard errors are in parentheses. *, *p* < 0.10; **, *p* < 0.05. Country fixed effects are not shown. For the LM test, all excess credit coefficients equal zero: $F(10, 585) = 3.026; p = 0.001$. In each crisis type bin, the recession indicators (*N*, *F*) are interacted with demeaned excess credit ($EXCESS_N$, $EXCESS_F$). Author's calculations are based on data presented in Jordà et al. (2013a).

$$X_{it} = \begin{pmatrix} \Delta\%rgdp \\ \Delta\%((loan/gdp) \\ \Delta\%cpi \\ i_{3month} \\ i_{5year} \\ \frac{investment}{gdp} \\ \frac{current\ account}{gdp} \end{pmatrix}$$

Takeaways:

- Larger credit booms cause the pace of economic recovery to significantly drag after recessions.
- The drag of credit is present in both normal (N) and financial crisis (F) recessions.

Credit: Costs of financial crises (cont.)

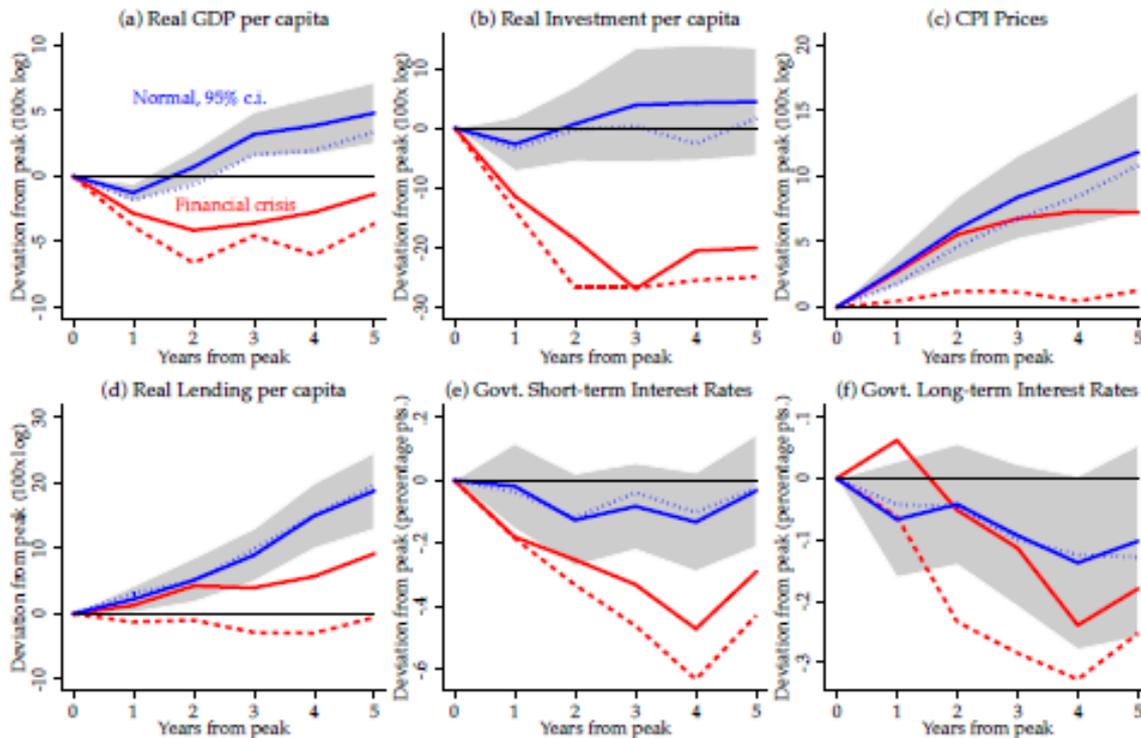


Figure 7: The local projection, conditional cumulative average path of (a) real GDP per capita, (b) real investment per capita, (c) CPI price level, (d) real private credit (bank loans) per capita, (e) short-term interest rates, and (f) long-term interest rates, all relative to the level in the peak year of the recession in both normal and financial crisis recessions in the advanced economies in the full sample. The solid lines show paths computed when excess credit is at its mean level, and the dotted lines show paths computed when excess credit is +1 standard deviation above its mean level. Figure reproduced from Jordà et al. (2013a). Abbreviations: CI, confidence interval; CPI, Consumer Price Index.

