

SWEDISH HOUSE
OF FINANCE



NOBEL SYMPOSIA



Nobel Symposium “Money and Banking”

<https://www.houseoffinance.se/nobel-symposium>

May 26-28, 2018
Clarion Hotel Sign, Stockholm



RIKSBANKENS
JUBILEUMSFOND

THE SWEDISH FOUNDATION FOR
HUMANITIES AND SOCIAL SCIENCES

BANKS AND MONETARY POLICY

Jeremy Stein, Harvard University and NBER
Nobel Symposium on Money and Banking
May 27, 2018



OVERVIEW

- Motivation: problems with textbook account of monetary transmission
- The bank lending channel
 - An old-style story: binding reserve requirements
 - Some evidence
 - A more modern story: safe asset demand, imperfect competition and the deposit franchise
- Banks and the reaching-for-yield channel
 - Evidence
 - Is the deposit franchise key here too?
- Reasons to care

PROBLEMS WITH THE TEXTBOOK MODEL

- In standard NK model, transmission is via expectations hypothesis and term structure of interest rates.
 - Short (real) rate up today → expected (real) rate up in the future → long rate up today → investment and consumption decline.
- But:
 - Expectations hypothesis doesn't explain much variation in long-term rates. Term premium variation is more important.
 - Not much evidence that long-term Treasury rates matter for investment.
 - In expectations-hypothesis land, can't make sense of idea that Fed should hike rates gradually because " r^* is low by historical standards and likely to rise only gradually over time." (Janet Yellen, 12/16/15)
- In bank-centric view of MP transmission, the short rate matters in its own right.
 - Because it directly affects bank loan supply.
 - Because it influences banks' and others' appetite for risk, and hence credit spreads and term premiums.

BANK LENDING CHANNEL: OLD SCHOOL

- As developed in Bernanke-Blinder (1988), Kashyap-Stein (1994), Stein (1998).
- Two key frictions:
 1. Bank loans are “special”—i.e., not the same thing as open-market securities.
 - A small firm cut off from bank loans can’t issue bonds directly to households.
 - Will be a spread between loan rate and security rate.
 2. Banks’ uninsured liabilities are subject to adverse selection. Government-insured liabilities are not, but are subject to binding reserve requirements.
 - So when Fed expands supply of reserves, this is like adding “permits” to access cheap adverse-selection-free funding.
 - So banks can expand loan supply. And price of permits—i.e., nominal fed funds rate—declines.
- Key implication: monetary policy can have independent effect on bank loan supply, above and beyond impact on open-market rates.
 - Tight money increases loan-bond spread, reduces availability of loans to small firms.
- Note: aside from adverse-selection problem, market for bank liabilities is perfectly competitive: there are no rents here.
 - Banks’ “franchise” is entirely on the asset side as in Diamond (1984)—just like a non-financial firm.
 - This is where perspective has shifted dramatically in recent years: imperfect competition on deposit side is now seen to be key.

EARLY EVIDENCE ON BANK LENDING CHANNEL

- Bernanke-Blinder (1992), Kashyap-Stein-Wilcox (1993), Gertler-Gilchrist (1994), Kashyap-Stein (1995) collectively show that in the wake of a monetary contraction:
 - Aggregate bank deposits fall.
 - Banks draw down their securities holdings.
 - But still, volume of new lending by banks declines.
 - Though loans made under commitment rise for a while.
 - The volume of loan substitutes (e.g. nonfinancial CP) *rises*.
 - The investment of small bank-dependent firms falls by more, and becomes more sensitive to internal liquidity.
 - Declines in lending volume are greater at smaller banks.
- A consistent picture, but hard to separate loan supply vs. demand effects. A fundamental identification problem.

