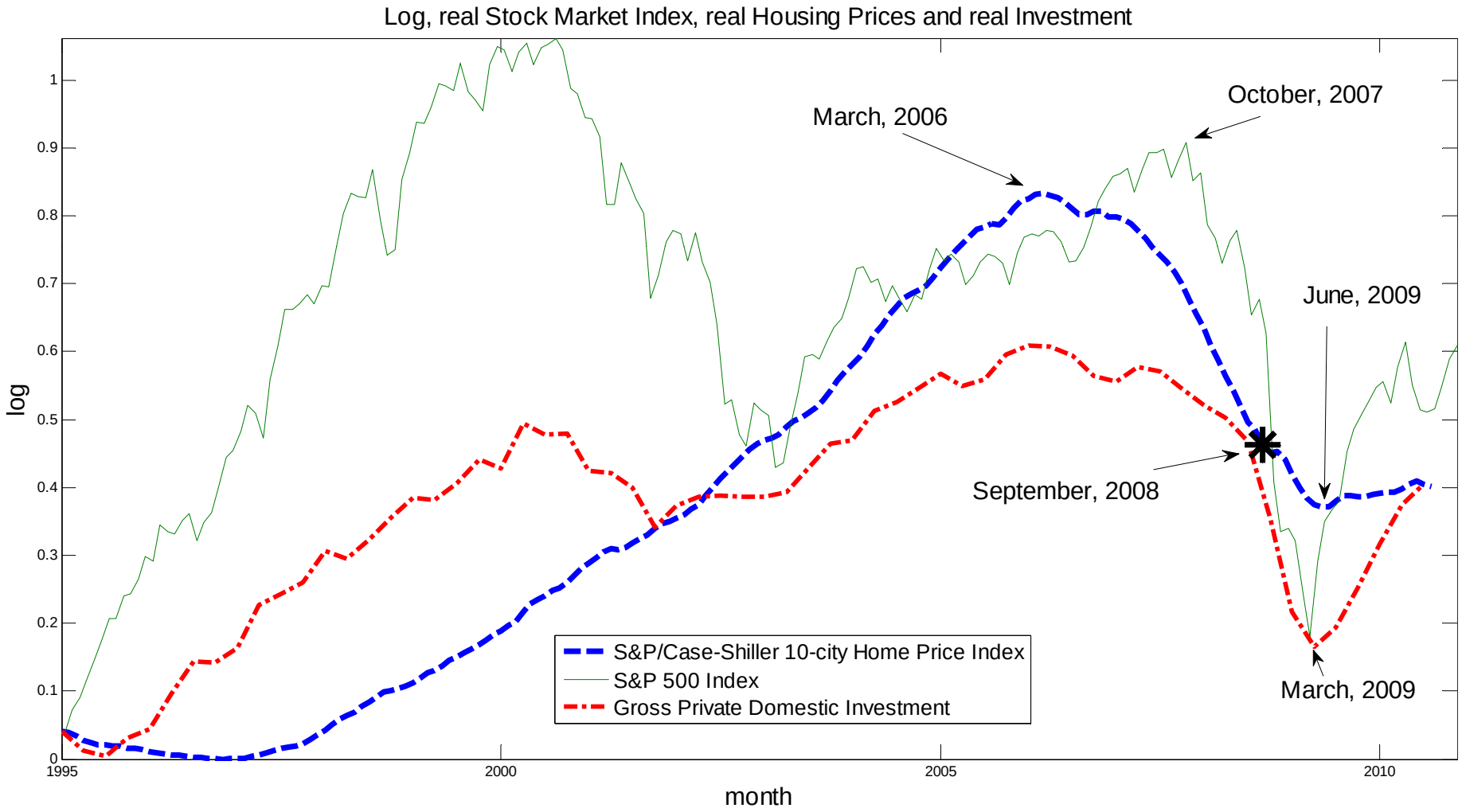
Three Financial Friction Models

Lawrence J. Christiano

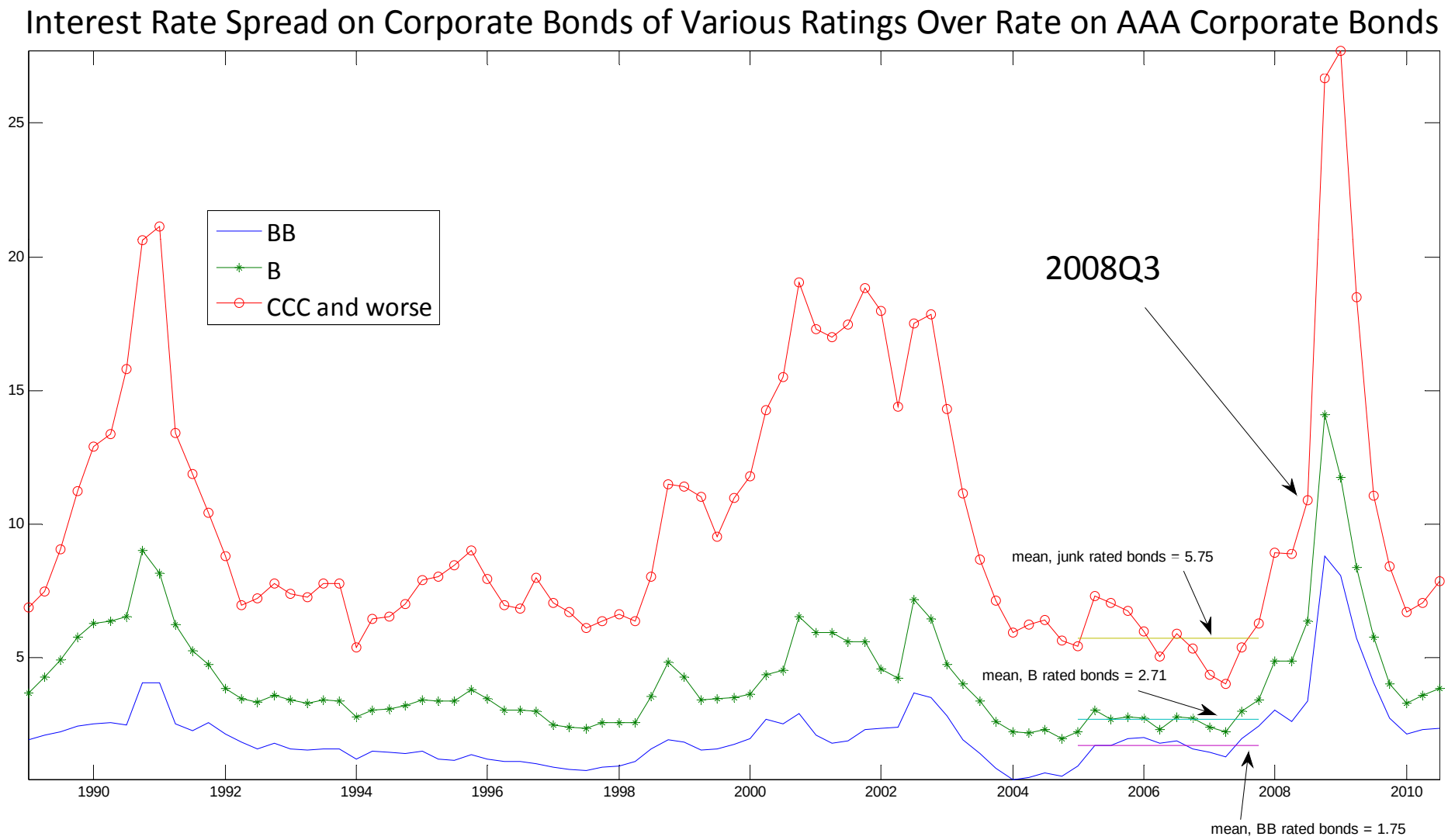
Motivation

- Beginning in 2007 and then accelerating in 2008:
  - Asset values collapsed.
  - Intermediation slowed and investment collapsed.
  - Aggregate output shrank.
  - Interest rates spreads over what the US Treasury and highly safe private firms had to pay, jumped.
  - US central bank initiated unconventional measures (loans to financial and non-financial firms, very low interest rates for banks, etc.)
- In 2009 – the worst parts of 2007-2008 began to turn around.