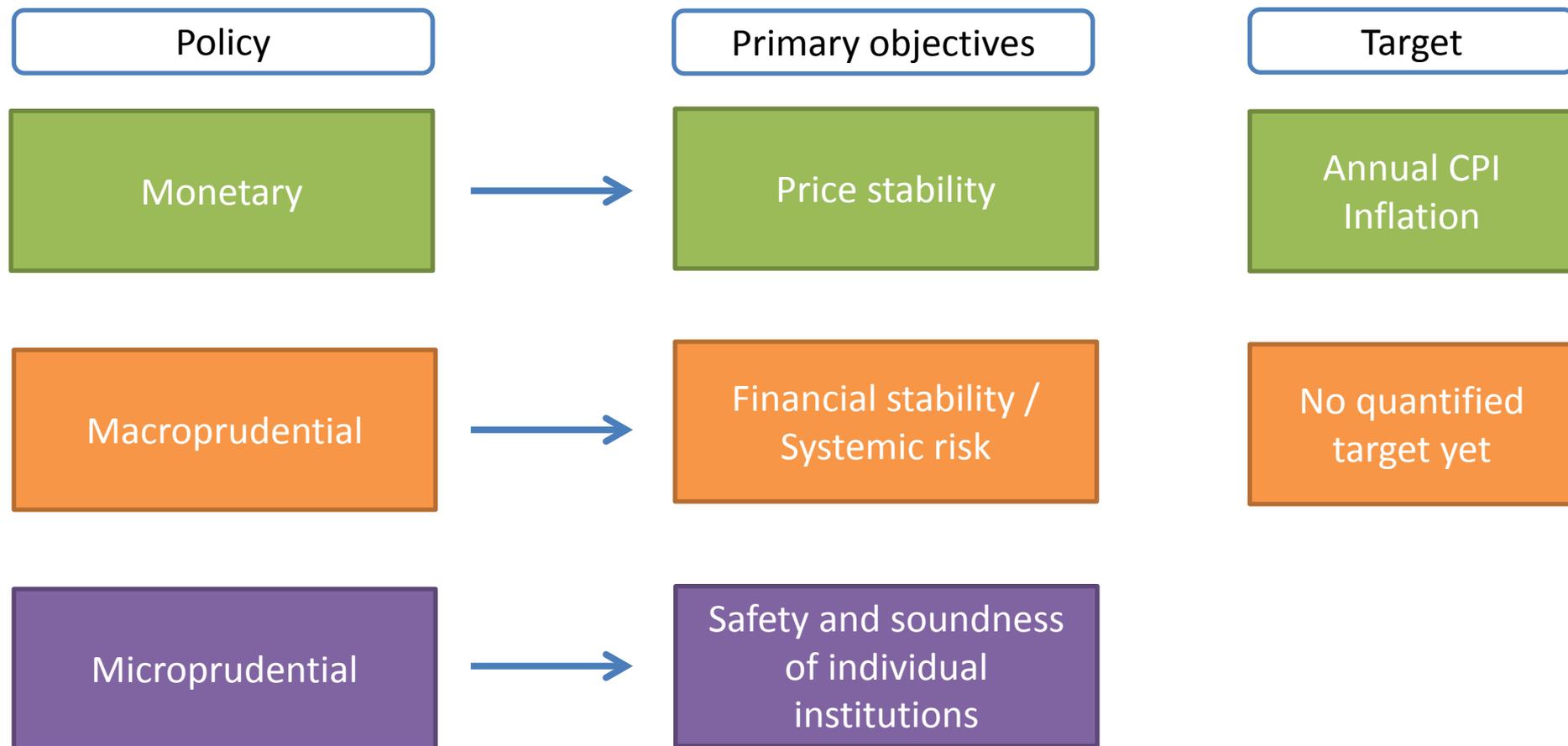
Takeaways:

- The basic findings from the raw data, even when subject to the additional rigors of local projection estimation with a large control set, are robust.
- If there is a crisis, the financial recession is characterized by longer and deeper collapses in output and investment, a lower rate of price inflation, contractions in credit, lower interest rate and a shift to a current account surplus.
- Counterfactuals with elevated excess credit (red dashed line) show that the bigger the credit boom, the bigger are the reversals in all these variables.
- Credit bites back.

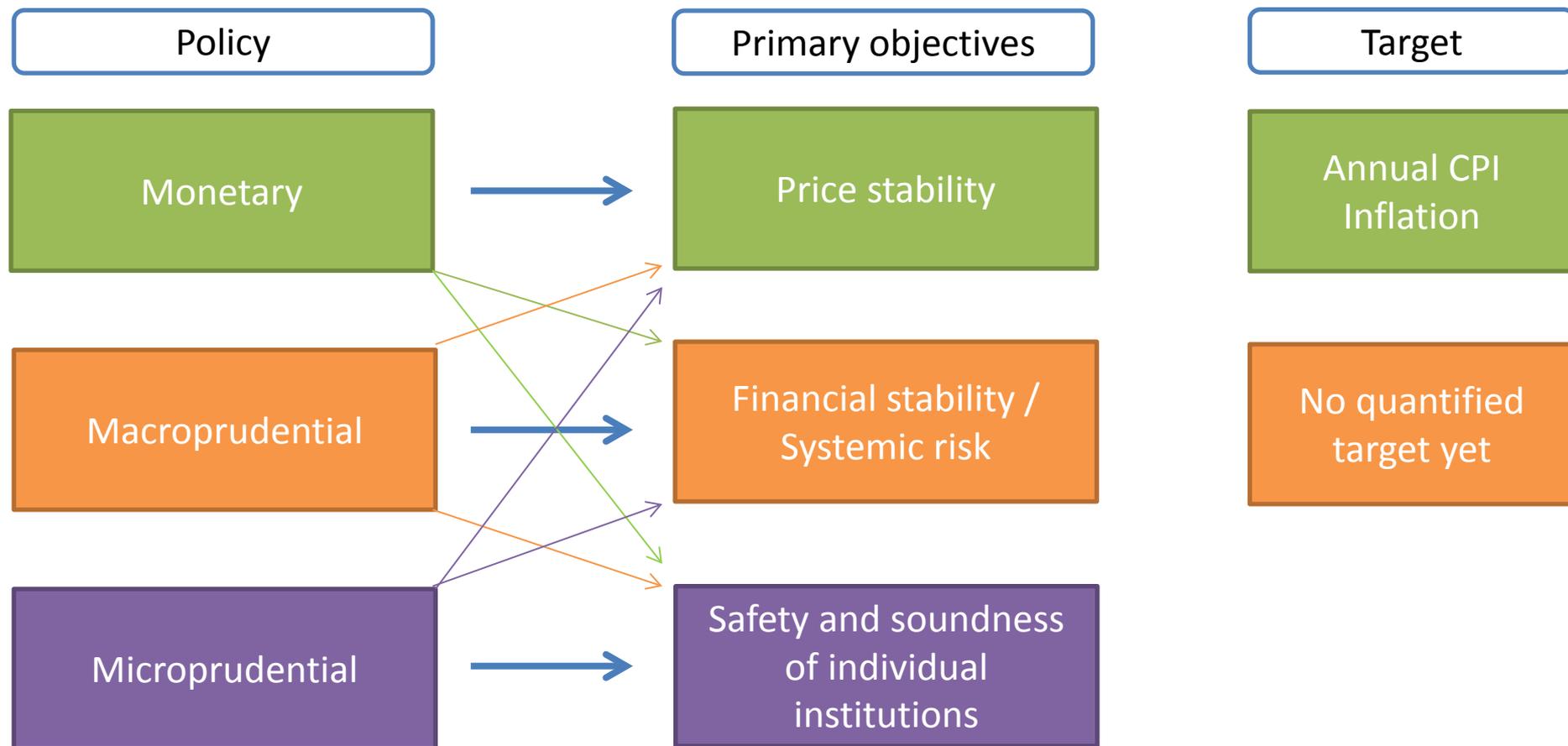
Financial crisis and its implications (One Bank; Bank of England)

