Linkages across Sovereign Debt Markets by Cristina Arellano and Yan Bai

Alberto Martin

CREI, UPF, Barcelona GSE, IMF

November 13, 2014

Overview

- **Motivation**
  - sovereign debt crises tend to occur in tandem
    - ★ Latin America in the 80s
    - ★ Europe today
- **Main goal**
  - extend workhorse model of sovereign default to two countries
  - study simultaneity of debt crises
- **Main channel: spillover effects**
  - country's actions affect other's incentives to default
    - ★ price of debt and recovery (haircut) on defaulted debt
  - spillover effects quantitatievely important

General reaction

- Important and timely topic
- Very interesting contribution
  - workhorse model of sovereign debt
  - extension: multicountry (Lizarazo (2009), Park (2013)) and risk averse lenders
  - non-trivial step forward
- Outline
  - description of model
  - quantitative results
  - comments: spillover channels

Model: ingredients

- Two symmetric countries and international lenders
  - infinite horizon
- Preferences: $E \sum_{t=0}^{\infty} \beta^t u(c_t)$
  - countries less patient than lenders
- Income:
  - countries: stochastic endowment
  - lenders: income from lending
- Asset markets:
  - non-contingent bond
  - sovereign risk

Model: timing and default

- In each period, two rounds:
  - round 1: repayment/renegotiation decision
  - round 2: borrowing decisions (Cournot)
- Costs of default:
  - financial autarky
  - loss of output
- To end default:
  - country must renegotiate with creditors
    - ★ Nash bargaining
  - succesful renegotiation at t ends default from $t+1$ onwards
- **Crucial assumption:** countries bargain *cooperatively*
  - take-it-or-leave-it offers, lenders must accept or reject all
  - if both countries negotiate: lenders' outside option is autarky!
    - ★ low recovery

Model: main results

- Spillover effects
  - one default raises likelihood of another
  - possibility of multiple equilibria
- Two channels:
  - bond prices
    - ★ default hurts income of lenders: raises risk-free rate r
    - ★ raises cost of repayment
  - recovery
    - ★ in joint renegotiation, worse outside option for lenders
    - ★ lower recovery: higher return to default
- Calibrate model to Europe:
  - borrower income process/preferences to match Greek data
  - lender income process/preferences to match German data
  - significant spillover effects on spreads and recoveries

Table 3: Debt Linkages

	Overall	Foreign Good Credit		Foreign Bad Credit	
Home	Mean	Repay	Default	Renegotiation	Nonrenegotiation
Default prob.	4.5	2.9	37.3	0.03	100
Renegotiation prob.	98	100	1	100	–
Recovery	66	71	90	58	–
Spread	1.6	1.6	1.9	1.1	–

Table 4: Types of Defaults and Renegotiations (%)

	Default	Repay	Renegotiation	Nonrenegotiation
Independent	75	73	7	0
Dependent	25	27	93	100
Self-fulfilling	14	0	36	87

Comment: spillover through bond prices

- In the model, spillover effects through
  - bond prices
  - recovery
- Bond prices: spillover always negative
- Why? Not obvious:
  - lower income of lenders: reduces bond prices
  - portfolio rebalancing: raises bond prices
  - higher market power of borrower (monopolist): raises bond prices
    - ★ only first effect mentioned in paper
    - ★ conceptual or quantitative?
- Possibly important during crises:
  - US and Germany during recent crisis
  - as "safe assets" disappeared, contagion vs. scarcity effects
  - investors flocked to US and German bonds, lowering interest rates

Comment: spillover through recovery rates

- Recovery rates
  - second channel for spillover effects
  - quantitatively, crucial

Table 5: Sensitivity

	Benchmark	Decomposing Mechanism			Correlated Shocks
		Linear	Low IES	Small Country	
Mean (%)					
Default probability	4.5	4.2	1.3	5.7	4.2
Spread	1.6	1.7	0.6	2.8	1.9
Recovery	66	66	62	77	64
Recovery *multiple* − *single*	-13	-10	-18	-2.5	-17
Debt service / GDP	6.3	6.3	5.9	7.4	6.4
Volatility (%)					
Risk-free rate	1.6	0.0	4.0	1.6	1.6
Spread	1.8	1.7	1.2	5.4	2.0
Exposure	15	15	17	8.5	30
Correlations across countries					
Spreads	0.42	0.28	0.52	0.17	0.67
Exposure	0.30	0.34	0.51	0.07	0.74
Default	0.34	0.45	0.32	0.11	0.59
Fraction dependent events (%)					
Default	25	35	31	–	41
Repay	27	27	22	–	22
Renegotiation	93	94	95	–	94
Nonrenegotiation	100	100	100	–	66

Comment: spillover through recovery

- Recovery rates
  - second channel for spillover effects
  - quantitatively, crucial
- Yet, not very persuasive
- Theoretical perspective:
  - countries do not cooperate when they issue debt...
  - ...but they cooperate when they negotiate!
  - hard to justify
- Practical/empirical perspective:
  - is there any evidence of countries negotiating jointly?
  - paper motivated through Latam and Euro periphery
    - ★ do they really limit outside options of investors?