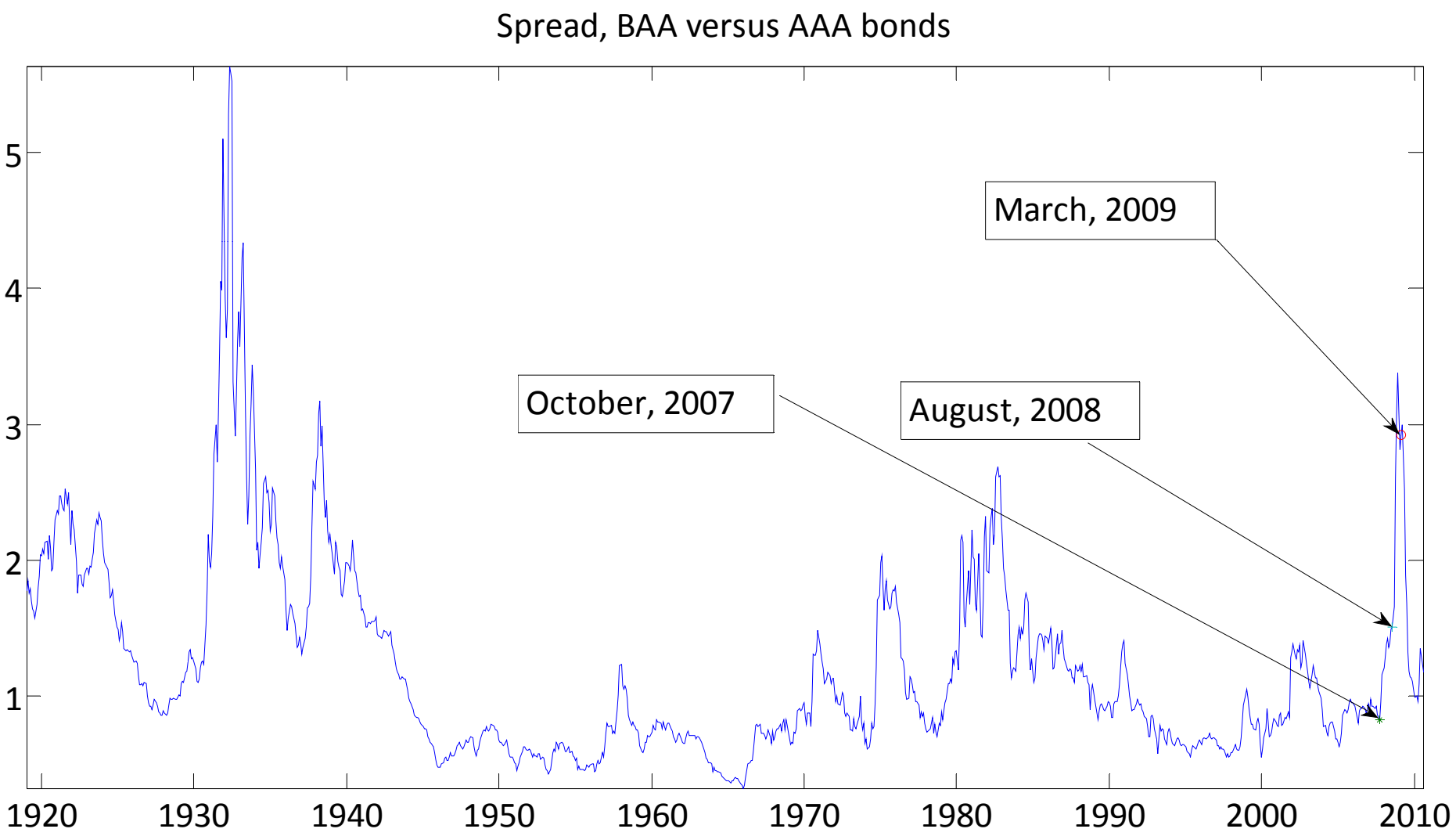
Collapse in Asset Values and Investment



