

Which Financial Frictions? Parsing the Evidence from the Financial Crisis of 2007-9

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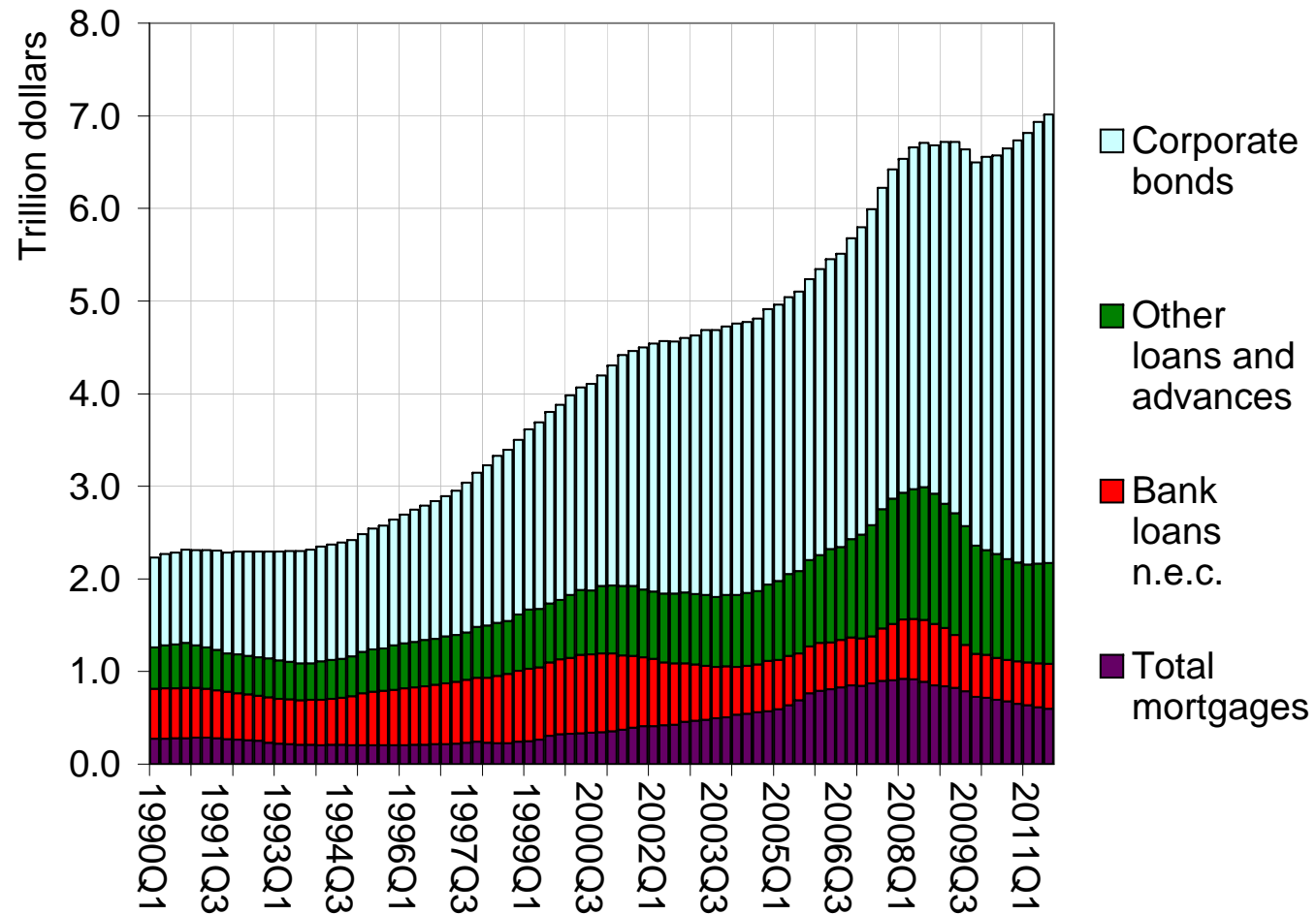


Figure 1. Credit to non-farm, non-financial corporate business sector (Source: Flow of Funds, table L102)

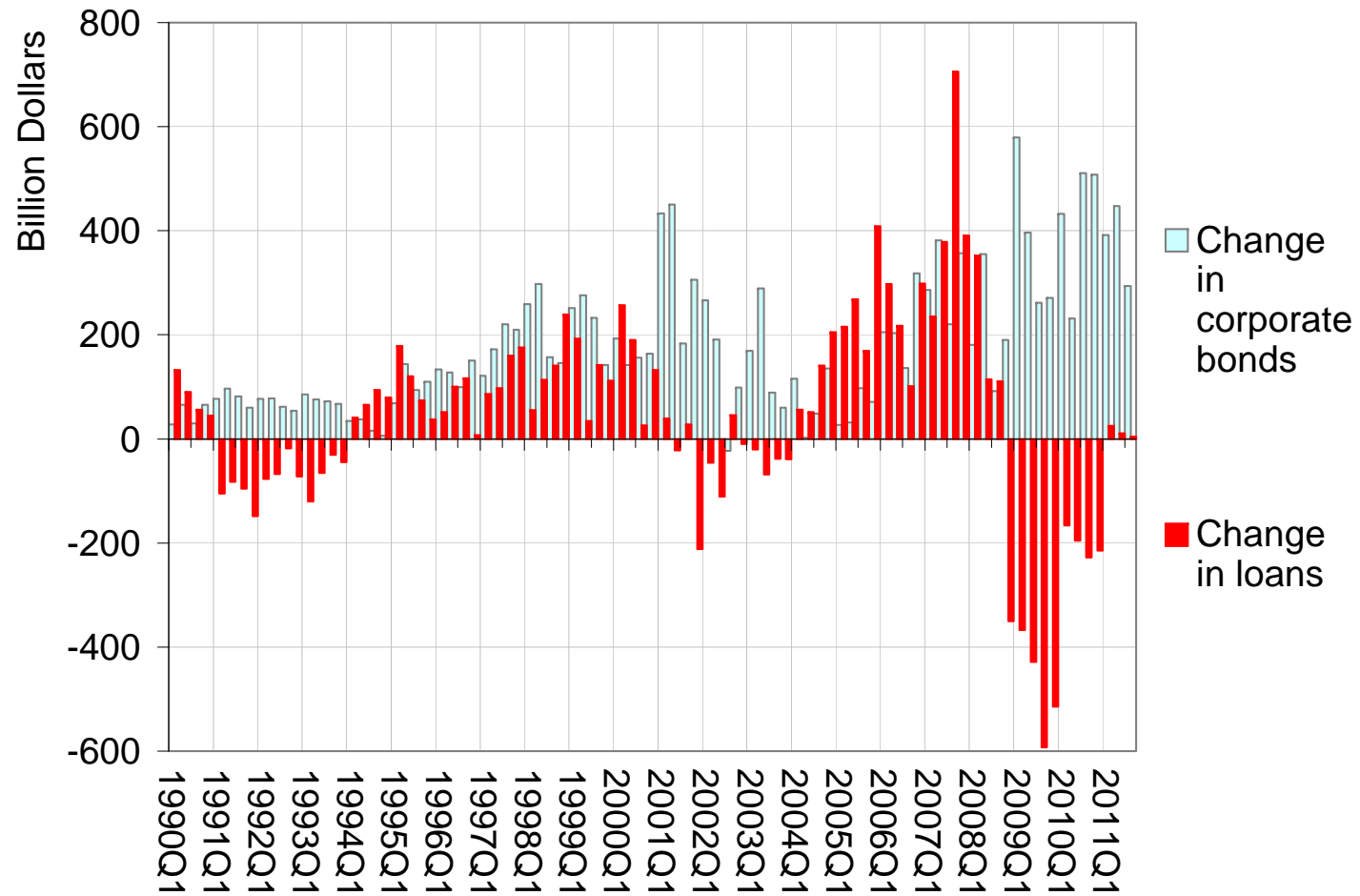


Figure 2. Change in outstanding credit to non-farm, non-financial corporate business sector (Source: Flow of Funds, table F102)