FROM BERNANKE-BLINDER (1992)

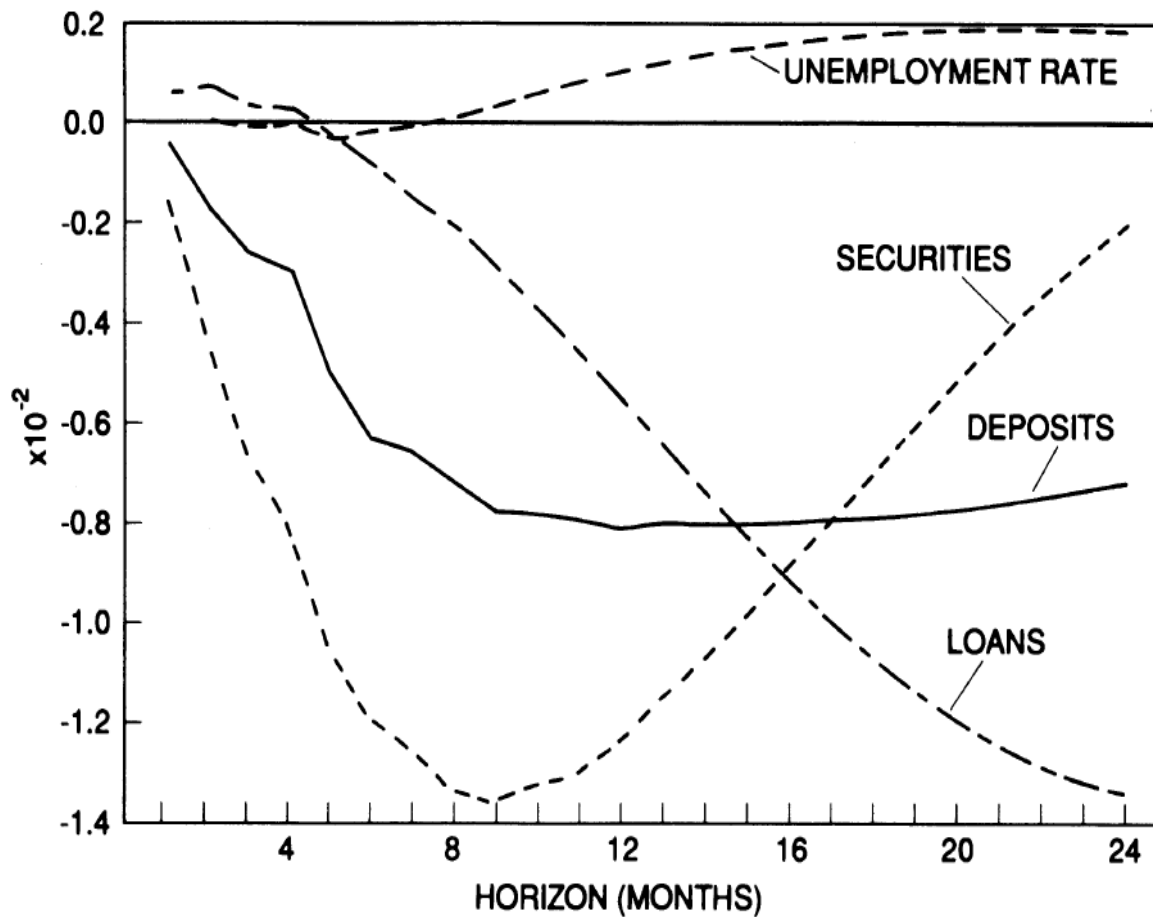
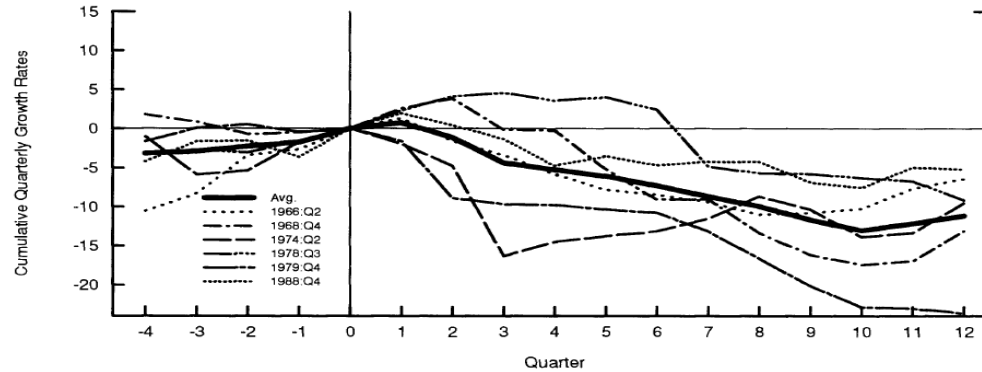