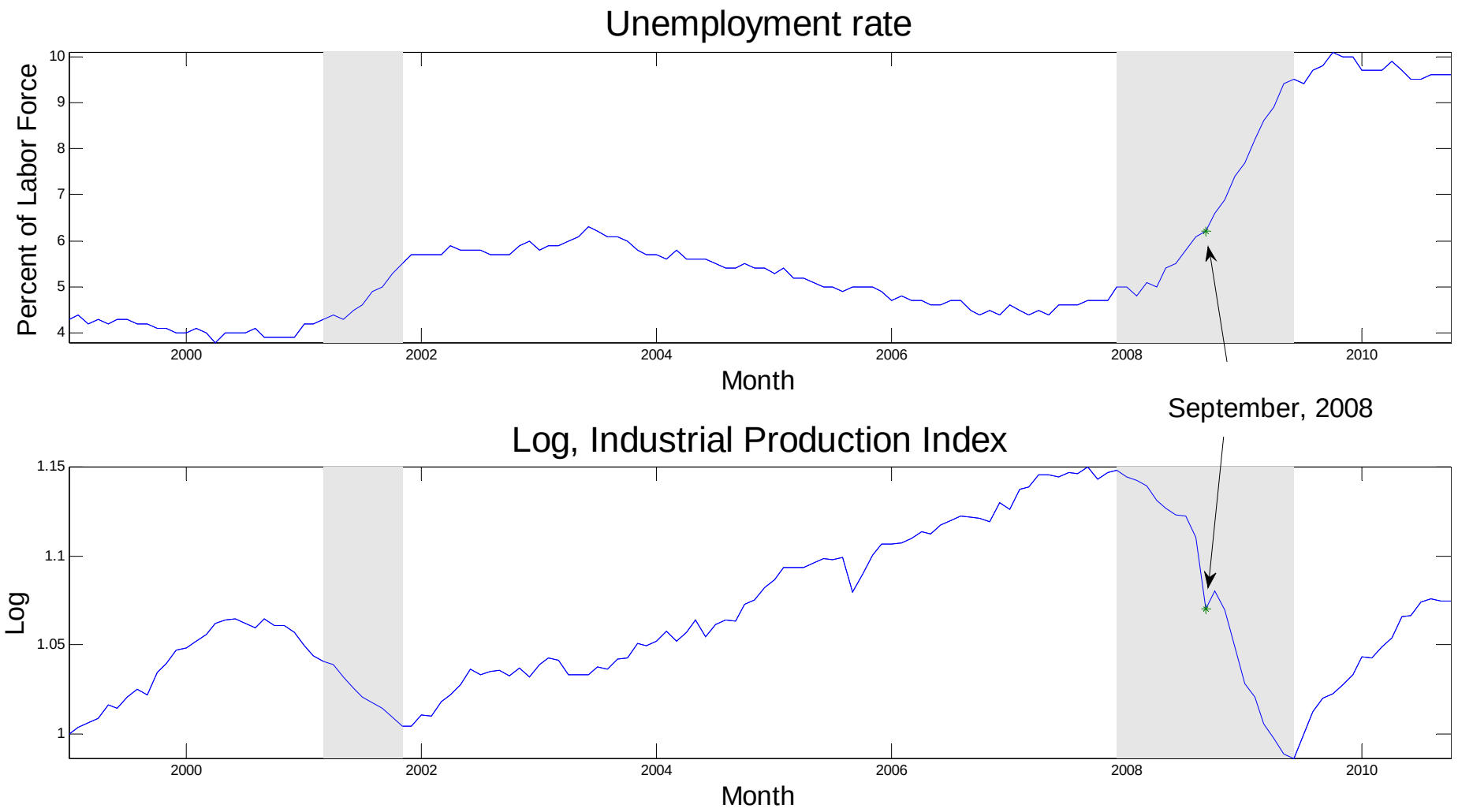
Spreads for ‘Risky’ Firms Shot Up in Late 2008