- Conventional thinking about monetary, macroprudential and microprudential policy and their interactions has been challenged by the financial crisis.
 - Price stability proved to be insufficient for ensuring macroeconomic stability.
 - Conventional monetary policy was inadequate for ‘mopping up’ the impact of the crisis on output.
 - International capital flows did not necessarily represent efficient allocation of global savings into investments.
 - The prevailing regulatory framework failed in spotting and acting on system-wide risks.

Pre-crisis 'policy trinity'



Post-crisis 'policy trinity'



Established objectives of CEMLA's associates

Table 1: Established Mission of Latin American and Caribbean Monetary Authorities

Central bank	Price stability / Monetary stability	Financial stability	Payment systems	Economic stability	Full employment	Economic growth	Economic development
Argentina	*	*			*		*
Aruba	*	*					
Bahamas	*	*	*				
Barbados	*	*					*
Belize	*	*				*	
Bolivia	*						
Brazil	*	*					
Cayman Islands	*	*					
Chile	*		*				
Colombia	*						
Costa Rica	*	*	*	*	*		*
Cuba	*	*	*	*			*
Curacao en Sint Maarten	*	*	*				
Dominican Republic	*	*	*				*
Eastern Caribbean	*	*		*			*
Ecuador	*						
El Salvador	*	*	*	*			
Guatemala	*						*
Guyana	*	*				*	
Haiti	*						
Honduras	*		*				
Jamaica	*	*			*	*	
Mexico	*	*	*				
Nicaragua	*		*				
Paraguay	*	*					
Peru	*						
Suriname	*	*	*				*
Trinidad and Tobago	*	*			*	*	
Uruguay	*	*	*		*	*	
Venezuela	*						*
	30 of 30	20 of 30	12 of 30	4 of 30	5 of 30	5 of 30	9 of 30

Note: The table was elaborated with the objective established in each Central Bank Act.

Microprudential and macroprudential regulation compared (from Freixas et al 2015)

	Microprudential	Macroprudential
View	<ul style="list-style-type: none"> • Partial equilibrium 	<ul style="list-style-type: none"> • General equilibrium
Risk	<ul style="list-style-type: none"> • Risk in isolation (VaR) 	<ul style="list-style-type: none"> • Risk of system (CoVar)
Distortions	<ul style="list-style-type: none"> • Socialization of losses 	<ul style="list-style-type: none"> • Externalities / spillovers • Amplification / endogenous risk • Financial cycle / procyclicality
Results	<ul style="list-style-type: none"> • Excessive risk-taking • Hide risk in tail • Gambling for resurrection • Diversification 	<ul style="list-style-type: none"> • Excessive systemic-risk • Herding / irrational fashions • Create tails • Diversity
Fallacy of composition	<ul style="list-style-type: none"> • Fire sale of assets is microprudent • Deleveraging to meet capital or liquidity requirement is microprudent • Individual bank run 	<ul style="list-style-type: none"> • Fire sale not prudent in aggregate • Needs to raise equity, not sell assets or not renew loans • Credit crunch and aggregate liquidity dry up

Policy frameworks and interactions

1. How does monetary policy affect financial stability?
2. How should the monetary authority incorporate financial stability considerations?
3. How does international financial integration constrain monetary policy and prudential regulatory policies?

1) How does monetary policy affect financial stability?

- Last decade's global financial crisis brought a renewed recognition that **monetary and financial issues** could not be studied in isolation, that **financial markets do not self-regulate**, and that monetary policy could contribute to tame the **financial cycle**.
- Monetary policy impacts financial stability through its effects on asset prices and on financial markets' risk taking and lending decisions.
 - The asset price channel refers to how monetary policy stance affects prices in the stock, bond, derivative, real estate and exchange rate markets.
 - The risk taking channel refers to how relatively low levels of interest rates may induce financial imbalances as a result of reductions in risk aversion and a more intensive search for yield by banks and other investors.
 - The lending channel refers to how the monetary policy stance could impact credit supply by modifying financial intermediaries' sources of funding.

1) How does monetary policy affect financial stability?