FIGURE 4. RESPONSES TO A SHOCK TO THE FUNDS RATE



FROM GERTLER-GILCHRIST (1994)

Changes in Sales Around Romer Dates
Small Firms



Changes in Sales Around Romer Dates
Large Firms

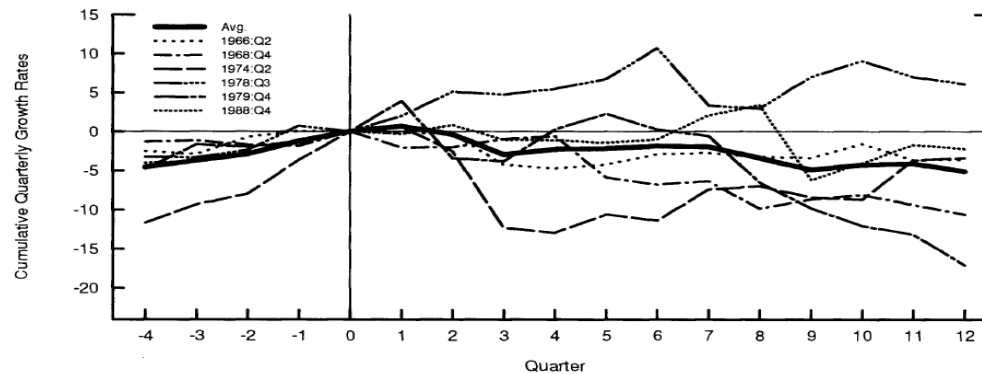


FIGURE II

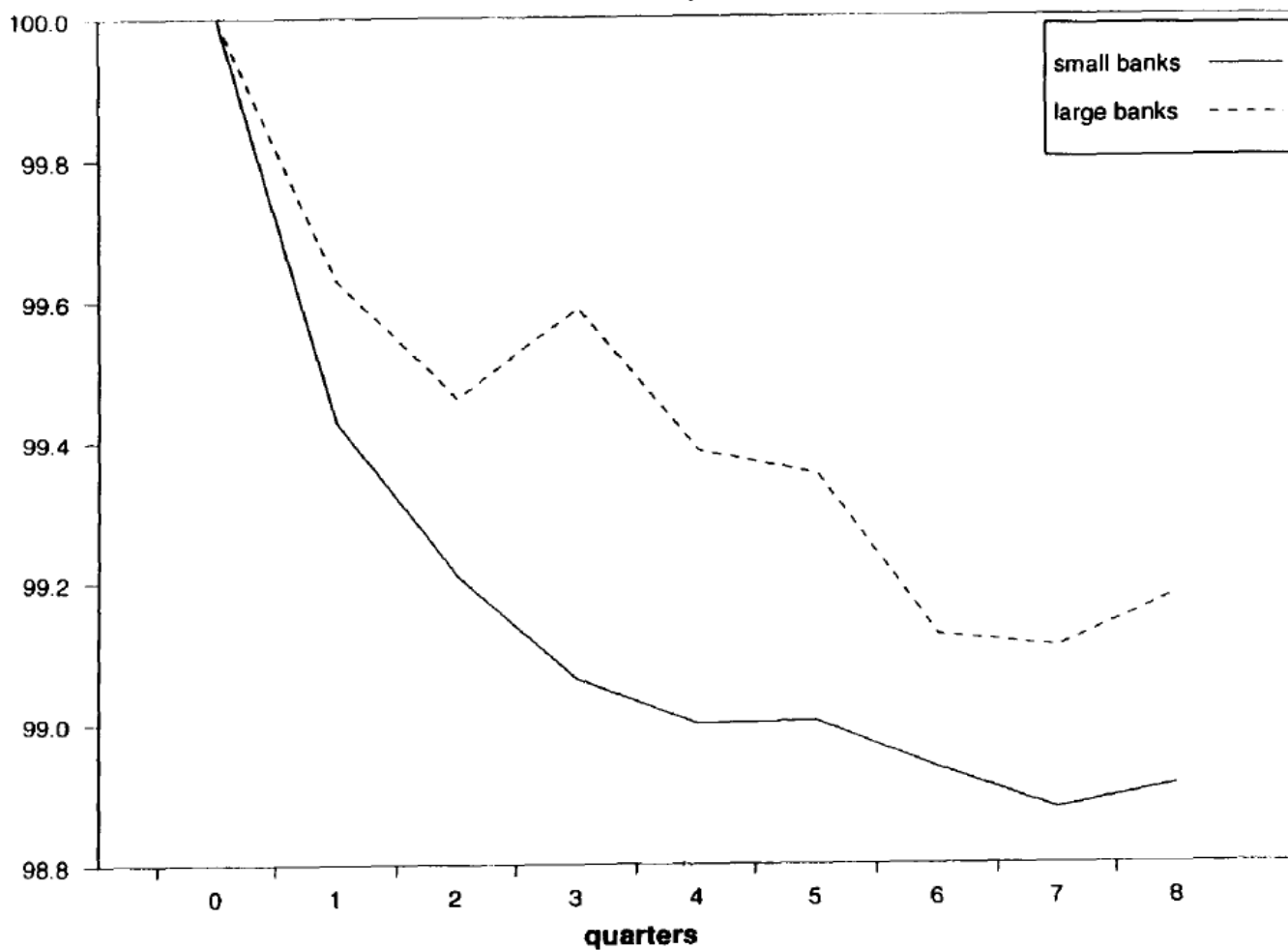
All series are shown as log deviations from their values at Romer dates.

