Banking Crises and Real Activity:

Identifying the Linkages

Mark Gertler

NYU

June 2010

Financial Crises: Basic Concepts

$R_{kt+1} \equiv$ rate of return return to capital;

$R_{t+1} \equiv$ riskless rate;

$\Lambda_{t,t+1} \equiv$ household's stochastic discount factor

- With Frictionless Capital Markets:

$$E_t \Lambda_{t,t+1}(R_{kt+1} - R_{t+1}) = 0$$

- With Capital Market Frictions:

$$E_t \Lambda_{t,t+1}(R_{kt+1} - R_{t+1}) \geq 0$$

- Financial Crisis: Sharp increase in $E_t \Lambda_{t,t+1}(R_{kt+1} - R_{t+1})$

Banking Crises

$R_{bt+1} \equiv$ bank lending rate

- Frictionless capital markets:

$$E_t \Lambda_{t,t+1} R_{kt+1} = E_t \Lambda_{t,t+1} R_{bt+1} = E_t \Lambda_{t,t+1} R_{t+1}$$

- With Capital Market Frictions:

$$E_t \Lambda_{t,t+1} R_{kt+1} \geq E_t \Lambda_{t,t+1} R_{bt+1} \geq E_t \Lambda_{t,t+1} R_{t+1}$$

- Financial Crisis: Sharp increase in either $E_t \Lambda_{t,t+1}(R_{kt+1} - R_{bt+1})$ or $E_t \Lambda_{t,t+1}(R_{bkt+1} - R_{t+1})$

- Banking Crisis: Sharp increase in $E_t \Lambda_{t,t+1}(R_{bkt+1} - R_{t+1})$

Banking Crises and the Capital Constraint

$L_t \equiv$ loans; $N_t \equiv$ bank equity

$\phi_t \equiv$ leverage ratio; $\phi^R \equiv$ regulatory maximum

$\mu_t \equiv$ excess return $= \Lambda_{t,t+1}(R_{bkt+1} - R_{t+1})$;

- Limits to arbitrage: Capital constraint due to agency/regulatory factors

$$L_t = \phi_t N_t$$

with

$$\phi_t = \mathsf{min}[\phi(\mu_t, \sigma_t), \phi^R]$$

$$\phi_1 > 0, \phi_2 < 0$$

Banking Crises and the Capital Constraint (con't)

- Capital constraint

$$L_t = \phi_t N_t$$

with

$$\phi_t = \min[\phi(\mu_t, \sigma_t), \phi^R];\ \phi_1 > 0, \phi_2 < 0$$

- Crisis: Sharp drop in N_t and/or increase in $\sigma_t \Rightarrow$ increase in μ_t

- Note: No clear prediction for L_t : $\mu_t \uparrow \Rightarrow \phi_t \uparrow$, but $\sigma_t \uparrow \Longrightarrow \phi_t \downarrow$.
  - Also, may be countercyclical rise in loan demand for liquidity reasons

- Complicates identification of effect of N_t on L_t

- But what we care about is $\mu_t = E_t \Lambda_{t,t+1}(R_{bkt+1} - R_{t+1})$

  - this measures the credit market distortion.