- Relevant research questions in this topic include:
 1. Which are the main transmission mechanisms in the monetary policy – financial stability nexus.
 2. What are the dynamics of aggregate credit, including its procyclicality, and financial intermediaries' leverage cycles.
 3. What is the interdependence between credit cycles and business cycles and the long-term relationship among credit, financial stability and economic growth.

2) How should the monetary authority incorporate financial stability considerations?

- There is an ongoing debate on how a monetary authority should participate in a country's search for financial stability.
 - Some argue in favor of a separation of objectives, instruments and even authorities dealing with price and financial stability, while others claim that they cannot be detached and that it is better to have a single entity being responsible of both objectives.
 - The institutional arrangements vary from cases where the central bank is directly responsible for designing and executing macroprudential regulation, as in the Bank of England, to cases where macroprudential policies continue being conceptualized and implemented by financial regulators, as in Sweden where the Financial Supervisory Authority received the sole financial stability mandate from the parliament taking powers out from the Riskbank.

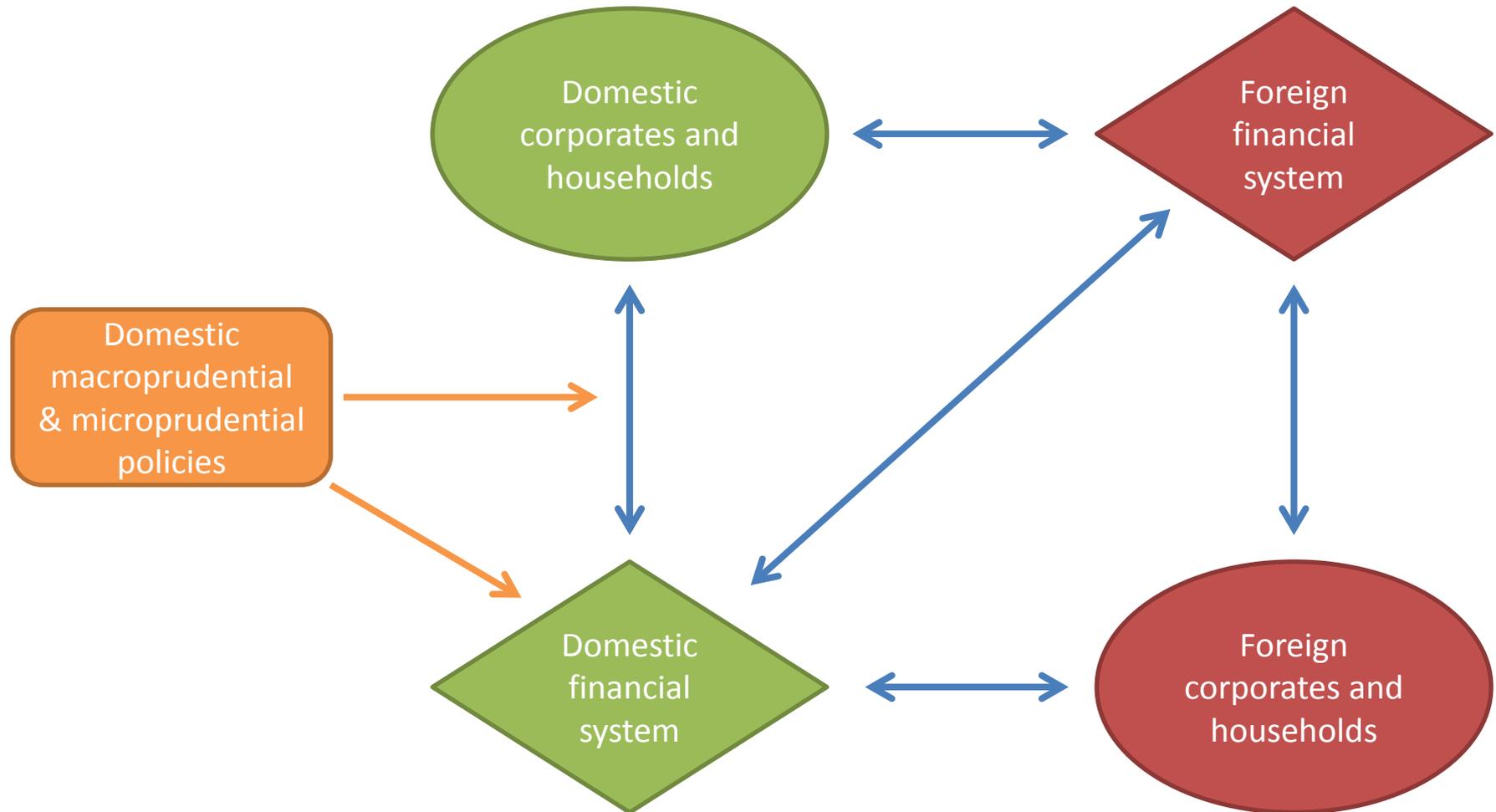
2) How should the monetary authority incorporate financial stability considerations?

- Relevant research questions in this topic include:
 1. How monetary and macroprudential regulation policies are addressing price and financial stability objectives.
 2. If policies are being conducted in an integrated framework where the central bank is in charge of implementing macroprudential regulation along with monetary policy, or if policies are executed by separate institutions.
 3. How macroprudential regulation effectiveness is altered by the stance of monetary policy.
 4. How macroprudential regulation can modify the monetary policy transmission mechanisms.
 5. How price control credibility could be jeopardized by a central bank's commitment to financial stability.
 6. Which tools should accompany a financial stability mandate.
 7. Which arbitrage opportunities are generated by the joint implementation of different prudential policies.
 8. How monetary and macroprudential regulation policies interact in normal times and in times of financial stress.