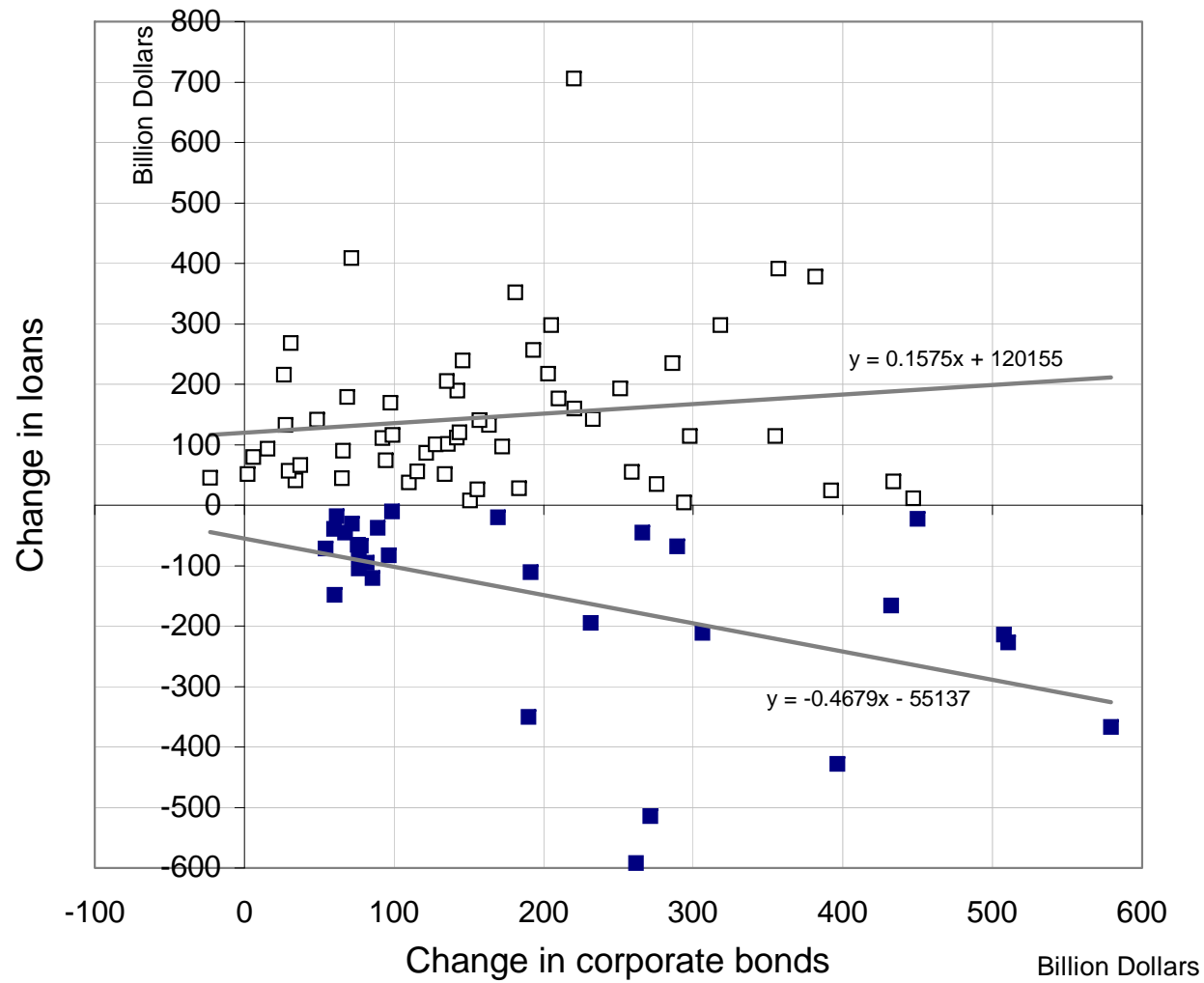


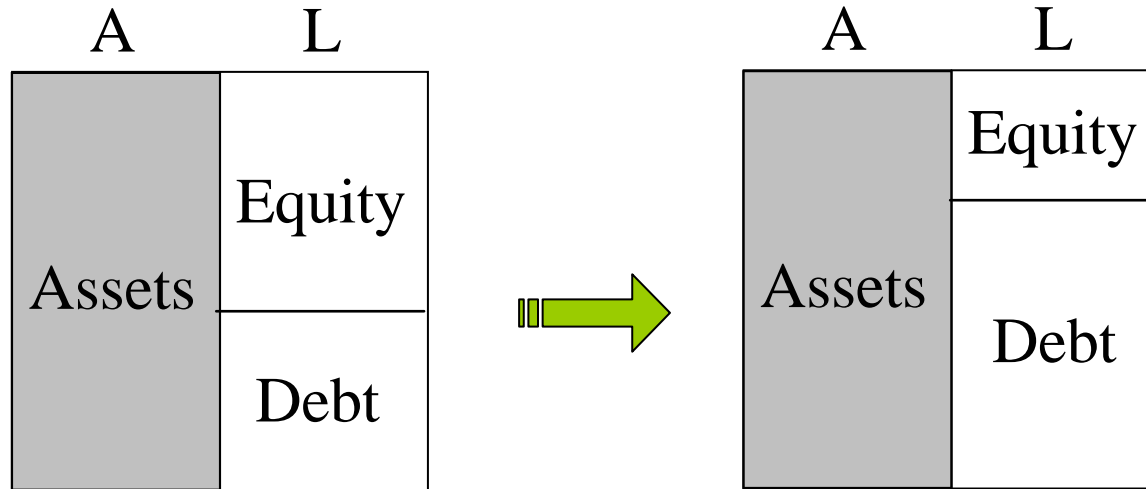
Figure 3. Scatter of change in loans and bonds outstanding to non-farm, non-financial corporate business sector (Source: Flow of Funds, table F102)

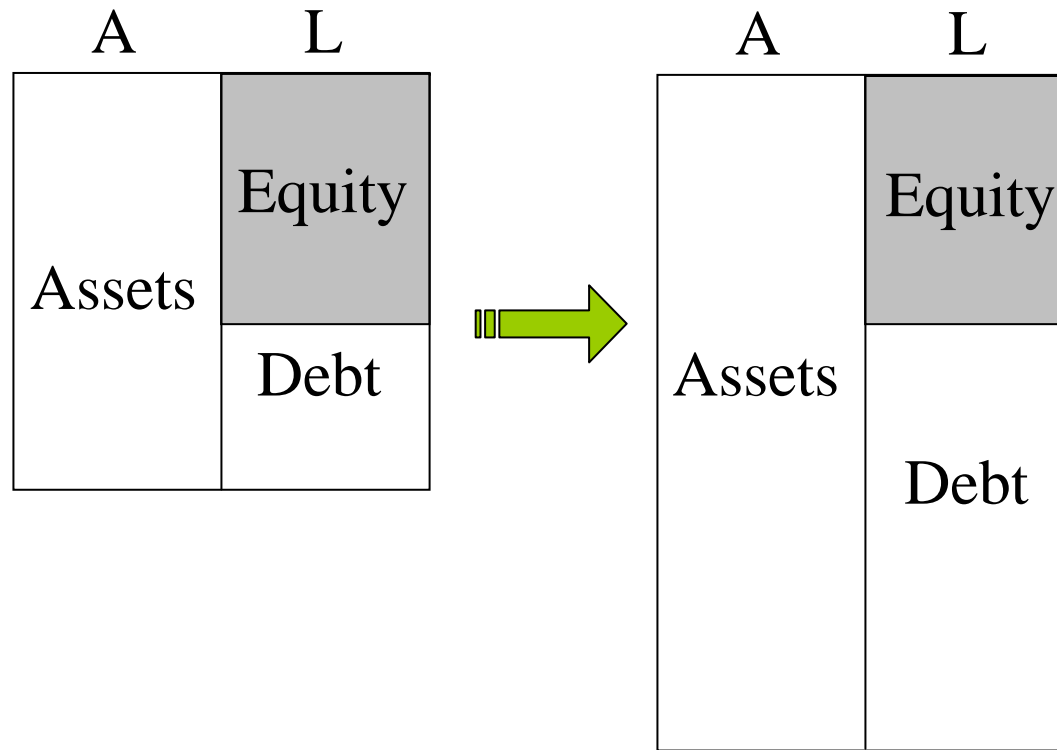
First Impressions

- Loans decline in downturns
- But corporate bonds increase to make up most of the gap
 - Does aggregate evidence hold up at micro level, too?
 - What happens to spreads?
- Need to address difference between **direct** and **intermediated finance**