FROM KASHYAP-STEIN (1995)

Figure 2

Simulated Response of Large and Small Bank Loans

Increase the Funds Rate by 100 basis points



USING MICRO DATA ON BANKS

- Kashyap-Stein (2000) use data on individual banks from Call Reports over 1976-1993: try to exploit implications of theory for cross-sectional differences in response of banks to monetary policy.
- Basic idea: if theory is right, less liquid banks should cut loans by more in response to monetary contraction. Especially if banks are small, have little access to capital markets.
- K-S test and confirm two hypotheses:
 - 1) $d^2L_{it}/dB_i dM_t < 0$. (Holding fixed size). In other words:
 - Tight money intensifies banks' liquidity constraints; or alternatively
 - Less liquid banks are more sensitive to monetary policy.
 - 2) $d^3L_{it}/dB_i dM_t dSIZE_i > 0$.
 - The above effects are more pronounced for small banks.
- But still, can't match banks to borrowers, so can't control decisively for loan demand effects: what if customers of illiquid banks have more cyclical loan demand?

IDENTIFICATION WITH FIRM FIXED EFFECTS

- Jimenez et al (2012): use data from Spanish credit registry: can match loans and firms.
 - Dependent variable is whether a loan application is granted.
 - Ask: when short-term rates rise, are illiquid or low-capital banks less likely to grant a loan *to the same firm*?
- Becker and Ivashina (2014): look at how individual firms switch from bank debt to bond market debt, conditional on borrowing.
 - More likely to do so when monetary policy is tightening.
- This approach is gold standard for identification, though not much help in pinning down aggregate effects.