3) How does international financial integration constrain monetary policy and prudential regulatory policies?

- The continue surge of international capital flows is increasing the sensitivity of countries to external factors, meanwhile it is limiting the effectiveness of a country's monetary and macroprudential regulation policies.
- This capital market integration is a double-edged sword creating opportunities to finance investment and to provide risk-sharing, but could generate vulnerabilities if financial funds are inefficiently allocated.
- This global phenomena raise the question if there should be a centralized global agency regulating financial vulnerabilities or if at least there should be a harmonization of financial regulation policies across countries.

Can the trinity of policies deal with international shocks and policy spillovers?



3) How does international financial integration constrain monetary policy and prudential regulatory policies?

- Relevant research questions in this topic include:
 - 1) The mechanisms through which financial integration impacts domestic macroeconomic and financial variables in the region.
 - 2) To what extent capital flows affect liquidity in the financial system and the credit cycle.
 - 3) The role played by global and regional commercial banks in the propagation of risk across countries.
 - 4) How credit cycles affect households, firms and financial intermediaries' economic decisions.
 - 5) In the absence of a global centralized agency limiting financial vulnerabilities, what is the scope for regional policy coordination in Latin America and the Caribbean
 - 6) Which existing international financial regulatory guidelines can be applied to the countries in the region.
 - 7) Which common indicators of financial stability should be tracked to help a policy response at a multi-country level.

CEMLA Joint Research 2014: Monetary Policy and Financial Stability

- At CEMLA we chaired the joint research initiative of Central Bank researchers in 2014 and 2015 with two books in preparation.

	Institution	Researcher(s)	Document
1	Banco Central de Barbados, Banco Central de República Dominicana and Banco Central de Belize	Allan Wright, Francisco Ramírez and Rumile Arana	Interaction of Monetary and Macro-Prudential Policies
2	Banco Central do Brasil	João Barata R. B. Barroso	Realized Volatility as an Instrument to Official Intervention
3	Banco Central de Bolivia	Oscar Díaz and Tatiana Rocabado	The Effect of Monetary Policy in Bank Credit – Evidence for Bolivia
4	Banco de Guatemala	José Alfredo Blanco-Valdés and Héctor Augusto Valle-Samayoa	The Credit Channel in Guatemala
5	Banco de México	Martín Tobal and Renato Yslas	Two Models of FX Market Interventions
6	Banco Central de República Dominicana	Francisco Ramírez	The_Relationship_Between_Credit_and_Business_Cycles
7	CEMLA	Oscar Carvallo and Leslie Jimenez	Banks' Capital Buffers and Procyclicality in Latin America
8	CEMLA and EGADE	Alberto Ortiz	Optimal Monetary Policy Design with Financial Stability Considerations

CEMLA Joint Research 2015: International Monetary Spillovers

	Institution	Researcher(s)	Document
1	Banco Central do Brasil	João Barata R. B. Barroso	Quantitative easing and portfolio rebalancing towards riskier foreign assets
2	Banco Central de Chile	Jorge Fornero, Roque Montero and Andrés Yany	Reassessing the effects of foreign monetary policy on output: new evidence from structural and agnostic identification procedures
3	Banco Central de Costa Rica	José Pablo Barquero Romero and Evelyn Muñoz Salas	The Effects of the International Monetary Expansion on Costa Rica's Economy
4	Bank of England	Martin Weale and Tomasz Wieladek	What are the macroeconomic effects of asset purchases?
5	Banco de España	Fructuoso Borrillo, Ignacio Hernando and Javier Vallés	The impact of U.S. unconventional monetary policies in Latin America
6	European Central Bank	Georgios Georgiadis and Johannes Gräßl	Global Financial Market Impact of the Announcement of the ECB's Expanded Asset Purchase Programme
7	European Central Bank	Luca Dedola, Giulia Rivolta and Livio Stracca	If the Fed sneezes, who gets a cold?
8	Banco de Guatemala	Héctor Valle and Edwin Morales	Guatemala ante los efectos del Quantitative Easing, sus recortes y la normalización de la política monetaria en los Estados Unidos
9	Bank of Jamaica	André Murray	Investigating monetary policy spillovers of advanced economies to small open developing countries
10	Banco de México	Claudia Ramírez and Miriam González	Have Quantitative Easing Programs Affected Capital Flows to Emerging Markets? A Regional Analysis
11	Banco Central de Reserva del Perú	Jairo Flores and Marco Vega	The Transmission of US Financial Shocks to Latin American Countries: A GVAR Approach
12	Banco Central de la República Dominicana	Francisco Ramírez, Ariadne Checo and Salomé Pradel	Measuring the Effects of the "Normalization" of U.S. Monetary Policy on the economies of Central America and the Dominican Republic
13	Banco Central del Uruguay	Elizabeth Bucacos	Impact of international monetary policy in Uruguay: a FAVAR approach
14	CEMLA	Kólver Hernández	The transmission of US shocks to emerging markets