Corporate Finance of Banking

A	L
Assets	Equity
	Debt





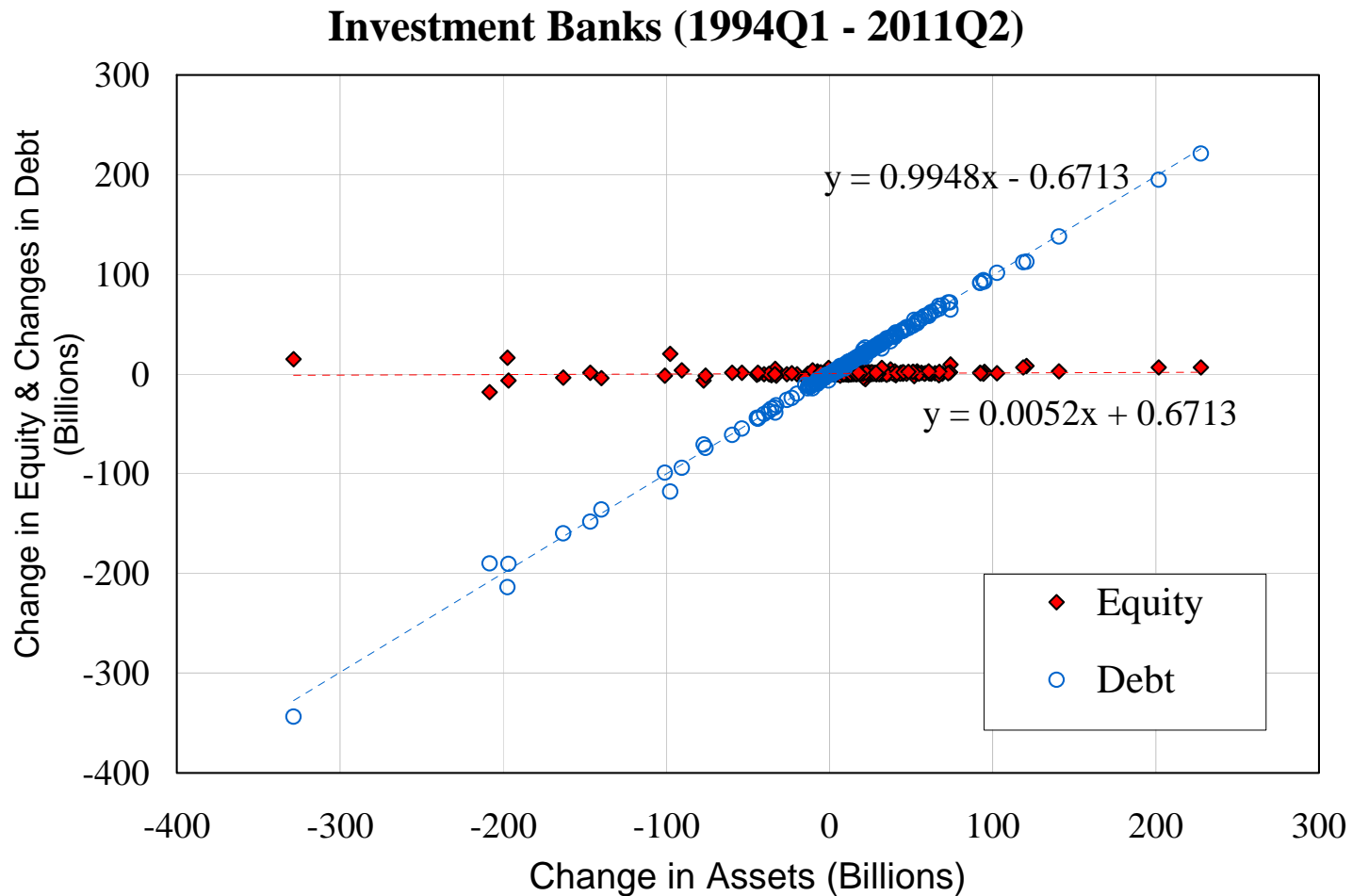


Figure 4. Scatter chart of $\{(\Delta A_t, \Delta E_t)\}$ and $\{(\Delta A_t, \Delta D_t)\}$ for changes in assets, equity and debt of US investment bank sector consisting of Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch and Morgan Stanley between 1994Q1 and 2011Q2 (Source: SEC 10Q filings).

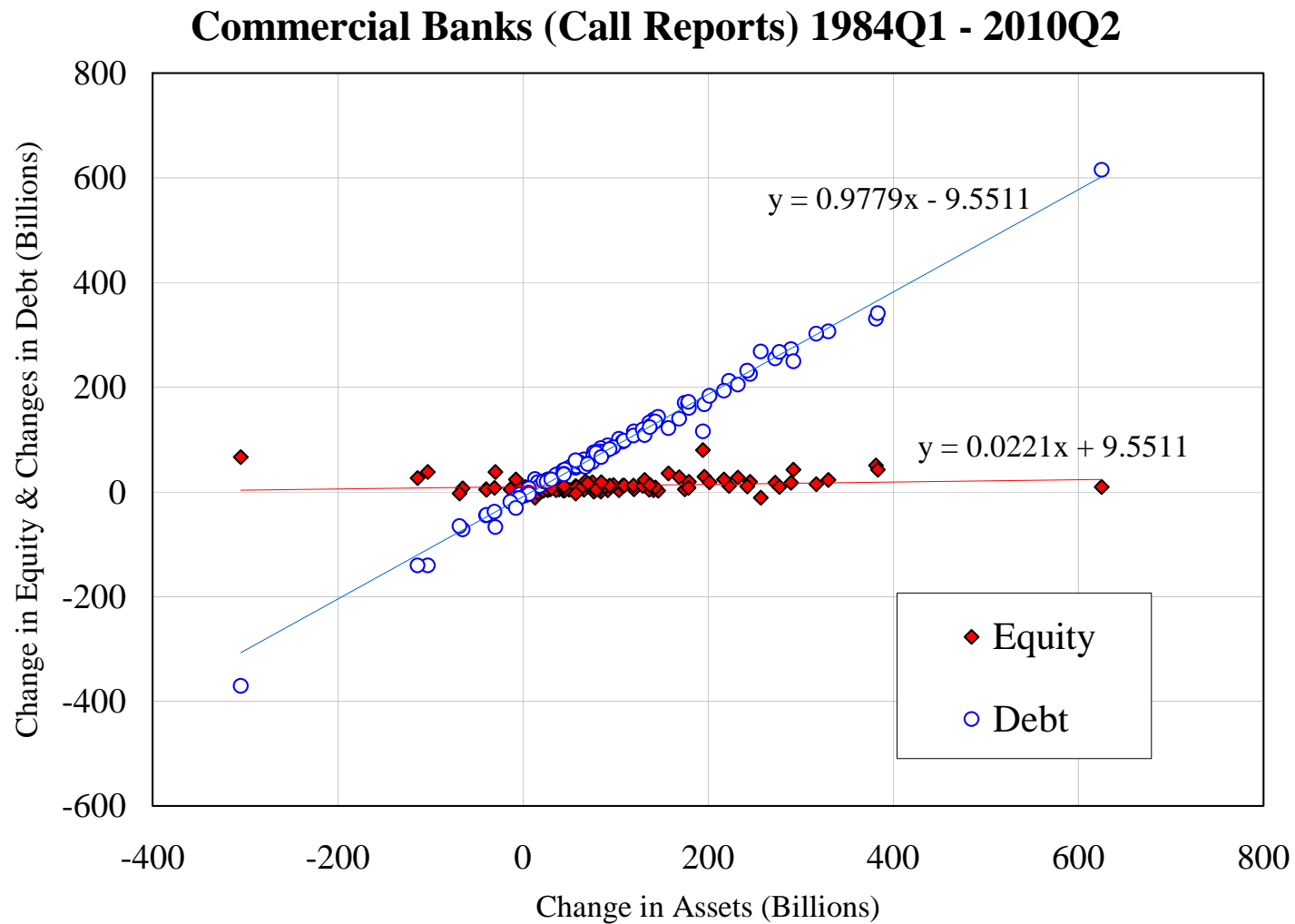


Figure 5. Scatter chart of $\{(\Delta A_t, \Delta E_t)\}$ and $\{(\Delta A_t, \Delta D_t)\}$ for changes in assets, equity and debt of US commercial bank sector at t between 1984Q1 and 2010Q2 (Source: FDIC call reports).