Comment: spillover through recovery

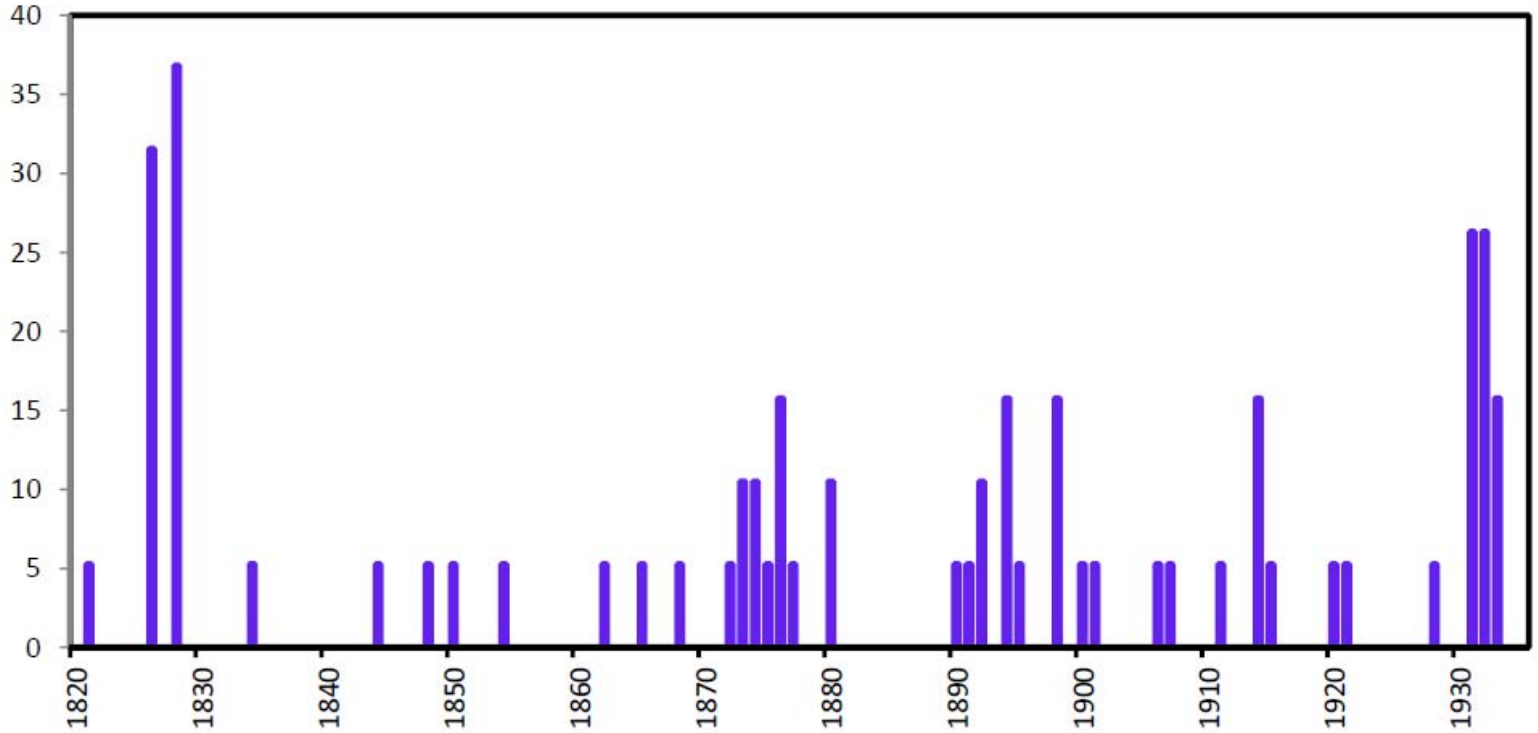
- Paper provides some empirical evidence
  - recovery rates are lower when other countries are negotiating, i.e. $\gamma_R < 0$

$$\text{recovery}_{it} = \alpha + \gamma_D \text{FracDefault}_{it} + \gamma_R \text{FracRenegotiate}_{it} + \gamma_{dy} \text{Debt/GDP}_{it} + \varepsilon_{it}$$

- Alternative story
  - defaults happen in tandem during "bad times"
    - ★ common shocks
  - fraction of countries renegotiating is higher in aftermath of these large shocks
    - ★ low recovery rates
  - in robustness, control for world GDP but probably not enough