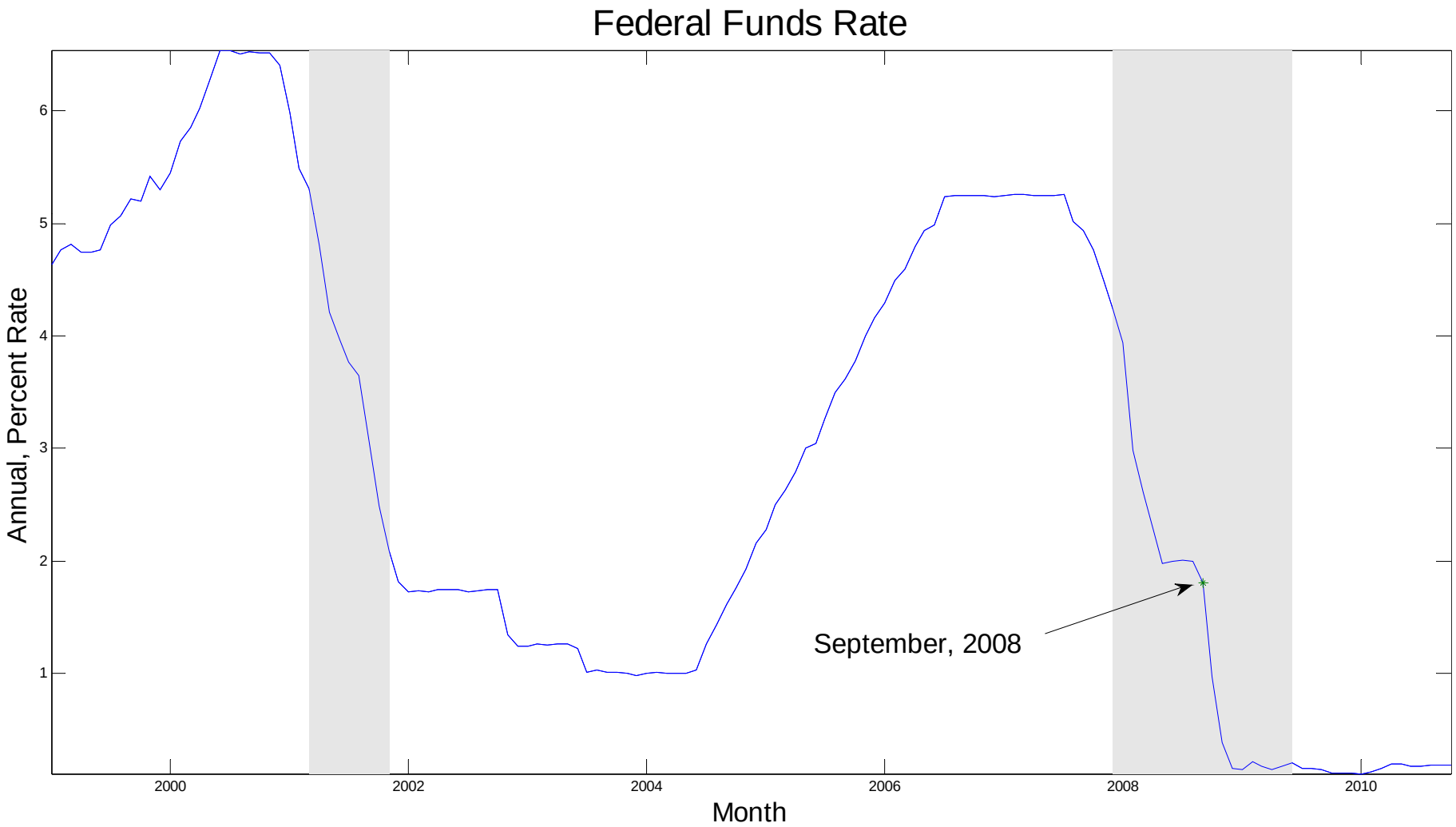
Must Go Back to Great Depression to See Spreads as Large as the Recent Ones



Economic Activity Shows (tentative) Signs of Recovery June, 2009



Banks' Cost of Funds Low



Objective

- Asset Values Fell.
- Banking System Became ‘Dysfunctional’
  - Interest rate spreads rose.
  - Intermediation and economy slowed.
- Monetary authority:
  - Transferred funds on various terms to private companies and to banks.
  - Sharply reduced cost of funds to banks.
- Economy in (tentative) recovery.
- Seek to construct models that links these observations together.