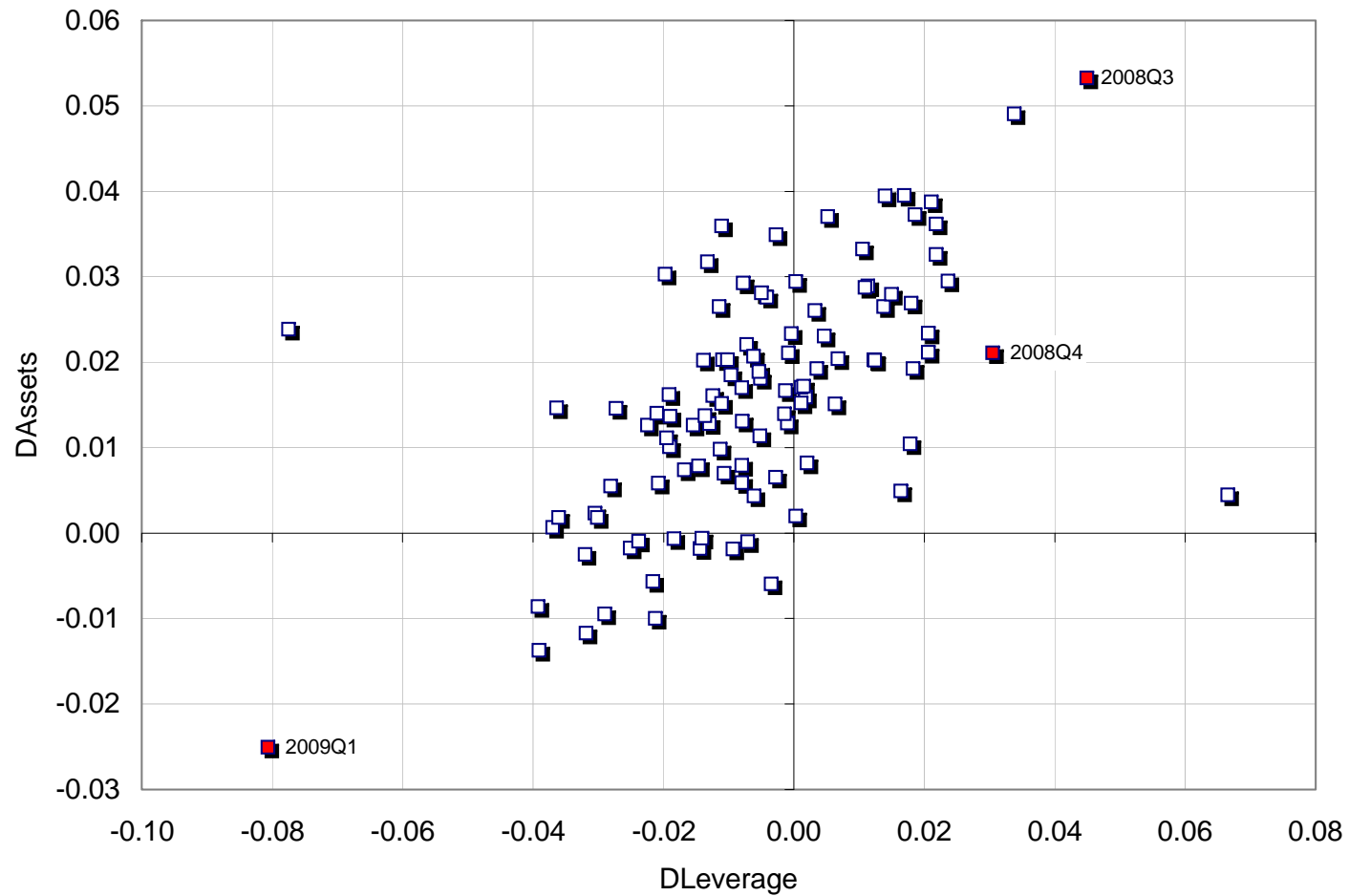


Figure 6. Scatter chart of quarterly asset growth and quarterly leverage growth of the US commercial bank sector, Q1:1984 - Q2:2010. Leverage is defined as the ratio of sector assets to sector equity, and growth is measured as log differences (Source: FDIC Call Reports).

Checklist for the Banking Sector

- Bank lending rises and falls dollar for dollar through a change in debt financing, while equity remaining largely unchanged.
 - Equity is “sticky”
 - Bank chooses leverage given equity

- As a result, banking sector leverage is procyclical

Closer Look at Evidence

- Sample: U.S. public firms 1998-2010
- Intersection between
 - Compustat
 - Loan Pricing Corporation (LPC) Dealscan database
 - Securities Data Corporation (SDC) New Bond Issuances database
- 4,902 firms with new financing between 1998 and 2010 (out of 11,856 in Compustat sample)