The Volatility of Bank Equity

$D_t \equiv$ deposits $\Longrightarrow$

$$L_t = N_t + D_t$$

- Evolution of Bank Equity

$$N_t = R_{bt} L_{t-1} - R_t D_{t-1}$$

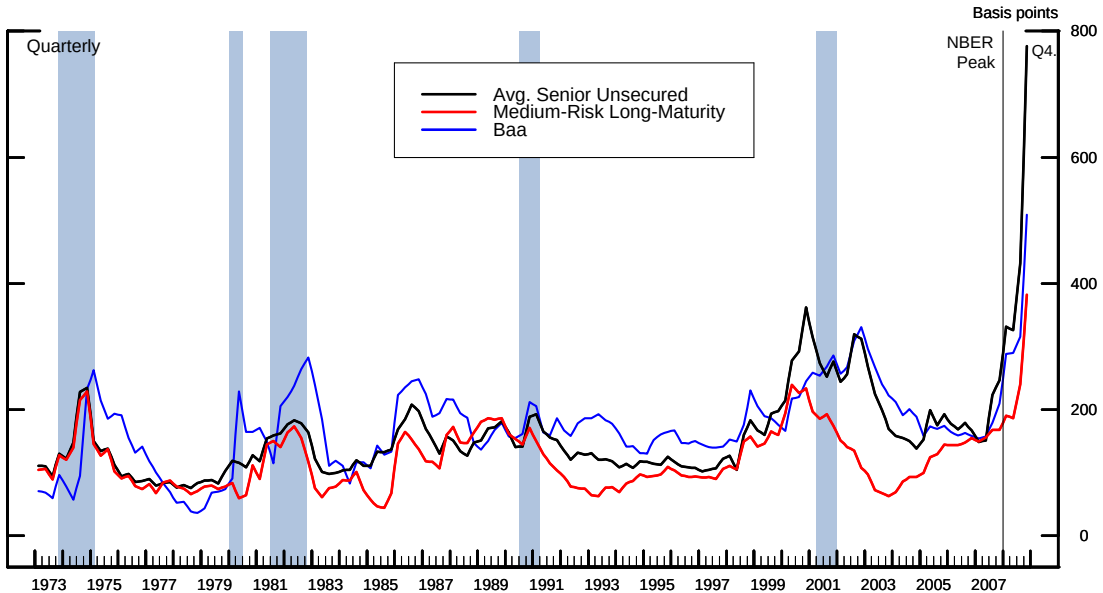
given $L_{t-1} = \phi_{t-1} N_{t-1} \Longrightarrow$

$$N_t = [(R_{bt} - R_t)\phi_{t-1} + R_t] N_{t-1}$$

- Volatility in $R_{bt} - R_t \Longrightarrow$ volatility in N_t

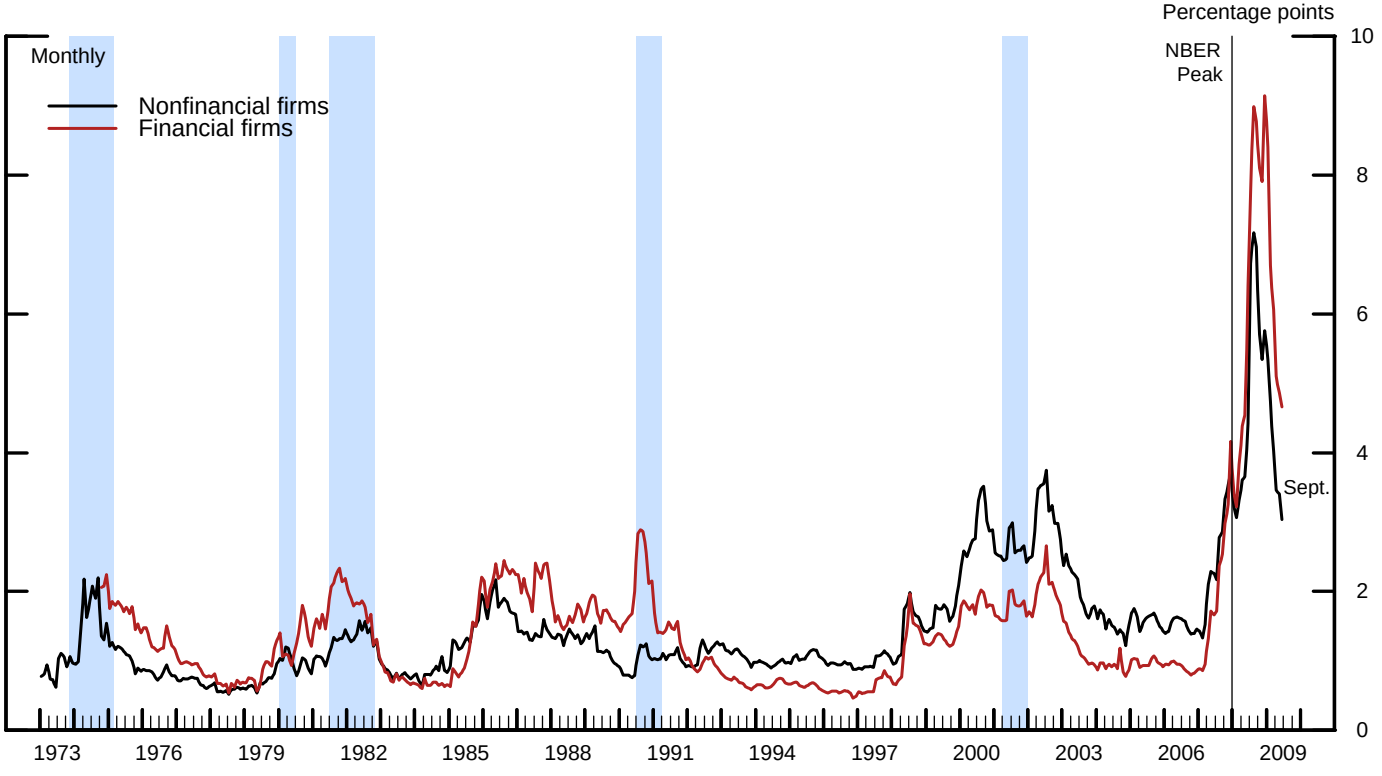
  Effect is magnified by the leverage ratio ϕ_{t-1}