TABLE 3—REGRESSION RESULTS, LOAN GRANTING AND MONETARY CONDITIONS
WITH FIRM-MONTH OR LOAN FIXED EFFECTS
(Dependent variable: *LOAN APPLICATION IS GRANTED*_{ibt})

Model	(1)	(2)	(3)	(4)
Macroeconomic controls (<i>t</i>)				
$\Delta IR_t \times BANK\ CAPITAL\ RATIO_{bt-1}$	28.566*** (6.822)	30.081*** (7.737)	19.873*** (5.681)	49.477*** (16.241)
$\Delta IR_t \times BANK\ LIQUIDITY\ RATIO_{bt-1}$	11.548*** (2.019)	12.269*** (2.286)	5.190*** (1.926)	10.412** (4.537)
$\Delta GDP_t \times BANK\ CAPITAL\ RATIO_{bt-1}$	-31.426*** (5.669)	-37.078*** (5.994)	-25.668*** (3.175)	-12.594 (15.468)
$\Delta GDP_t \times BANK\ LIQUIDITY\ RATIO_{bt-1}$	-1.602 (2.035)	-1.877 (2.166)	-2.375** (1.109)	6.947 (4.945)
Bank characteristics (<i>b</i>)				
<i>BANK CAPITAL RATIO</i> _{bt-1}	0.308* (0.184)	0.389** (0.191)	0.175* (0.093)	-0.810 (0.503)
<i>BANK LIQUIDITY RATIO</i> _{bt-1}	-0.075 (0.066)	-0.062 (0.070)	-0.055 (0.035)	-0.489*** (0.162)
ln(<i>TOTAL ASSETS</i> _{bt-1})	-0.001 (0.001)	-0.003*** (0.001)	0.001 (0.001)	-0.006*** (0.002)
<i>ROA</i> _{bt-1}	1.252*** (0.233)	1.355*** (0.261)	1.434*** (0.218)	1.371** (0.533)
<i>DOUBTFUL LOANS RATIO</i> _{bt-1}	0.158 (0.145)	0.136 (0.164)	-0.286*** (0.088)	-0.693** (0.337)
<i>HERFINDAHL BY INDUSTRY</i> _{bt-1}	0.016 (0.015)	0.018 (0.017)	0.002 (0.014)	0.056* (0.033)
Firm characteristics (<i>i</i>)				
ln(1 + <i>NUMBER OF MONTHS WITH THE BANK</i> _{ibt-1})	0.010*** (0.001)	0.013*** (0.001)	0.011*** (0.001)	0.026*** (0.004)
Firm-month fixed effects	Yes	No	Yes	Yes
Loan fixed effects	No	Yes	No	No
Observations	328,891	263,042	427,364	55,025
Number of bank-month clusters	8,714	8,310	10,637	6,022
Sample period	2002:02– 2008:12	2002:02– 2008:12	2002:02– 2010:06	2002:02– 2008:12

OK, BUT DOES IT WORK IN THEORY?

- According to old-school theory, a loose upper bound on lending channel is:

$$d\text{Loans}/d\text{MP} < d\text{Reserves}/d\text{MP} * (1/\text{reserve requirement}).$$

- In pre-crisis era:
 - Bank reserves are very small (in tens of billions).
 - Given highly inelastic demand for reserves, changes in funds rate are associated with tiny changes in quantity of reserves.
- Suggests old-school theory based on reserve requirements can't deliver quantitatively meaningful loan supply effects.
- And in current environment, there is no scarcity of reserves. Does this mean bank lending channel no longer exists?

IMPERFECT COMPETITION IN DEPOSIT MARKETS

- Drechsler-Savov-Schnabl (2017): MP can impact bank deposits even absent binding reserve requirements.
 - Key idea: special role for safe assets, and imperfect competition in bank deposit markets.
 - One version of the story: banks have some market power, and both “sleepy” and “attentive” depositors.
 - When market rates rise, banks keep retail deposit rates low. Earn more rents from sleepers. But lose the deposits of the attentive types; replace these with more expensive wholesale funding.
 - Higher marginal cost of funding → cutback in loan supply. (As in old-school view, still need frictions that generate increasing marginal costs of wholesale funding.)
- DSS cross-sectional findings:
 - When fed funds rate rises, bank branches (of same bank) in more concentrated markets raise deposit rates by less, experience more retail outflows.
 - When fed funds rate rises, banks that raise deposits in more concentrated markets cut their lending by more to a given county, relative to other banks.