Flow of funds in the financial system

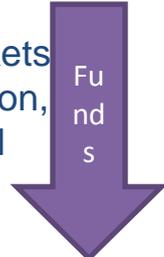
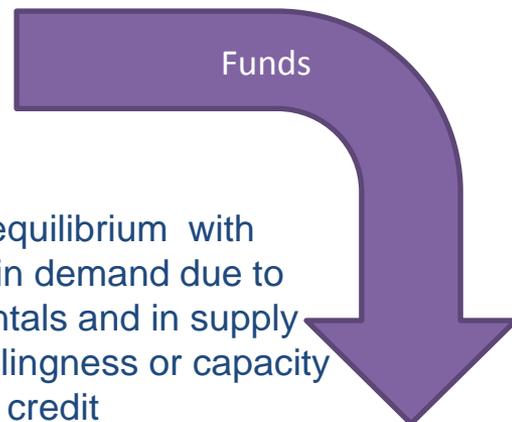
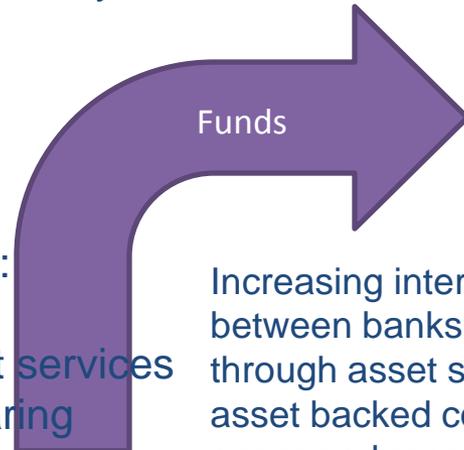
Tension between growth promotion and instability.

- Reduction of transaction costs
- Asset transformation
- Risk-sharing
- Loan monitoring

- Provision of:
- Funding
 - Payment services
 - Risk-sharing

Increasing interlinkage between banks and markets through asset securitization, asset backed commercial paper and repos.

General equilibrium with changes in demand due to fundamentals and in supply due to willingness or capacity to extend credit

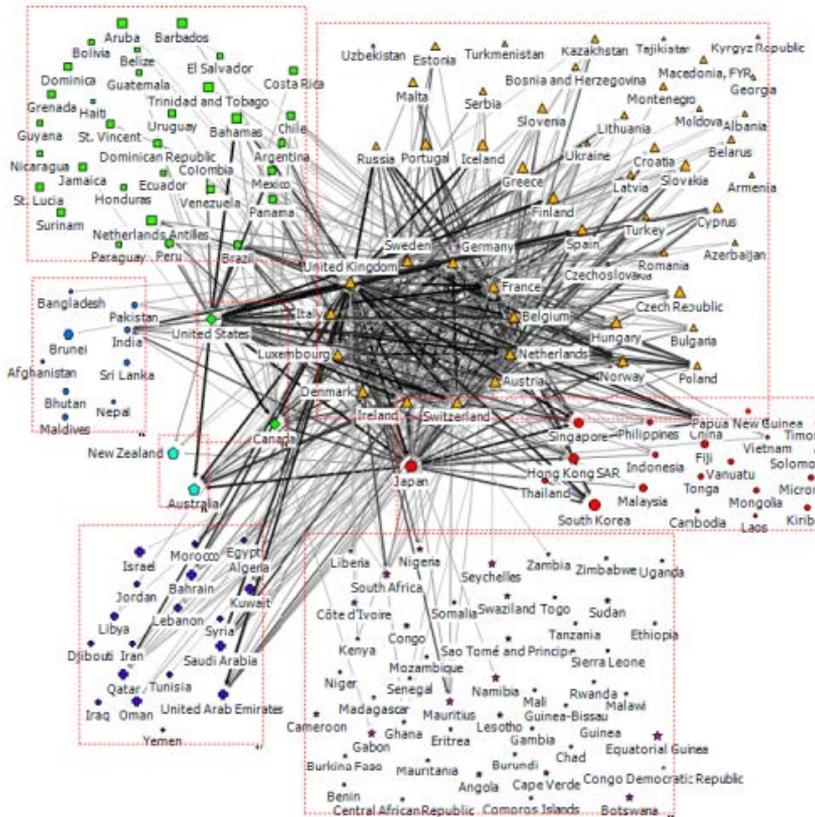


Liquidity credit default and interest rate risks, maturity mismatches, negative capital shocks, contagion