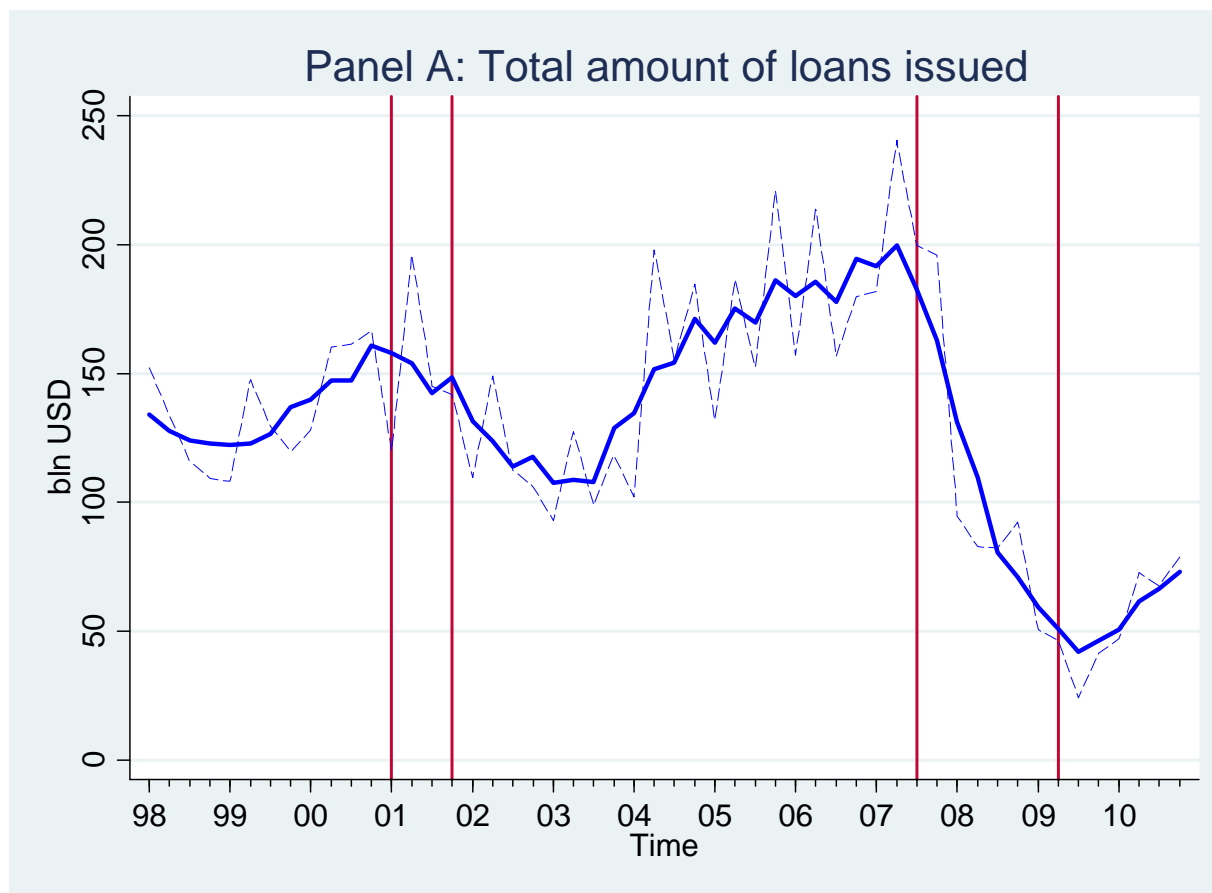


Figure 7

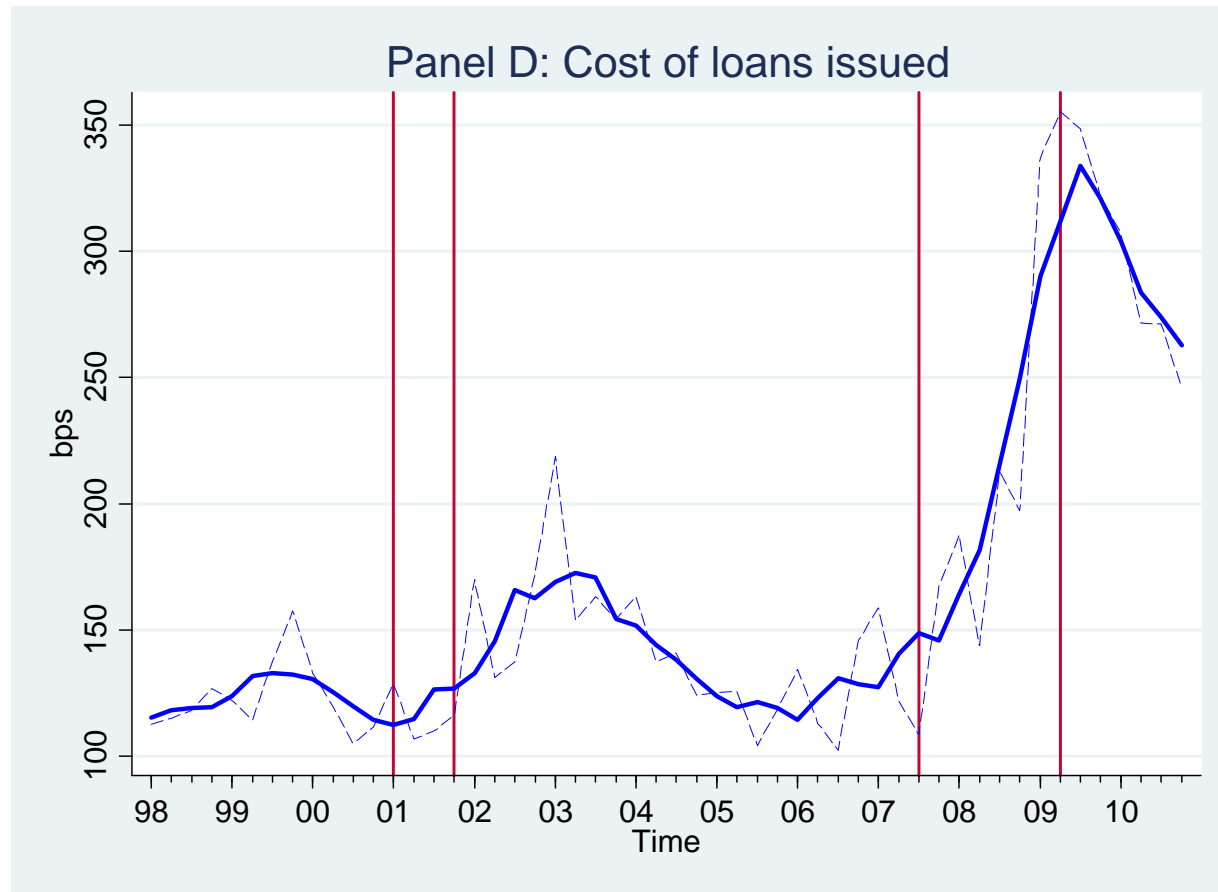


Figure 8

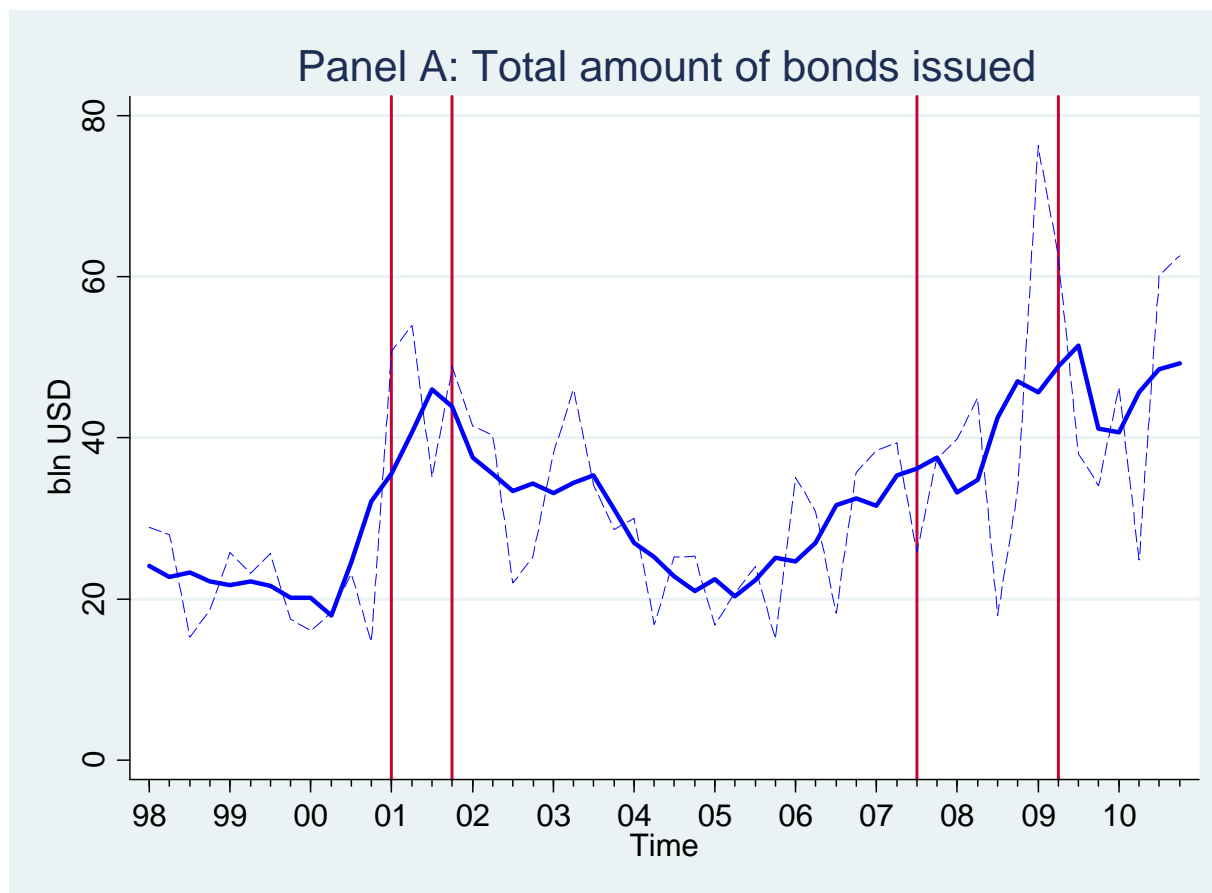


Figure 9

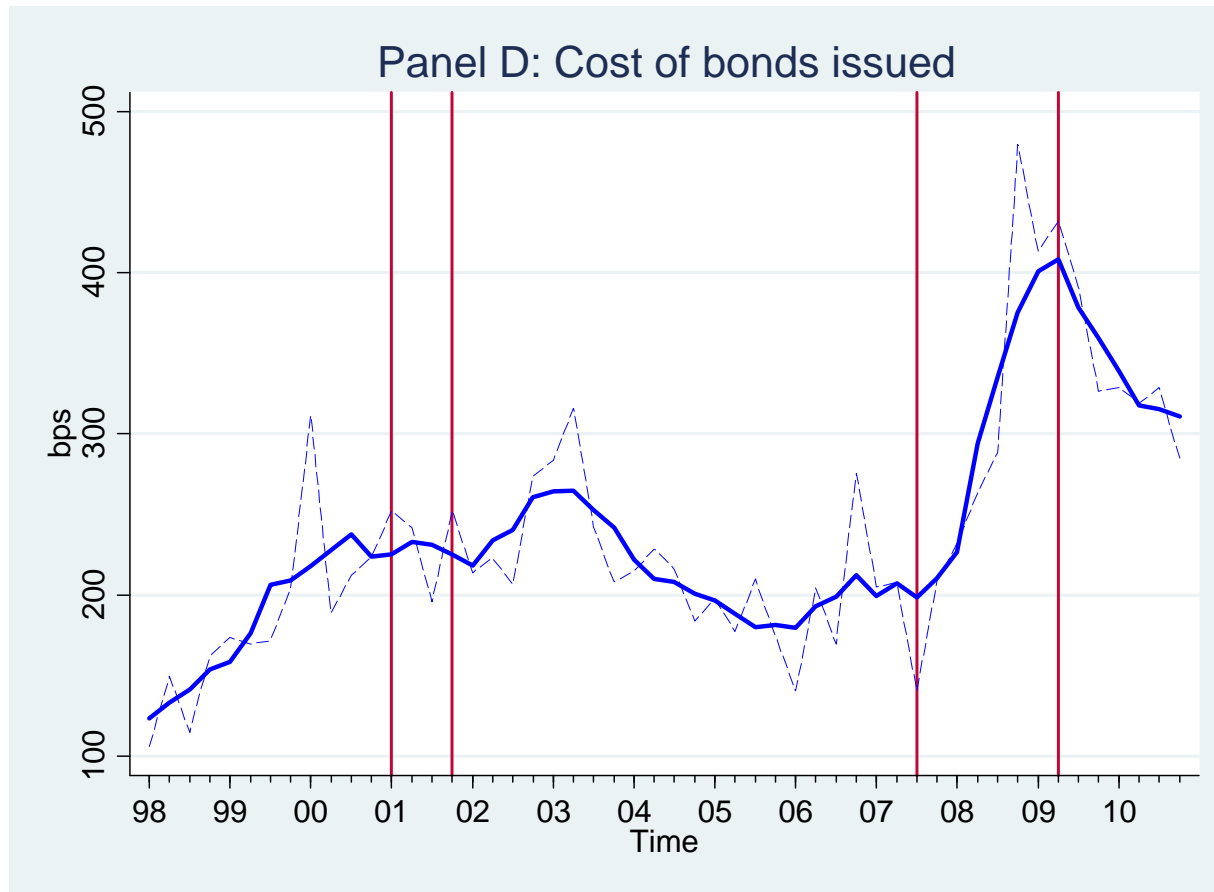


Figure 10

Before and After the Crisis

- **Before:** Q3:2005 ~ Q2:2007
- **After:** Q3:2007 ~ Q2:2009
- Sub-sample of 861 firms that either issued new bonds or obtained new loans after the crisis
- Tercile sorts according to size (total assets), payout ratio, cash, ...