Figure 1: Selected Corporate Bond Spreads

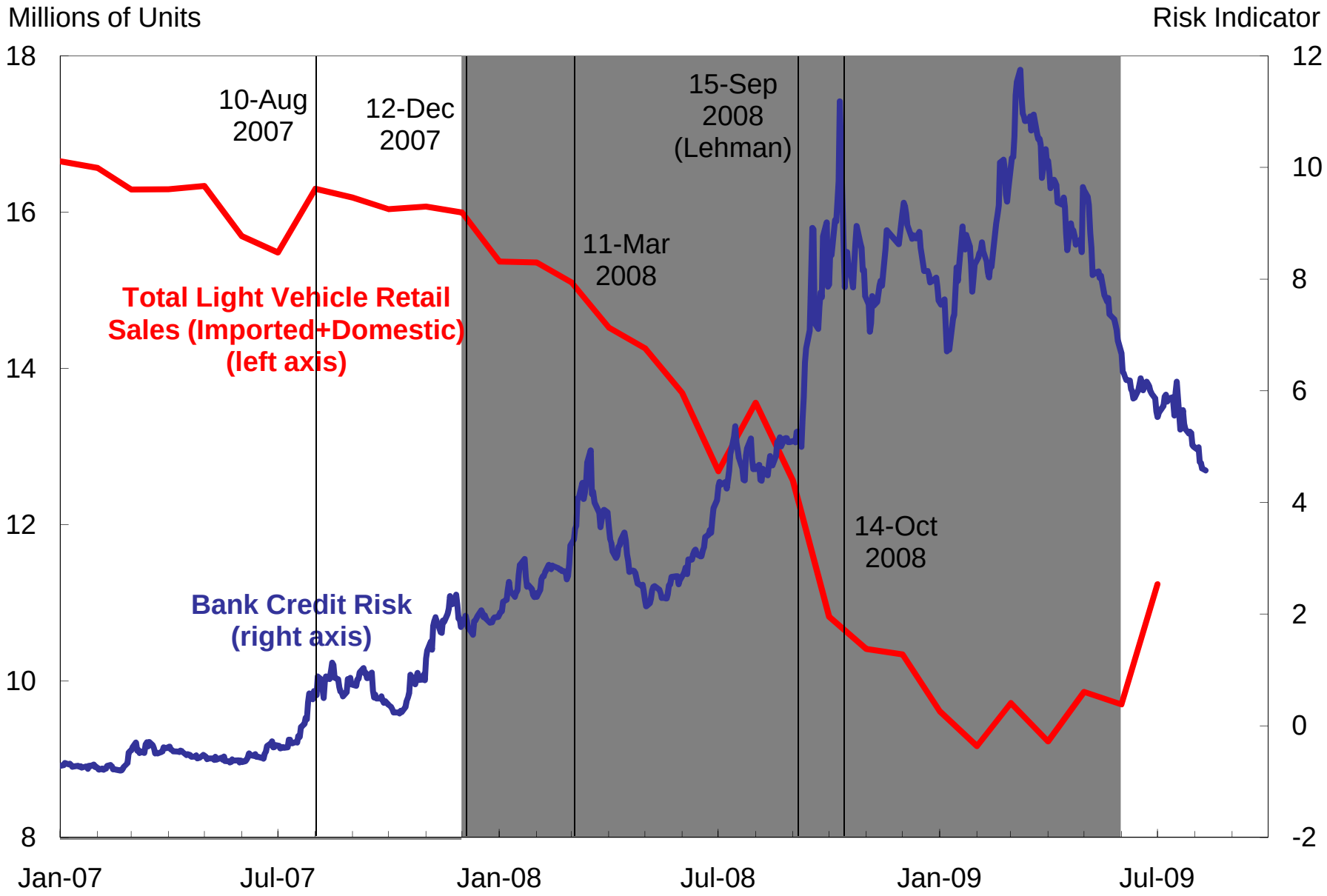


NOTE: The black line depicts the average credit spread for our sample of 5,269 senior unsecured corporate bonds; the red line depicts the average credit spread associated with very long maturity corporate bonds issued by firms