Sovereign Defaults in Latin America

(in Percent of Countries)

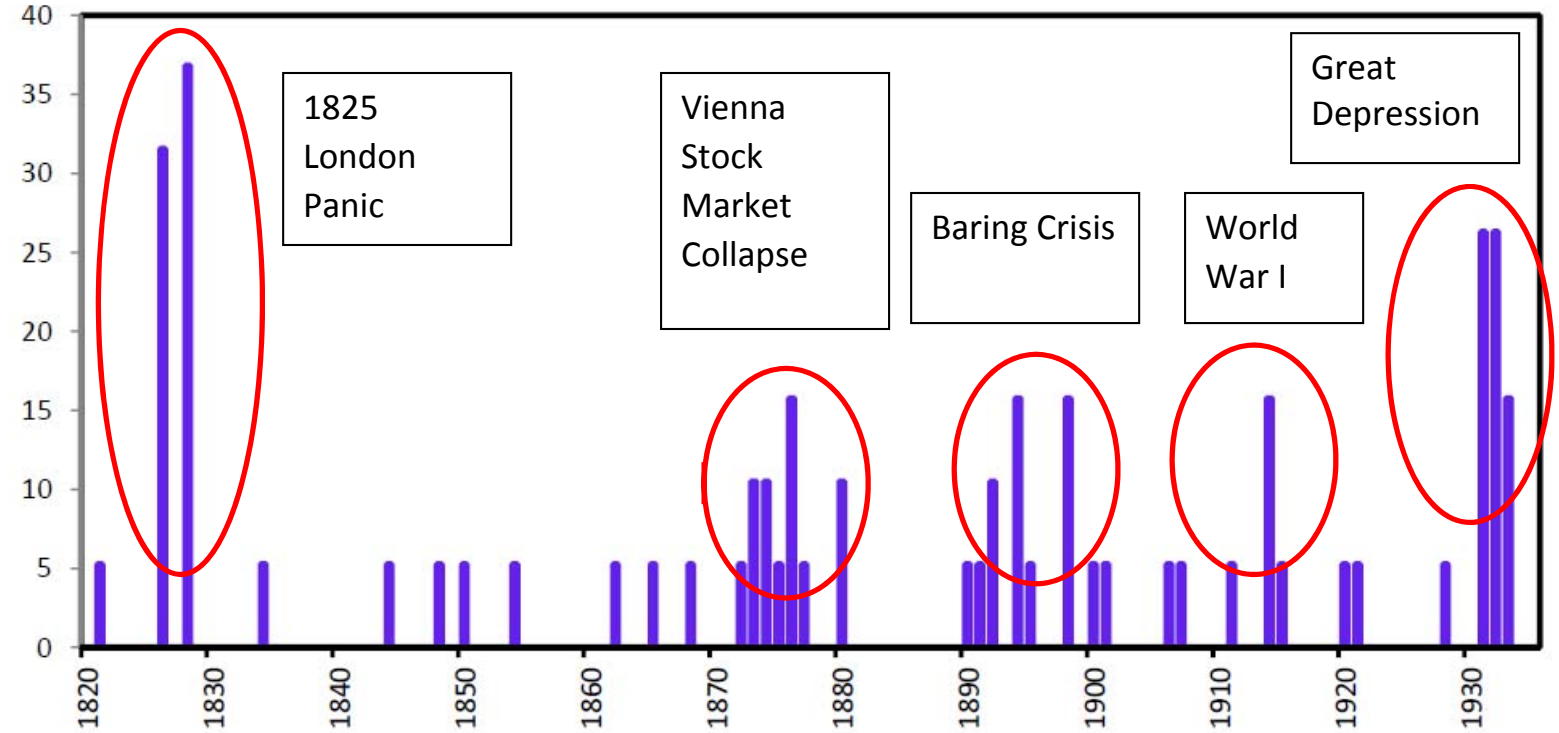


Note: The bars indicate how many countries defaulted in each year (in percent of all countries).