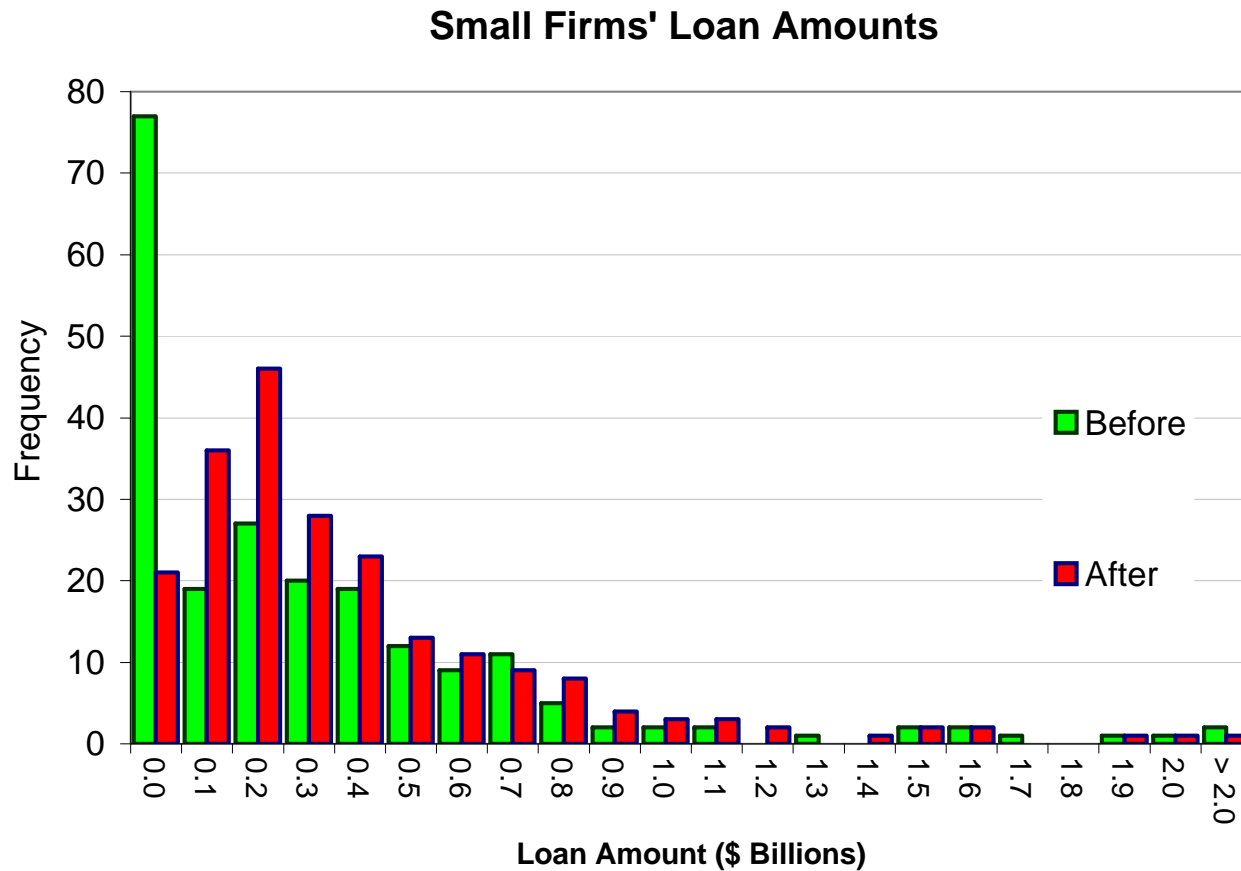


Figure 11. **Small firm loans.** New loans granted to firms in lower tercile of size distribution by total assets, before and after the crisis

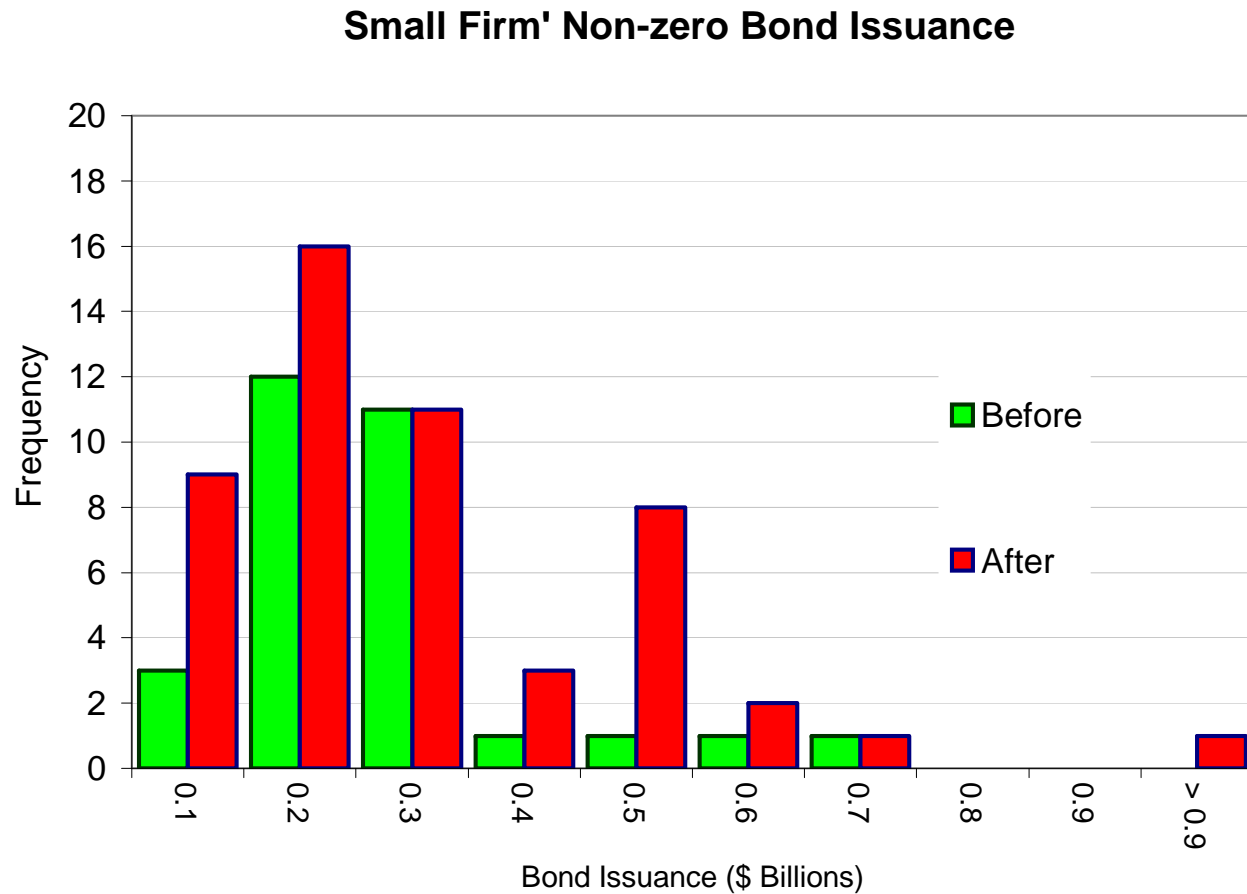


Figure 12. **Small firm nonzero bond issuance.** New bonds issued by firms in lower tercile of size distribution by total assets, before and after the crisis (conditional on positive bond issuance)

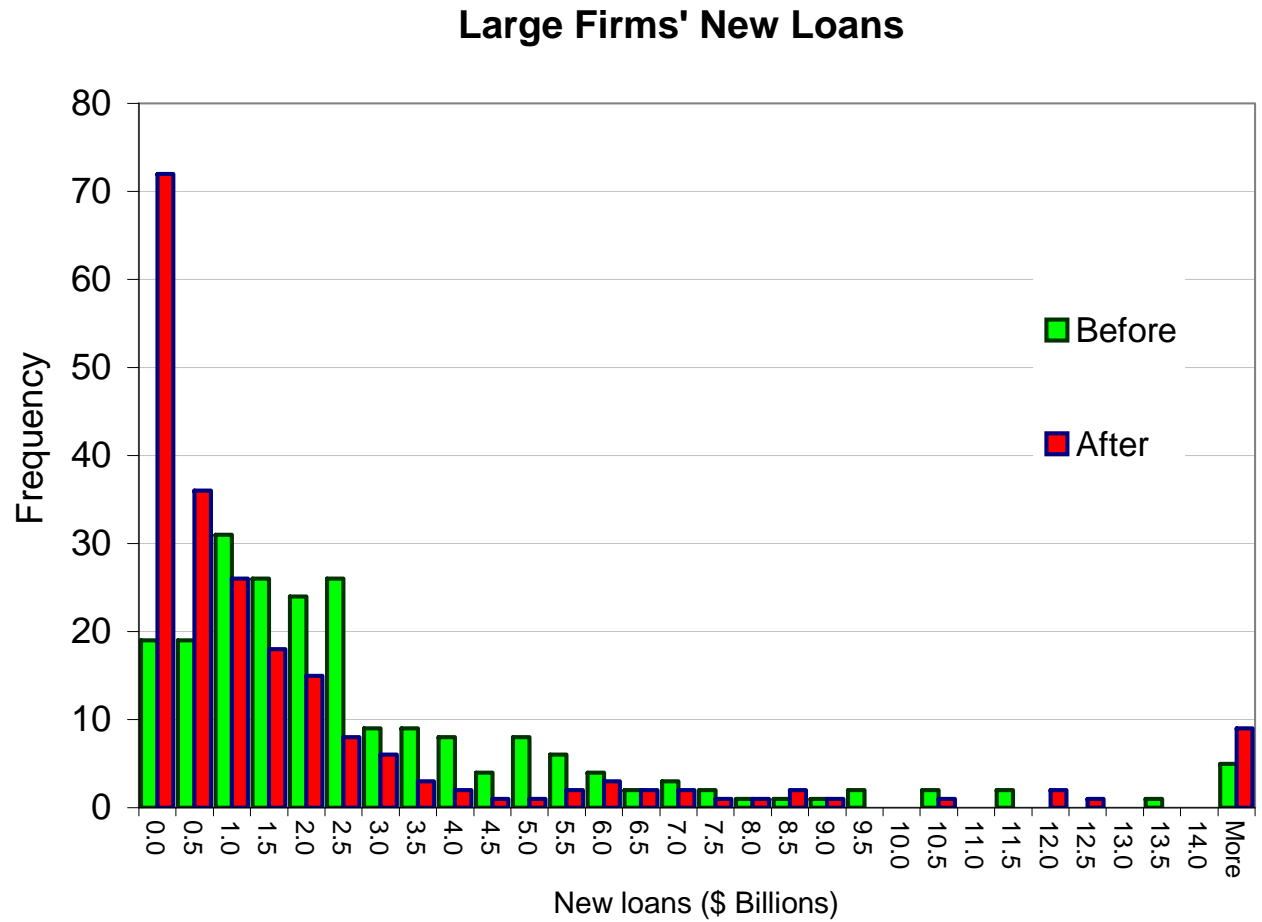


Figure 13. **Large firms loans.** New loans granted to firms in upper tercile of size distribution by total assets, before and after the crisis

