Banking and Sovereign Debt Crises

1. Many episodes where banking crises led to sovereign crisis/defaults
   - Recent Example: Iceland, Ireland
   - Systematic Evidence: Reinhart and Rogoff, From Financial Crash to Debt Crisis, 2010

2. Other episodes where fiscal troubles led to the demise of the banking system
   - Financial repression: governments coerce healthy banks to hold government debt in significant quantities (inflate the debt ex-post)
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Causality run both ways

Domestic and external debt accumulation underlie both crises

Hard to identify the relative importance of each channel in the absence of natural experiments
Our Approach: From fiscal shock to banking crisis

- Use a natural disaster as a fiscal shock
- Identification will be possible only if:
  - the size of the fiscal shock is big enough
  - there is variation in the degree of financial repression (banks’ exposure to public debt)
- Measure bank performance differentiating between banks with and without government debt exposure
  - Further decomposition: State versus private banks, domestic versus foreign banks
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August 17, 1999; November 12, 1999: Two big earthquakes (7.6, 7.2) hit industrial heartland of Turkey: Kocaeli, Istanbul, Bursa, Sakarya, Yalova, Duzce, Bolu

Marmara region’s share in:
★ Population: 25 percent
★ GNP: 35 percent
★ Industrial production: 50 percent
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Marmara region’s share in:
- Population: 25 percent
- GNP: 35 percent
- Industrial production: 50 percent
Does this rare disaster constitute a big fiscal shock?

- Total cost is 20 billion USD: 10-11 percent of GDP as of 2000.
- Ratio of damaged buildings (including key industrial/chemical factories) is 4 times higher than 1995 Kobe earthquake and 12 times higher than 1994 Northridge earthquake.
- Top ten in the U.S. Department of Commerce Significant Earthquakes database.
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Financial Repression

- The series of rare disasters led government force banks to increase their exposure to government debt (Asian Crisis, Russian Crisis).

- Banks dramatically change the composition of their portfolio from private sector lending to lending to government.

- Banks also increased their risk exposure feeling safe based on their government paper dominated portfolio.

- Then the exogenous fiscal shock came (earthquake), financial deterioration has reached to critical levels.

- Government went into downward debt spiral which brought the banks down culminating into twin crisis and devaluation in February 2001.
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How big are previous shocks?

- **Asian Crisis, June 1997:** First shock to Turkish banks that borrow internationally
  - A large decline in exports and GDP (-8% GDP decline)
  - A massive capital outflow of 7.2 billion USD (one third of the FX Reserves of CBRT)
  - A discrete jump on nominal interest rates on T-bills (from 77% to 137% within 1.5 months)
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Baskaya and Kalemli-OzcanGovernment Debt, Financial Repression and Bank Performance
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Earthquake Shock

- Earthquake, August 1999:
  - A significant blow to public finances
  - Further decline in GDP of -3 percent
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Inflation and Nominal Interest Rates: Financial Repression

Asian Crisis, June 1997
Russian Crisis, August 1998
Earthquake, August 1999
Stand-By, January 2000
Turkish Crisis, February 2001

- Interest Rates on Government Borrowing Auctions (Annual Compounded, Weighted Average)
- Annual CPI Inflation Rate
Government Debt, Financial Repression and Bank Performance

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Asian Crisis, June 1997

Russia Crisis, August 1998

Earthquake, August 1999

Turkish Crisis, February 2001

Public/Private Credit
Bank Balance Sheet Data from CBRT

- Universe of almost all banks in Turkey (domestic, foreign, private, public; excluding Participation Banks, which is less than 2 percent)
- Universe of Government Debt Market (Participation Banks do not participate in interest bearing borrowing and lending)
- Monthly balance sheets showing all government debt exposure and private credit provision, both with respect to domestic and foreign currency and the source of borrowing and lending (domestic vs. external).
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We ask whether the higher level of exposure of a bank to government debt market has resulted in a higher risk of it’s failure.

\[ y_{it} = \alpha_i + \lambda_t + \alpha_i \ast \omega_t + \beta Earthquake_t \times Government Debt Exposure_{it} + \gamma Gov Debt Exp_{it} + \epsilon_{it} \]

- \( i \) is bank, \( t \) is month/quarter, \( \alpha_i \) is bank-fixed effects, \( \lambda_t \) is month/quarter-fixed effects, \( \alpha_i \ast \omega_t \) is bank*quarter or bank*year fixed effects
- \( y_{it} \): Banks’ profits, capital and the SDIF-status (whether the bank taken over by the Savings Deposit Insurance Fund)
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Alternative Stories/Other Controls

- Lagged dependent variable, Russia Crisis dummy, Asia Crisis dummy, Stand-by agreement dummy, 2001 crises dummy, interactions for all dummies for government debt exposure.

- Demand side story: Banks do badly since there is a recession in the region and lower demand for credit; control for private sector lending.
Definition of Events

- Asia Crisis dummy is 1: July 1997-December 1997
- Russia Crisis dummy is 1: August 1998-December 1998
- Earthquake dummy is 1: August 1999-December 1999
- Stand-By dummy is 1: January 2000-June 2000
- Turkish Crisis dummy is 1: December 2000-December 2002
Why banks were taken over by SDIF?