with low to medium probability of default (see text for details); and the blue line depicts the standard Baa credit spread, measured relative to the 10-year Treasury yield. The shaded vertical bars denote NBER-dated recessions.

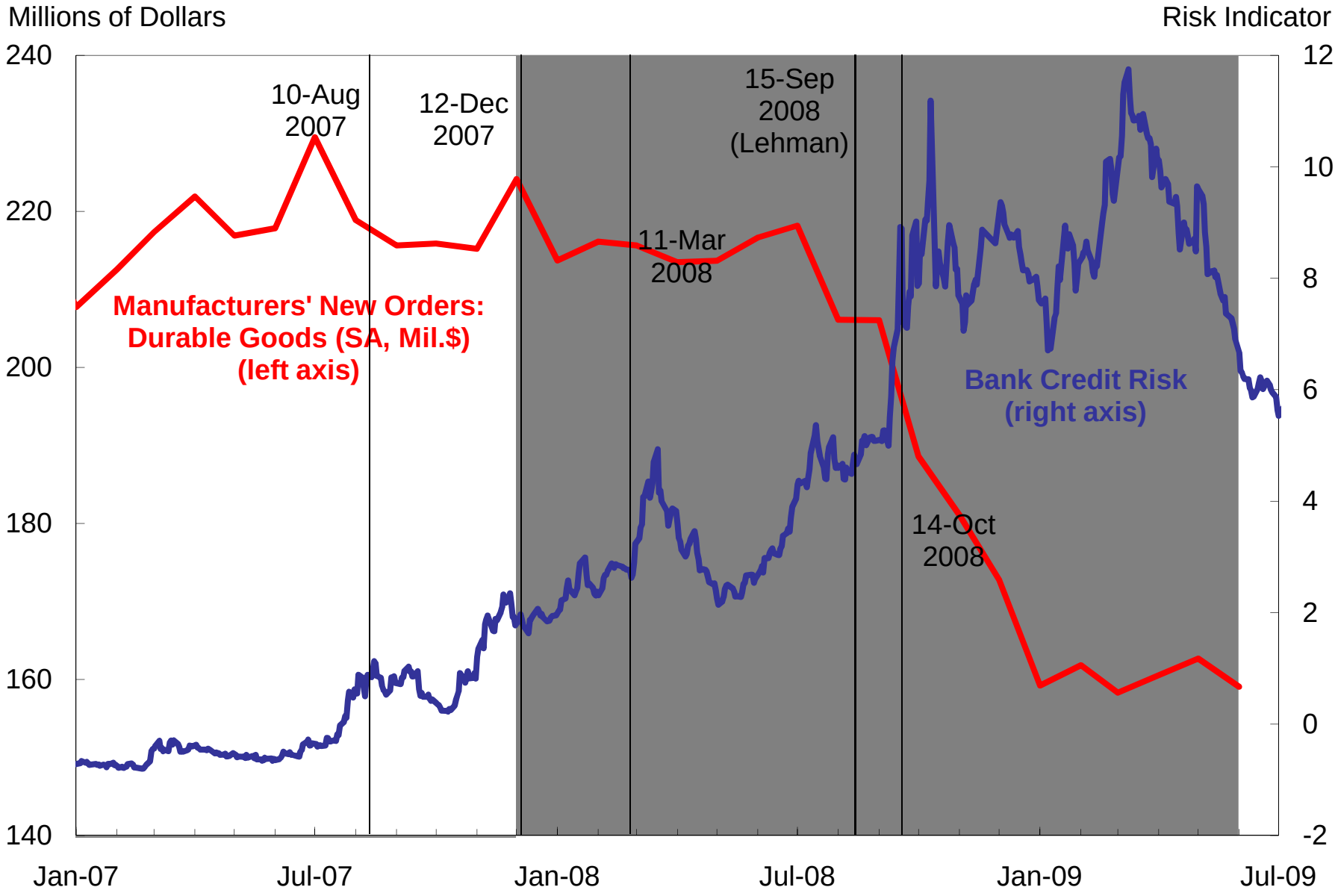
Credit spreads on senior unsecured bonds