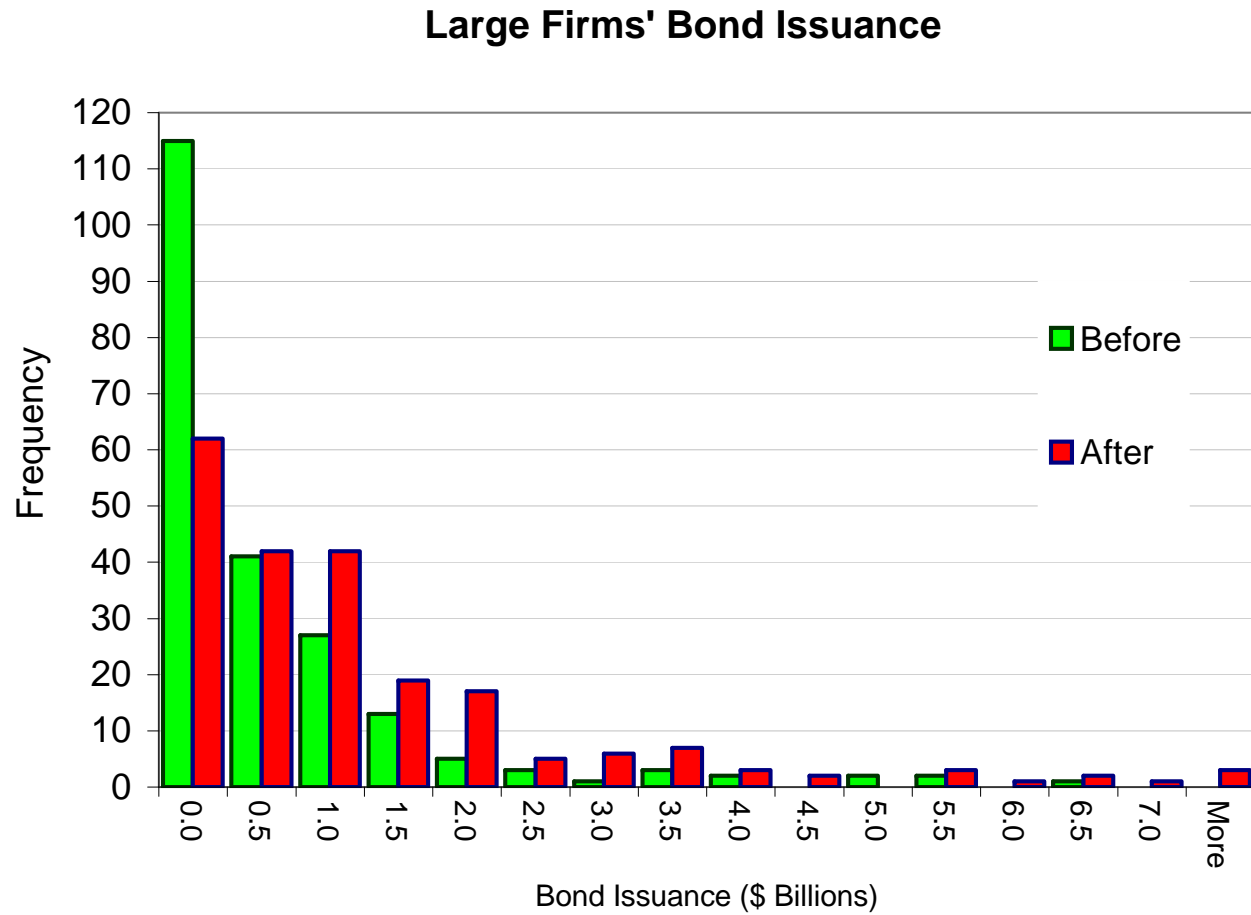
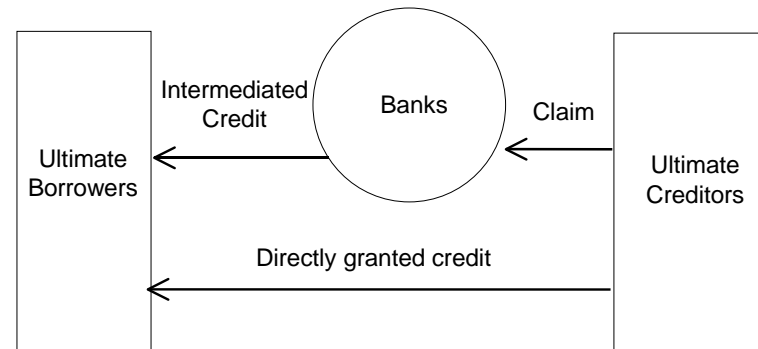


Figure 14. **Large firm bond issuance.** Bonds issued by firms in upper tercile of size distribution by total assets, before and after the crisis

Model Checklist

1. Model direct and intermediated credit
2. In downturn, new loans contract but bond issuance increases
3. Spreads increase on both loans and bonds
4. Bank lending increases or decreases dollar for dollar with an increase or decrease in debt, with equity being sticky
5. As a consequence, bank leverage is procyclical

Model of Direct and Intermediated Finance



- Banking sector: risk-neutral, Value-at-Risk constrained intermediaries
- Mean-variance investors who hold portfolio of (i) cash (ii) bank liabilities (iii) risky loans

Credit Risk

Vasicek (2002) model, backbone of Basel capital requirements.

Each borrower defaults with probability ε

Bank diversifies away idiosyncratic risk

Keeps default probability constant (Value-at-Risk = equity)

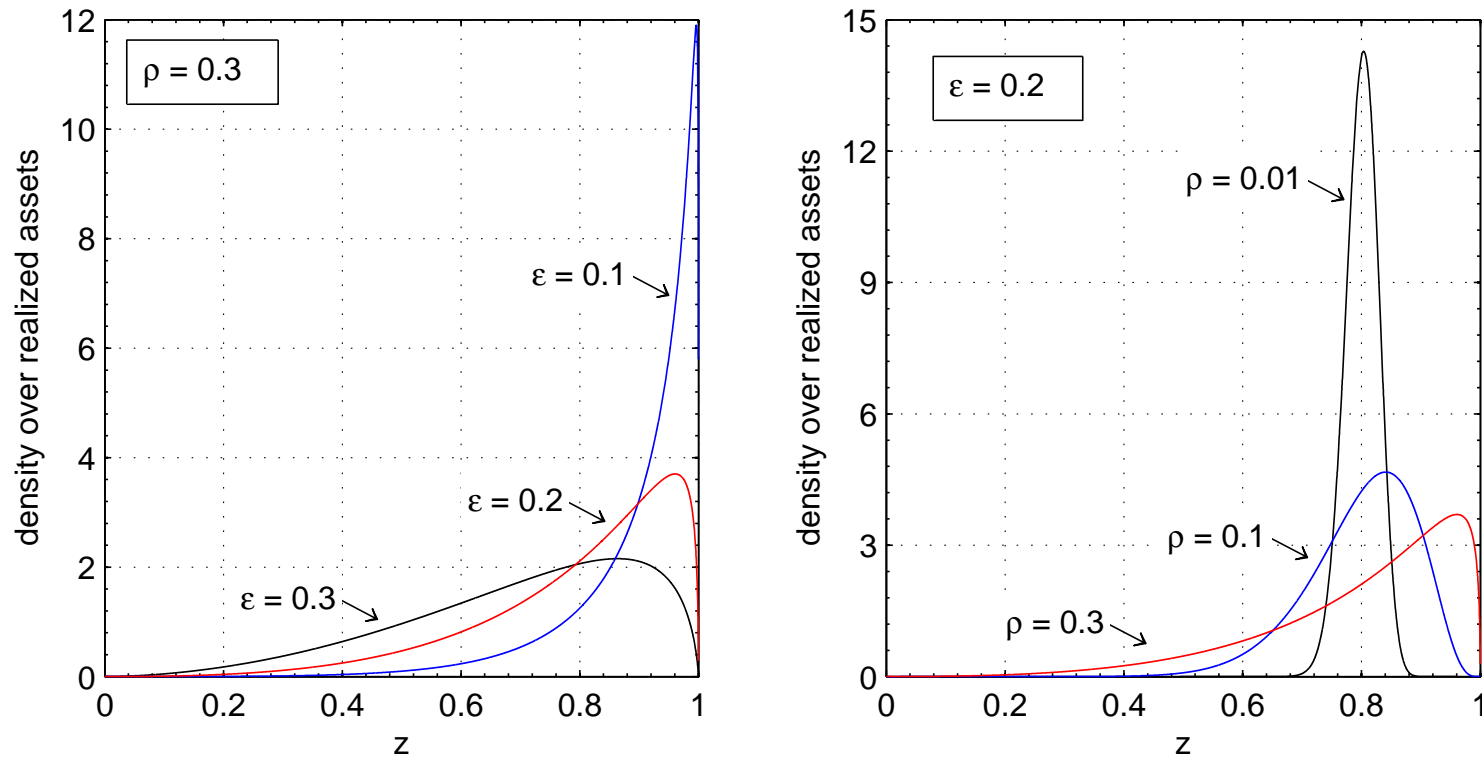


Figure 15. The two charts plot the densities over realized assets when $C(1+r) = 1$. The left hand charts plots the density over asset realizations of the bank when $\rho = 0.1$ and ϵ is varied from 0.1 to 0.3. The right hand chart plots the asset realization density when $\epsilon = 0.2$ and ρ varies from 0.01 to 0.3.