- If the regulatory agency observes a private bank to experience a decline in its capital adequacy ratio resulting from losses due to its operations, then it asks the bank to add new capital and to improve the balance sheet quality.
- If the bank fails to take necessary actions, then SDIF takes over the bank.
- If bank’s capital adequacy ratio falls below the legal limit, then SDIF takes over the bank.
If capital adequacy ratio falls below the legal limit and/or if banks do not improve balance sheet quality, then they are taken over by SDIF
Table: Government Debt Exposure and Bank Performance, 1997–2011

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<td>Profits/</td>
<td>SDIF Status in t</td>
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<td>Earthquake × Gov. Sec./Assets</td>
<td>-0.327*** (0.021)</td>
<td>-0.158*** (0.015)</td>
<td>0.089*** (0.010)</td>
<td>-0.306*** (0.022)</td>
<td>-0.026*** (0.003)</td>
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<td>Gov. Sec./Assets</td>
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<td>0.000 (0.003)</td>
<td>0.001 (0.001)</td>
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<td><strong>Earthquake × Gov.Sec./Assets</strong></td>
<td>-0.343***</td>
<td>-0.166***</td>
<td>0.092***</td>
<td>-0.222***</td>
<td>-0.254***</td>
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<td>(0.020)</td>
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Baskaya and Kalemli-Ozcan

*Government Debt, Financial Repression and Bank Performance*
Median bank (government securities share in total assets is 13 percent), witnesses 2 percentage point decline in profits to assets ratio and 4.4 percentage point decline in growth rate of bank capital.

Sizeable effects: 49 percent decline in profits to assets and 95 percent slowdown in capital growth relative to the pre-earthquake mean.

Such a bank also faces a 1.2 percentage point increase in probability of being taken over by Savings Deposit Insurance Fund (SDIF) relative to pre-earthquake mean.

Focusing on intensive margin only (or lagged) halves the estimates, constituting our lower bound.
Further Robustness

- Predetermined exposure/Lagged independent variables
- Quarterly data going back to 1986
If banks who hold more government securities on their balance sheets are affected from earthquake more (customer-wise), then our identification will be invalid. This is not the case.

If there are differential prior trends in our dependent variables between banks with high and low exposure to government debt, this will invalidate our strategy. We show that there are no differential trends.
Figure 7a: Profits to Assets Ratio By Each Quarter (All Banks)

- Profits/Assets for Banks Holding Gov't Securities Above Median Bank
- Profits/Assets for Banks Holding Gov't Securities Below Median Bank

Baskaya and Kalemli-Ozcan

Government Debt, Financial Repression and Bank Performance
Figure 7a: Profits to Assets Ratio By Each Quarter (All Banks)

Profits/Assets for Banks Holding Gov't Securities Above Median Bank

Profits/Assets for Banks Holding Gov't Securities Below Median Bank

1999 Earthquake

Nov 2000 Liquidity Crises

Summary and Discussion

- Direct causal evidence on: fiscally unsustainable sovereign bringing the banking sector down.
- Banks with higher exposures to government debt pre-earthquake have witnessed declining capital and equity values and profits after the earthquake.
- The effects are economically significant and have a direct impact on investment and real economy through hindered domestic credit expansion.
- Evidence on an alternative channel for public debt overhang on real sector, which is very relevant for Europe today.
Table: Domestic Debt, External Debt, Credit Growth (%): 1995–2009

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<td>External Private Debt/GDP</td>
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<td>Domestic/Total Public Debt</td>
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<td>Government Bonds/Bank Assets</td>
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Stand-By Agreement: 2000Q1

- 36 Month Stand-By Program announced on December 9, 1999 aiming at reducing inflation and restoring fiscal balances.

- Entailed a planned crawling peg regime for Jan. 2000-June 2001 in line with inflation targets, and a crawling band regime with a widening band for July 2001 to Dec. 2002 as a gradual exit to floating exchange rate regime.

- Central Bank commitment to no sterilization, whereby changes in the net foreign assets of its balance sheet would be the main source of changes in the monetary base.

- Explicit austerity measures on government expenditures and explicit primary balance as performance criteria.

- Resulted in a liquidity crises in November 2000, outflow of 6 billion USD as well as take-over of the control of a number of banks by Saving Deposit Insurance Fund.

- The grant of extra 7.5 billion USD by IMF as part of Supplementary Reserve Facility and a technical revision on the monetary policy side of the program in late December 2000.
Should we worry about Nickell Bias?

No.

- Monte Carlo studies show that when $T$ is larger than 20 the Nickell bias is negligible (Judson and Owen (1999)).
- Our $T=60$
- Under such circumstances, it is always better to perform fixed-effects LS estimation than the Arellano Bond difference and system GMM methods.
- The bias on the lagged dependent variable is less than 1% when the time horizon exceeds 30.
- More importantly, the bias on other independent variables becomes less than 1% when time horizon exceeds 30.
- Preliminary results stay intact when standard corrections applied