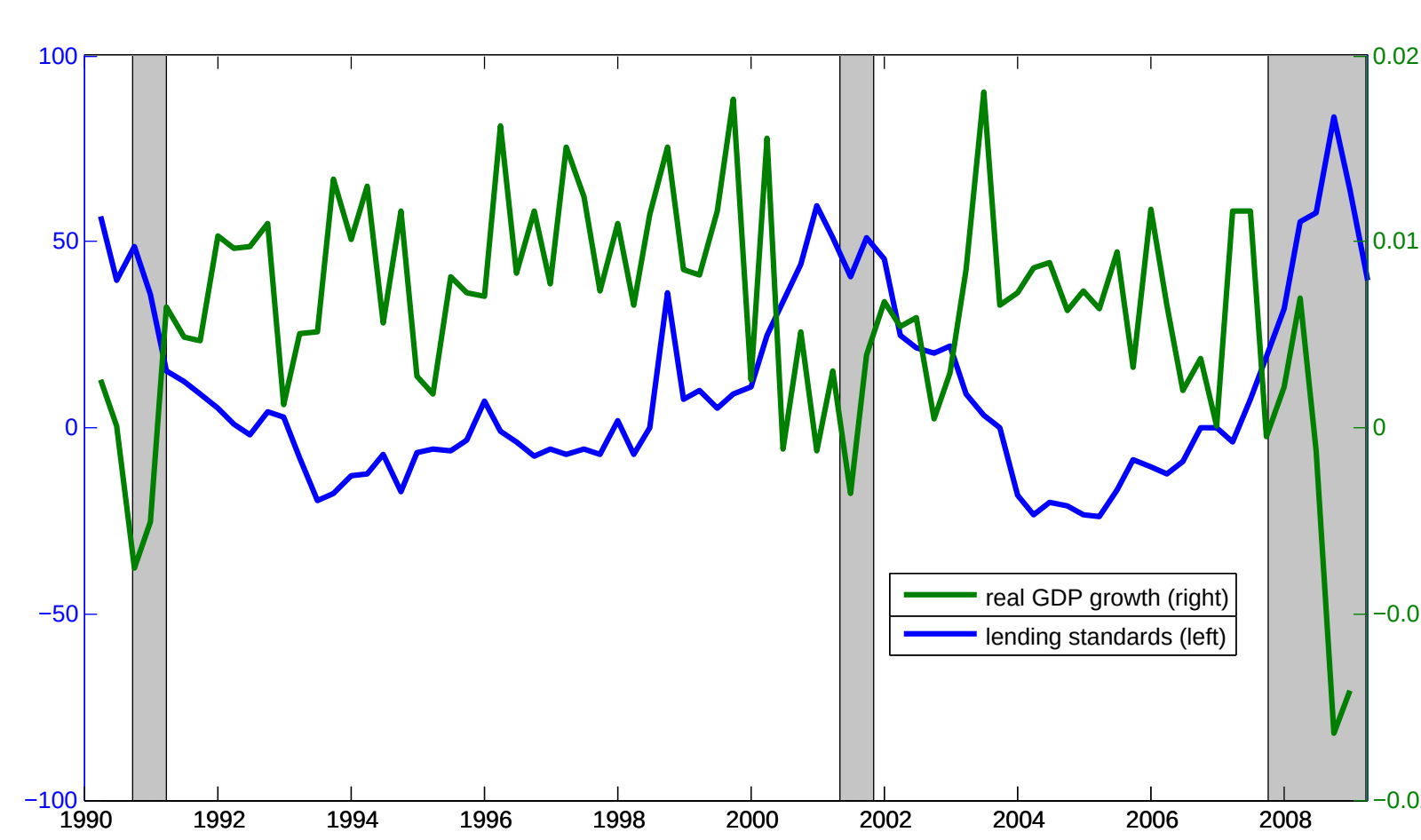


Bank Credit Risk vs. Auto Sales



Bank Credit Risk vs. Durable Goods Orders




100
50
0
−50
−100
0.02
0.01
0
−0.0
−0.0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
real GDP growth (right)
lending standards (left)

Bank Capital and Lending

- Important to consider investment banks along with commercial banks
- Events consistent with "capital crunch" in investment banking
  - Losses on MBS induced significant depeletion of equity in highly leveraged investment banks
  - Loss of equity combined with increased uncertainty lmited the ability of these banks to obtain funds
  - Securitized lending collapsed.
  - Credit spreads on these instruments shot up.