Turning Credit Risk Model on Its Head

- Turn credit risk model on its head and think of it as credit supply model
 - Fix E . Determine credit supply C_S

$$C_S = \frac{E}{1 - \frac{1+r}{1+f}\varphi(\rho, \alpha, \varepsilon)}, \quad \varphi \in (0, 1)$$

φ is ratio of **notional assets** to **notional debt**

Market Clearing

$$\underbrace{\frac{E}{1 - \frac{1+\pi}{1-\varepsilon}\varphi}}_{C_B} + T \underbrace{\frac{(1-\varepsilon)^2 \pi}{\sigma^2 (1+\pi)^2}}_{C_H} = K(\pi)$$

Risk premium

$$\pi = (1 - \varepsilon)(1 + r)$$

Iso-Lending Curves

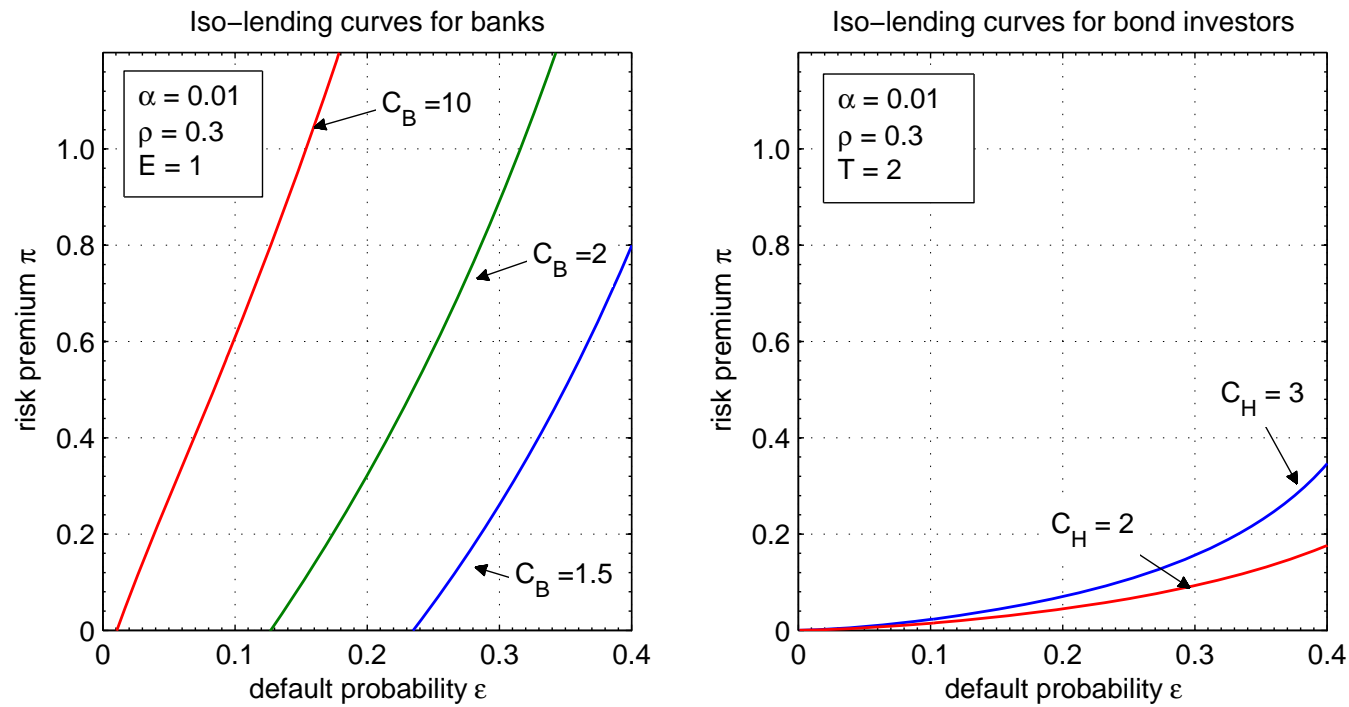


Figure 16. Iso-lending curves in (ε, π) -space for banks (left panel) and bond investors (right panel). Parameter values are as indicated in the boxes.

Excess Spreads Spike in Downturn

Proposition 1. *Under mild regularity conditions, the market risk premium π is strictly increasing in ε .*

Direct and Intermediated Credit

Proposition 2. *An increase in ε is associated with a contraction in banking sector credit but an expansion in directly granted lending through the bond market. The risk premium π increases with ε .*

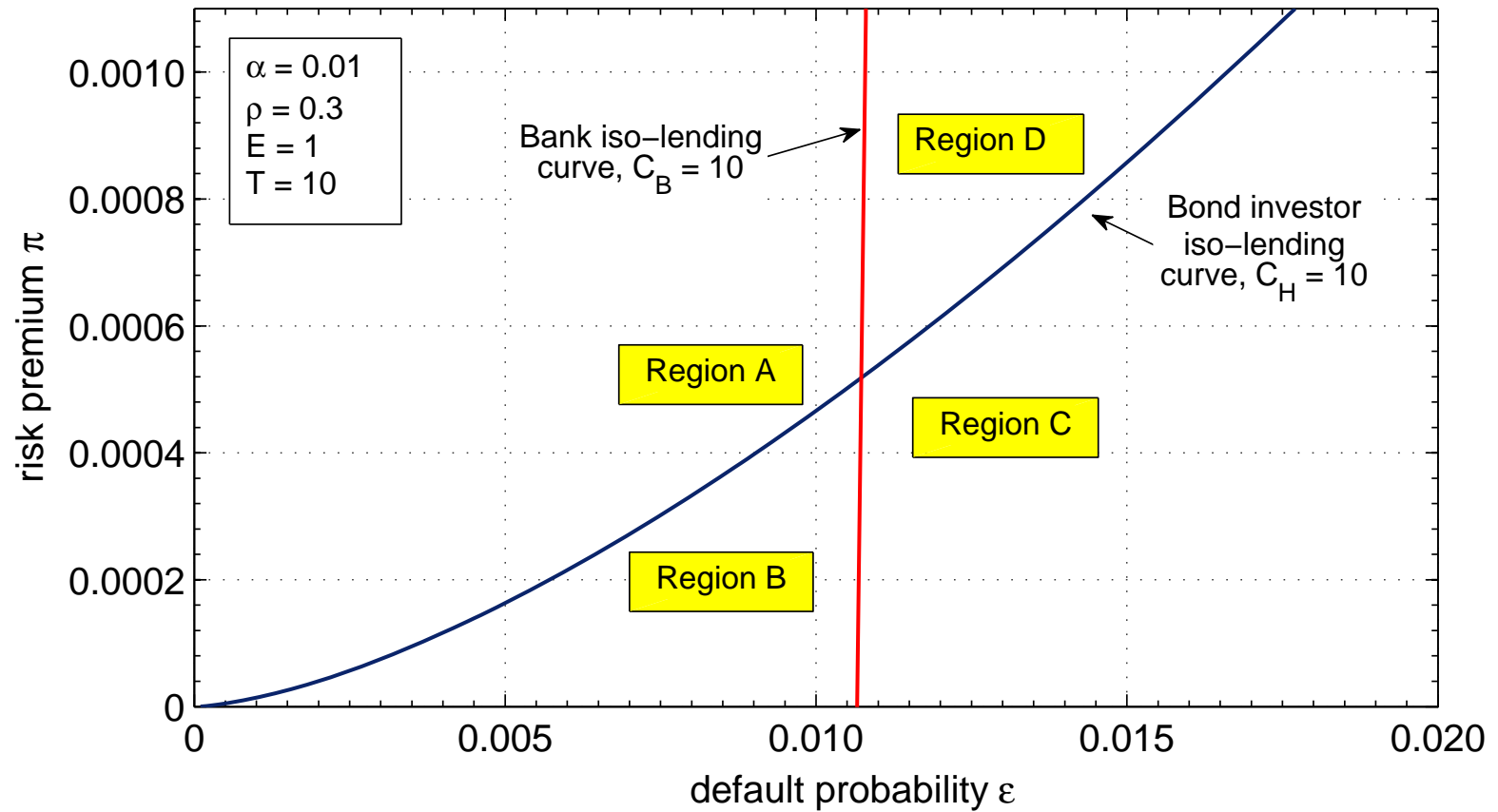


Figure 17. Crossing point for the iso-lending curves of banks and households.

Further Questions

- Spike in excess spreads is followed by decline in economic activity (Gilchrist, Yankov and Zakrajsek (2009), Gilchrist and Zakrajsek (2011))
 - What is the mechanism?
 - Why is the impact so large?
 - Which real projects are most affected by spike in excess spreads?
- What happens to (really) small firms that do not have access to market finance?
- International comparisons?