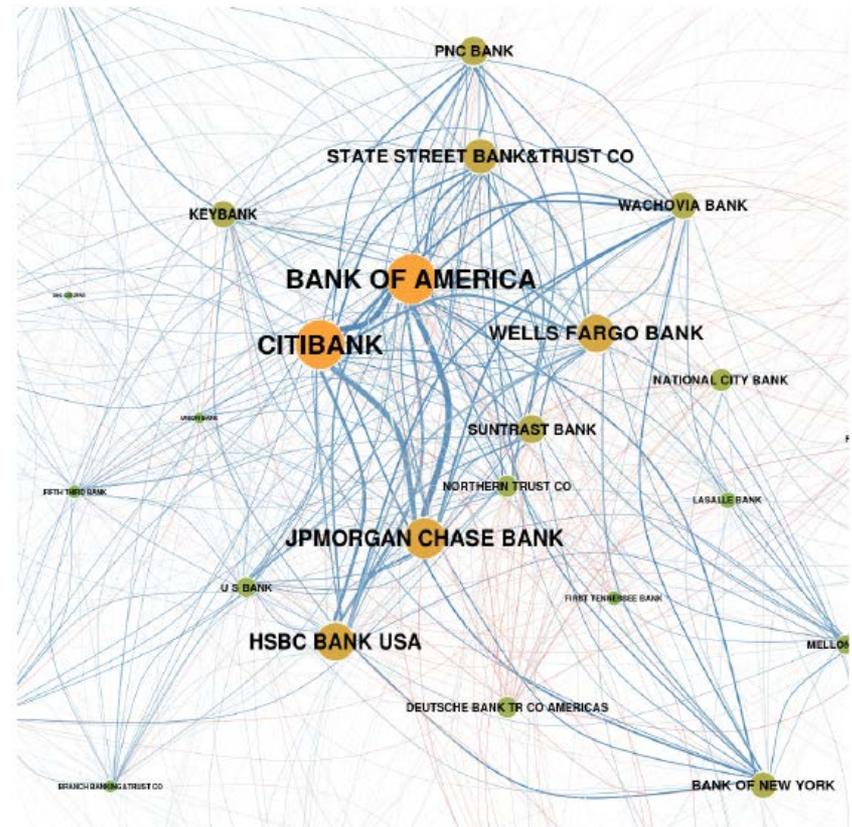
Complexity of financial networks

Too, big / connected/
complex to fail with moral
hazard for large risk-
taking.

Across countries



Within a country



Source: Network view of cross-border banking in 2007
<http://www.fna.fi/content/financial-networks-research-update-22011>

Source: OTC Derivatives and Systemic Risk in Financial
Networks. <https://www.sg.ethz.ch/projects/otc-derivatives-and-systemic-risk-financial-networks/>

Macroprudential policy and systemic risk

- Systemic risk: is the risk of threats to financial stability that impair the functioning of a large part of the financial system with significant adverse effects on the broader economy (IMF-FSB-ECB as in Freixas, Laeven and Peydró (2015) MIT Press).
- **Externalities:**
 - i. within the financial system

Market inefficiencies

- Financial amplification: creates pro-cyclicality in capital markets.

binding credit constraint → asset fire-sale → declining asset prices



capital outflows → falling exchange rates → declining collateral



- Pecuniary externality: agents do not internalize effect of individual borrowing on risk or collateral market prices.



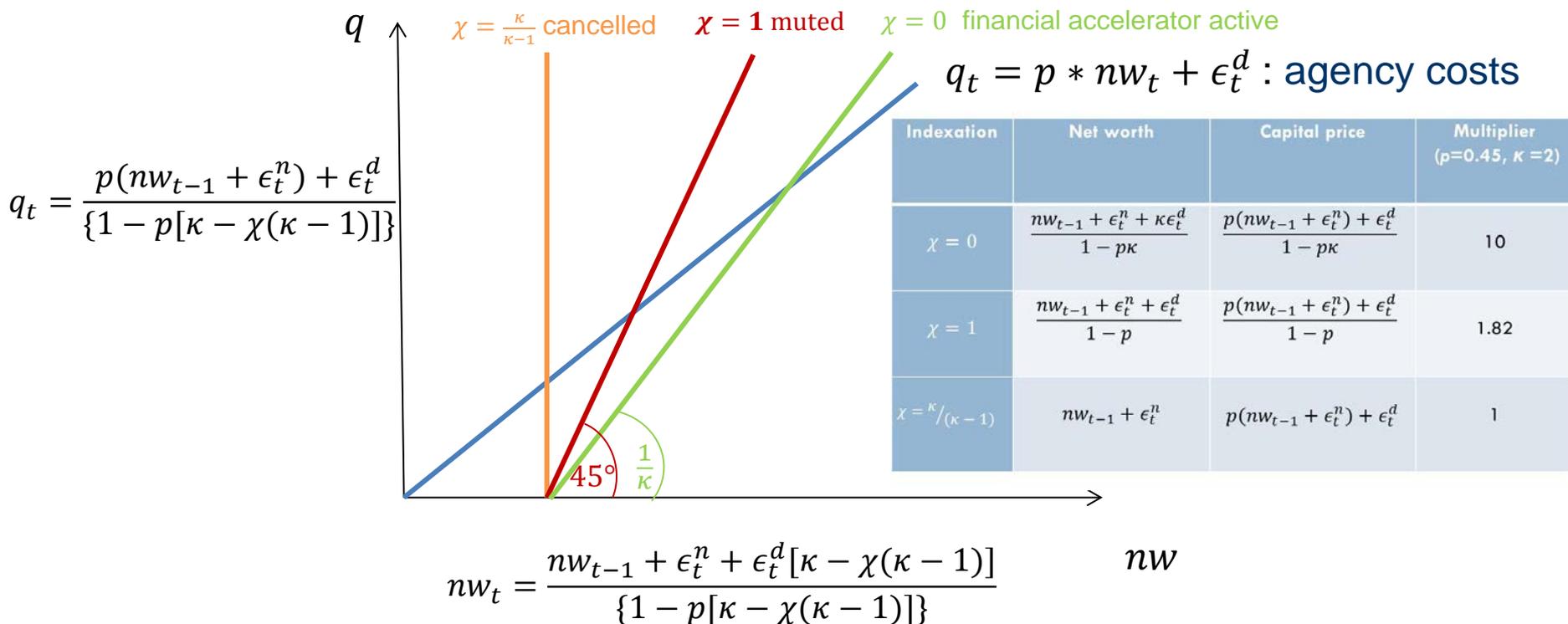
Macroprudential policy and systemic risk

- Systemic risk: is the risk of threats to financial stability that impair the functioning of a large part of the financial system with significant adverse effects on the broader economy (IMF-FSB-ECB as in Freixas, Laeven and Peydró (2015) MIT Press).
- **Externalities:**
 - i. within the financial system
 - ii. from the financial system to the broader economy