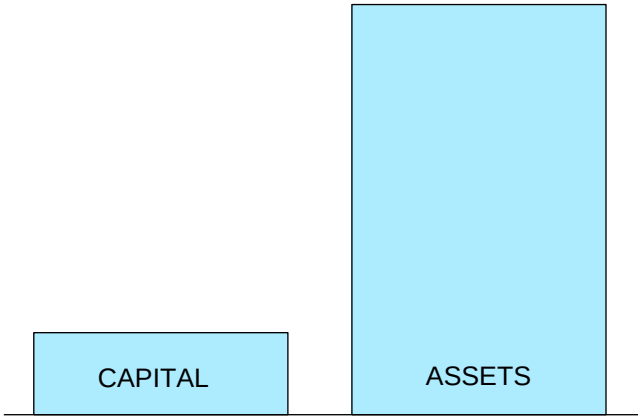
Bank Capital and Lending (con't)

- For commercial banks, the dynamics played out differently:
  - These banks entered the crisis well capitalized.
  - Experienced a combination of:
    (1) equity losses
    (2) increases in demand for bank credit.
  - (2) resulted from:
    (i) take-down of credit lines (Ivashina and Scharfstein, 2009)
    (ii) absorption of investment bank assets.

    $\Longrightarrow$initial increase in banking lending
  - Capital limited the ability to absorb assets:
    Mirrored by increases in various credit spreads.