Objective, cont'd

- Keep analysis simple and on point by:
  - Two periods
  - Minimize complications from agent heterogeneity.
  - Leave out endogeneity of employment.
  - Leave out nominal variables: just look 'behind the veil of monetary economics'

- Three models:
  - Moral hazard I: Gertler-Kiyotaki/Gertler-Karadi
  - Moral hazard II: hidden effort by bankers.
  - Adverse selection ('lemons problem').

Two-period Version of Gertler-Kiyotaki

- Basic idea:
  - Bankers can run away with a fraction of bank assets.
  - If banker net worth is high relative to deposits, running away is not in their interest.
  - If banker net worth falls below a certain cutoff, then they must restrict the deposits that they take.
    - To keep deposits at 'normal level' would cause depositors to lose confidence and take their business to another bank.
  - Reduced supply of deposits:
    - makes deposit interest rates fall and so spreads rise.
    - Reduced intermediation means investment drops, output drops.

Two-period Version of GK Model

- Many identical households, each with a unit measure of members:
  - Some members are ‘bankers’
  - Some members are ‘workers’
  - Perfect insurance inside households…everyone consumes same amount.
- Period 1
  - Workers endowed with *y* goods, household makes deposits in a bank
  - Bankers endowed with *N* goods, take deposits and purchase securities from a firm.
  - Firm issues securities to finance capital used in production in period 2.
- Period 2
  - Household consumes earnings from deposits plus profits from banker.
  - Goods consumed are produced by the firm.

Problem of the Household		
	period 1	period 2
budget constraint	$c + d \leq y$	$C \leq R^d d + \pi$
problem	$\max_{c,C,d}[u(c) + \beta u(C)]$	

Solution to Household Problem	
$\frac{u'(c)}{\beta u'(C)} = R^d$	$c + \frac{C}{R^d} = y + \frac{\pi}{R^d}$

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No change!

Household budget constraint when government buys private assets using tax dollars

$$c + \frac{C}{R^d} = y - T + \frac{\pi + TR^d}{R^d} = y + \frac{\pi}{R^d}$$

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Efficient Benchmark

Problem of the Bank	
period 1	period 2
take deposits, d	pay dR^d to households
buy securities, $s = N + d$	receive sR^k from firms
problem: $\max_d [sR^k - R^d d]$	

Properties of Efficient Benchmark

Equilibrium: R^d, c, C, d, π

(i) household problem solved

(ii) bank problem solved

(iii) market clearing

- Properties:
  - Household faces true social rate of return on saving:

$$R^k = R^d$$

  - Equilibrium is 'first best', i.e., solves

$$\max_{c,C,k,} u(c) + \beta u(C)$$

$$c + k \leq y + N,\ C \leq kR^k$$

Friction

- bank combines deposits, *d*, with net worth, *N*, to purchase *N+d* securities from firms.

- bank has two options:
  - ('no-default') wait until next period when $(N+d)R^k$ arrives and pay off depositors, $R^d d$, for profit:

$$(N+d)R^k - R^d d$$

  - ('default') take $\theta(N+d)$ securities, leave banking forever, refuse to pay depositors and wait until next period when securities pay off:

$$\theta(N+d)R^k$$

Incentive Constraint

- Bank will choose ‘no default’ iff

$$\overbrace{(N+d)R^k - R^d d}^{\text{no default}} \quad \geq \quad \overbrace{\theta(N+d)R^k}^{\text{default}}$$

- Default will never be observed, because depositors would never put their money in a bank that violates the deposit condition.

Collapse in Net Worth

- No default condition:

$$\overbrace{(N+d)R^k - R^d d}^{\text{no default}} \quad \geq \quad \overbrace{\theta(N+d)R^k}^{\text{default}}$$

- When condition is non-binding, then $R^k = R^d$ and

$$NR^k \geq \theta(N+d)R^k.$$

- If *N* collapses, then constraint may be violated for *d* associated with $R^d = R^k$

  - Equilibrium requires lower value of *d*
  - Lower *d* requires a spread: $R^d < R^k$
  - Lower *d* is not efficient

Policy Implications

- Make direct loans to non-financial firms
  - Presumably, this is only a good idea in really bad times.
- Make loans/equity injections into banks.
  - Government may have an advantage here because it's harder for banks to 'steal' from the government.
- Subsidize bank interest rate costs
  - Raises bank profits and increases confidence of depositors.