Estimating Contract Indexation in a Financial Accelerator Model Carlstrom, Fuerst, Ortiz and Paustian (JEDC 2014)

- We analyze the positive implications of indexing credit contracts to observable aggregate variables which, through providing insurance, could increase welfare.

financial accelerator: $nw_t = nw_{t-1} + \kappa q_t - (\kappa - 1)r_t^p + \epsilon_t^n$ and $r_t^p = \chi q_t$



Macroprudential dimensions (from Freixas et al 2015)

1. Cross-sectional dimension:

- Contagion
- Amplification and feedback effects
- General equilibrium

2. Time dimension

- Procyclicality
- Endogenous risk taking
- Systemic crises as discontinuities

Macroprudential instruments (from Freixas et al 2015)

Cross-sectional dimension	Time-dimension
Systemic capital surcharges	Countercyclical capital buffers
Systemic liquidity surcharges	Time-varying systemic liquidity surcharges
Levy on non-core liabilities	Countercyclical change in risk weights for exposure to certain sectors
Higher capital charges for trades not clear through central counterparty and Clearing Houses	Through-the-cycle valuation of margins on haircuts for repos
Powers to break up financial firms on systemic risk concerns	Time-varying LTV, Debt-To-Income (DTI) and Loan-To-Income (LTI) caps
Capital charge on derivative payables	Time-varying limits on currency mismatch or asset exposures
Deposit insurance risk premiums sensitive to systemic risk	Time-varying limits on aggregate credit, credit growth, and loan-to-deposit ratios
Restrictions on permissible activities (e.g. ban on proprietary trading for systemically important banks)	Dynamic provision rules

Prudential policies in Latin America and the Caribbean

Table 2: Prudential policies in Latin America and the Caribbean

		Financial system component					
		Bank or deposit-taker		Non-bank investor	Securities market	Financial infrastructure	
		Balance sheet	Lending contract				
Vulnerability	Solvency and leverage	capital ratio	Argentina, Brazil, Mexico, Peru	LTV cap	Argentina, Brazil, Chile, Colombia, Costa Rica, El Salvador, Guatemala, Mexico, Peru, Uruguay	margin / haircut limit	
		risk weights	Brazil	debt / income cap	Colombia		
		leverage ratio	Colombia	debt service / income cap			
		provisioning	Brazil, Bolivia, Chile, Colombia, Mexico, Paraguay, Peru, Uruguay	maturity cap	Argentina, Brazil, Peru		
		profit distribution restrictions	Argentina, Brazil	margin / haircut limit	Brazil		
		credit growth cap		tax on household credit	Brazil		
	domestic currency	reserve requirements	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Guatemala, Jamaica, Mexico, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela	valuation rules	local currency requirements	central bank balance sheet operations	Brazil
		liquidity requirements	Brazil, Chile, Colombia, Costa Rica, Peru, Uruguay				
		net stable funding ratio	Chile				
	Liquidity or market risk	foreign currency	FX lending restriction	Brazil, Peru, Uruguay	FX currency requirement	exchange trading	
reserves on FX liabilities			Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Guatemala, Jamaica, Mexico, Paraguay, Peru, Uruguay				
limits on FX gross or net positions: spot and forward		Argentina, Aruba, Bolivia, Brazil, Chile, Colombia, Costa Rica, Guatemala, Honduras, Mexico, Paraguay, Peru, Uruguay	unremunerated reserves on inflows	Argentina, Colombia, Peru			
capital requirements FX assets		Peru, Uruguay	tax on external credit	Brazil			
reserves on spot or forward open positions		Brazil	tax on inflows or outflows	Brazil			
provisions for open FX positions (spot or forward markets)		Brazil, Colombia, Mexico, Paraguay, Peru, Uruguay					
capital requirement for open positions		Colombia, Uruguay					
Interconnectedness	concentration limits	Brazil					
	limits on banks exposure to related counterparties	Chile, Colombia, Costa Rica, Mexico, Peru, Uruguay			central counterparties	Brazil	
	systemic capital surcharge						
	subsidiarisation	Brazil					

Note: the structure of this table extends Table 1 in BIS-Committee on the Global Financial System "Macroprudential Instruments and Frameworks: A Stocktaking of Issues and Experiences", CGFS Working Paper Number 38, Bank of International Settlements, May 2010. The table shows those countries that have adopted or modified this policies during the last decade. It is presented for illustration purposes and some policies and countries could be missing.

Effectiveness of Macroprudential Policies

- Dell'Ariccia et al. (2012): better at reducing the crisis impact than at preventing it.
- Instruments to build capital and liquidity buffers have reduced the ex post costs of a financial crisis.
- Increase in reserve requirements during boom years was successful when funding dried up.
- Poland, Croatia, Spain with its loan loss provisioning rules, Brazil capital controls and high-LTV car loans.
- Still scant evidence as macroprudential regulation framework was not in place to build up buffers during good times prior to the crisis.

New bank regulatory framework

- According to Freixas, Laeven and Peydró (2015) the new bank regulatory framework should have the following elements:
 - Pay greater attention to systemic risk
 - Prevent the buildup of financial imbalances
 - Monitor cross border spillovers
 - Improve banks' resolution procedures
 - Strengthen bank supervision
 - Strengthen market discipline
 - Recognize that monetary and prudential policy cannot be independent
 - Avoid excessive costs on the regulated

Credit, Financial Stability, Central Banks and Macroprudential Policy

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Sint Maarten
March 31, 2016