Source: Kaminsky and Vega-García

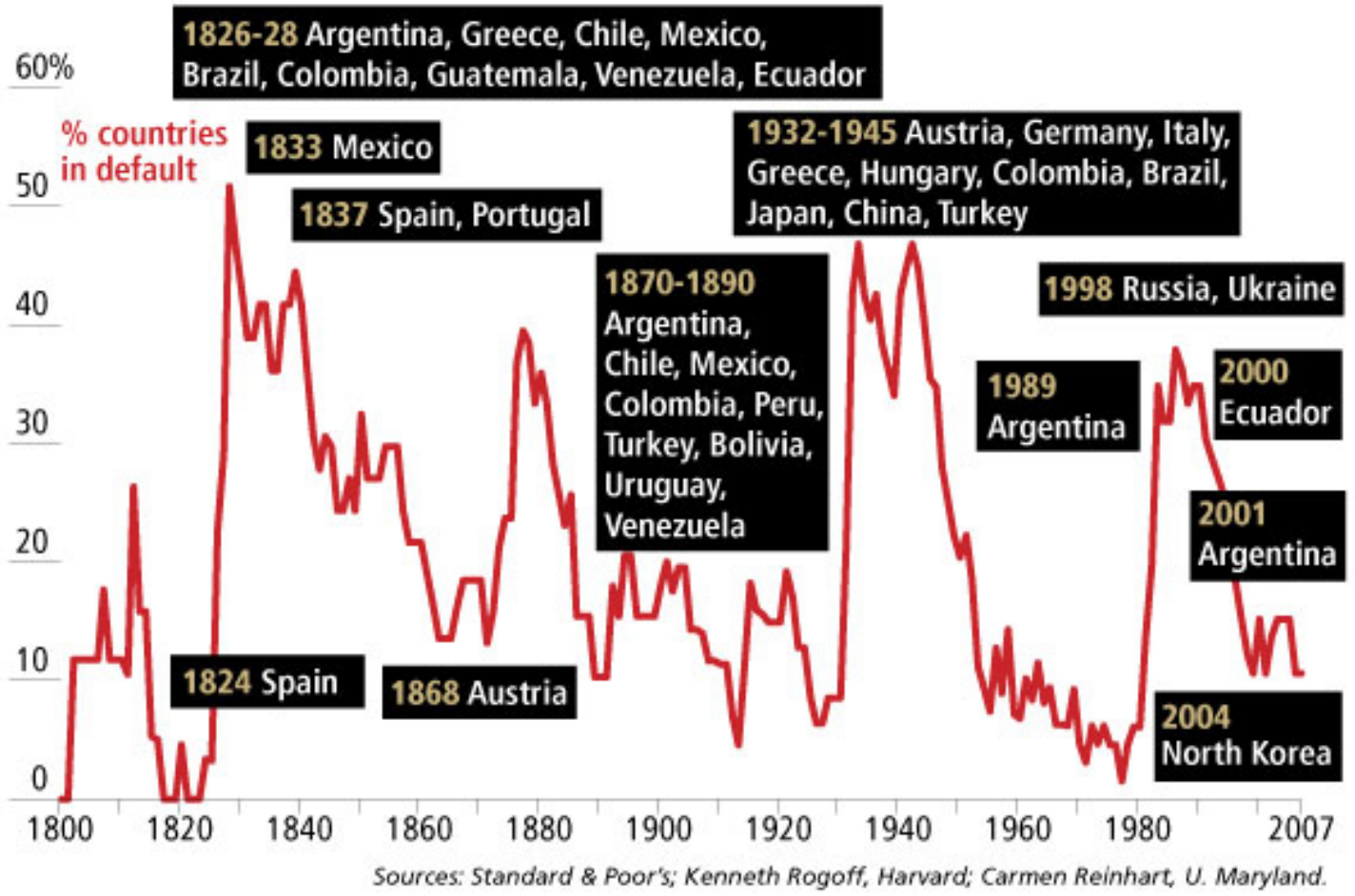
Sovereign Defaults in Latin America

(in Percent of Countries)



Note: The bars indicate how many countries defaulted in each year (in percent of all countries).

Source: Kaminsky and Vega-García



Sources: Standard & Poor's; Kenneth Rogoff, Harvard; Carmen Reinhart, U. Maryland.

Conclusion

- Very nice paper
  - important and timely topic
  - extend workhorse sovereign debt model to analyze contagion
- Main comments:
  - "bond-price" channel can be further explored
  - recovery channel not quite convincing
- Alternatives:
  - trade linkages
  - (other) financial linkages (Lizarazo 2009, Park 2013)
  - information or "wake up" call

For the (financial) record...

Ministers deny contagion in the Eurozone.

"Spain is not Greece" - Elena Salgado, Spanish Finance Minister, Feb 2010.

"Portugal is not Greece" - The Economist, April 2010.

"Greece is not Ireland" - George Papaconstantinou, Greek Finance Minister, Nov 2010.

"Spain is neither Ireland nor Portugal" - Elena Salgado, Spanish Finance Minister, Nov 2010.

"Ireland is not in 'Greek Territory'" - Irish Finance Minister Brian Lenihan, Nov 2010.

"Neither Spain nor Portugal is Ireland" - Angel Gurria, Secretary-general OECD, Nov 2010.

"Italy is not Spain" - Ed Parker, Fitch MD, June 2012.

"Spain is not Uganda" - Spanish PM Mariano Rajoy, June 2012.

"Uganda does not want to be Spain" - Ugandan Foreign Minister, June 2012.

Heard through Alex Banbury of Hamilton Capital who sent this to IFRAsia.