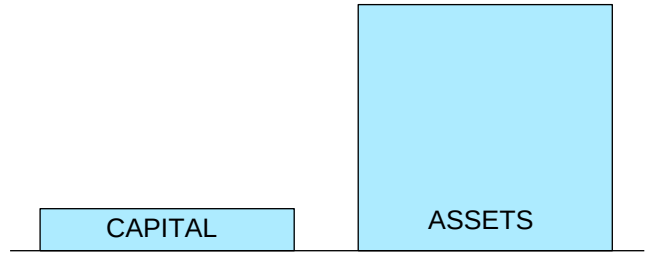
Before

Investment Banks

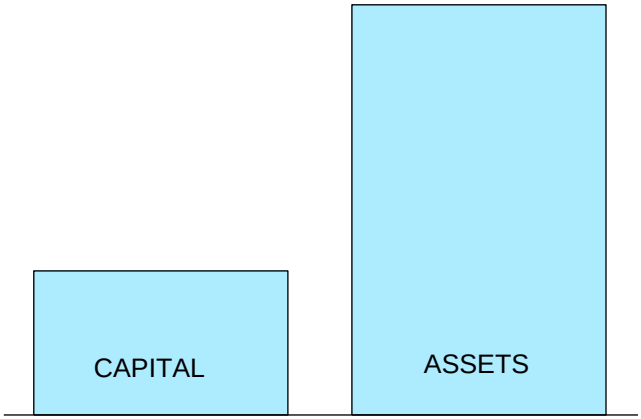


After

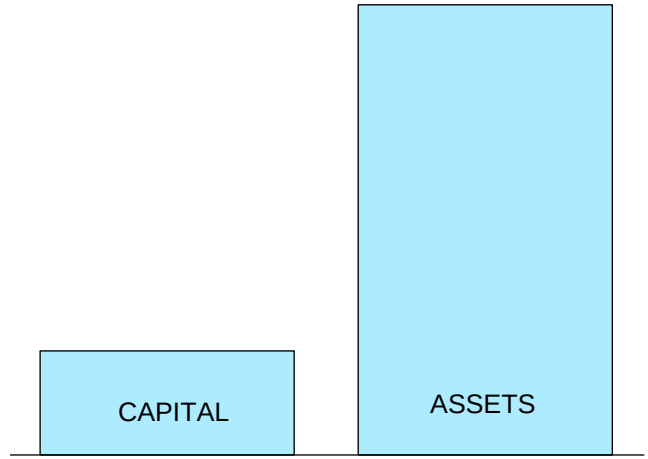
Investment Banks



Commercial Banks



Commercial Banks



The TARP and the CPP

- No significant increase in lending following capital injections:
- Agree with BE - banks do not maintain constant leverage ratios:
- But: BE's estimates of effect of capital on lending may be too conservative:
  - Sample period may contain insufficient variation in bank capital
  - Controlling for loan demand problematic
- Even if we accept BE's estimates, reason to think bank capital important in current recession
  - Disruption of liquidity markets enhances value of capital.
- Some support for TARP mattering: Impact on bank credit default swaps and, more generally,on credit spreads.

Forecasting Power of Bank Capital Asset Ratios

- If one can identify exogenous shifts in the bank capital asset ratios, then the theory suggests these shifts should help forecast real output.
- JM present strong evidence of forecast power, while BE find weak evidence.
- Caveat: identification approach (choleski decomposition) does not rule out possible unobservable factors.
- In either case interesting facts to interpret.

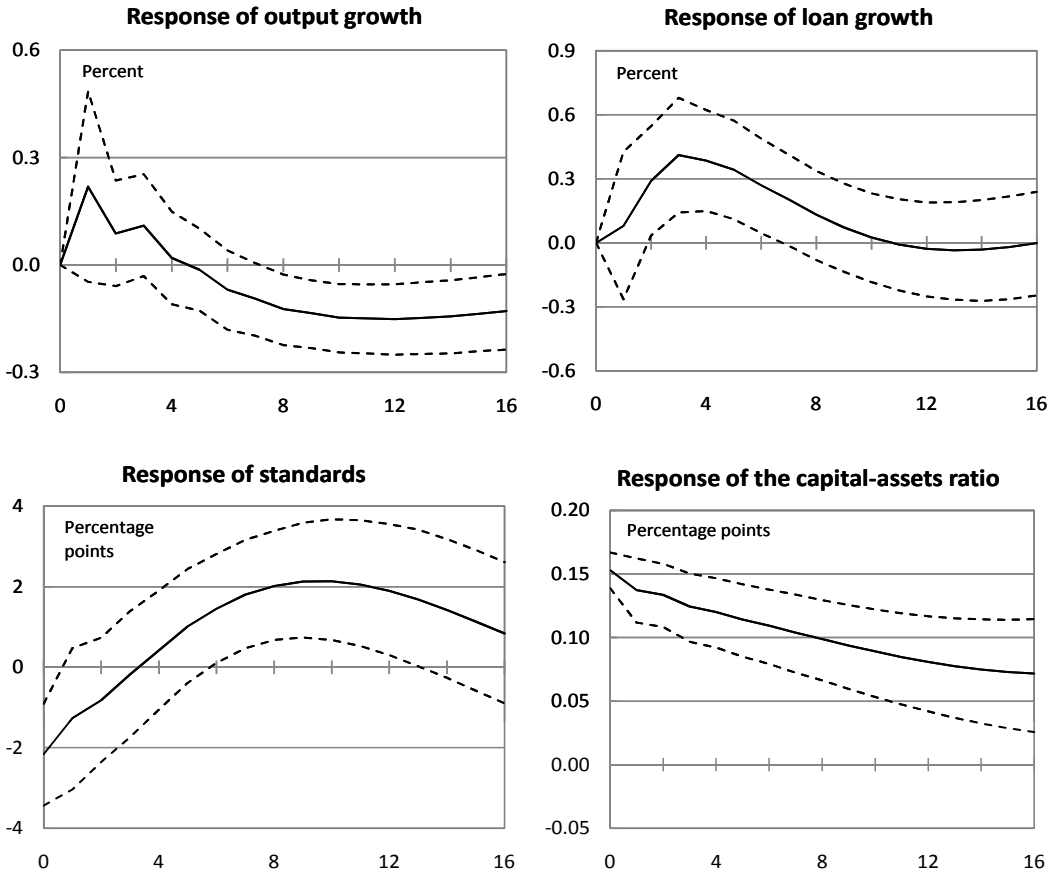


Figure 7: Response to a Capital-to-asset Ratio Shock