Figure 1: **Deposit rates and monetary policy**

This figure plots deposit rates by product, as well as the Fed funds rate target. The data is weekly from RateWatch. The sample is from January 1997 to June 2008.

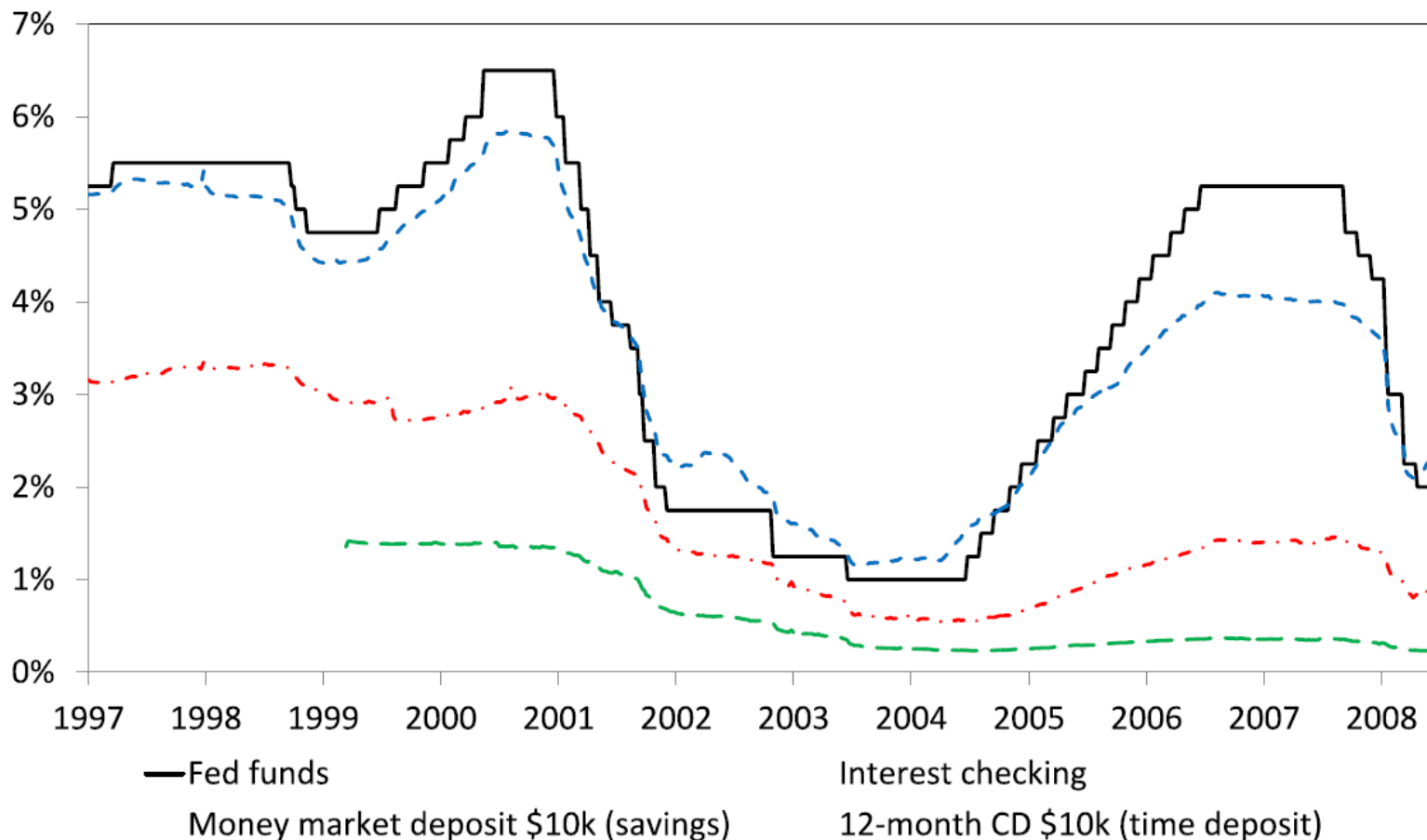
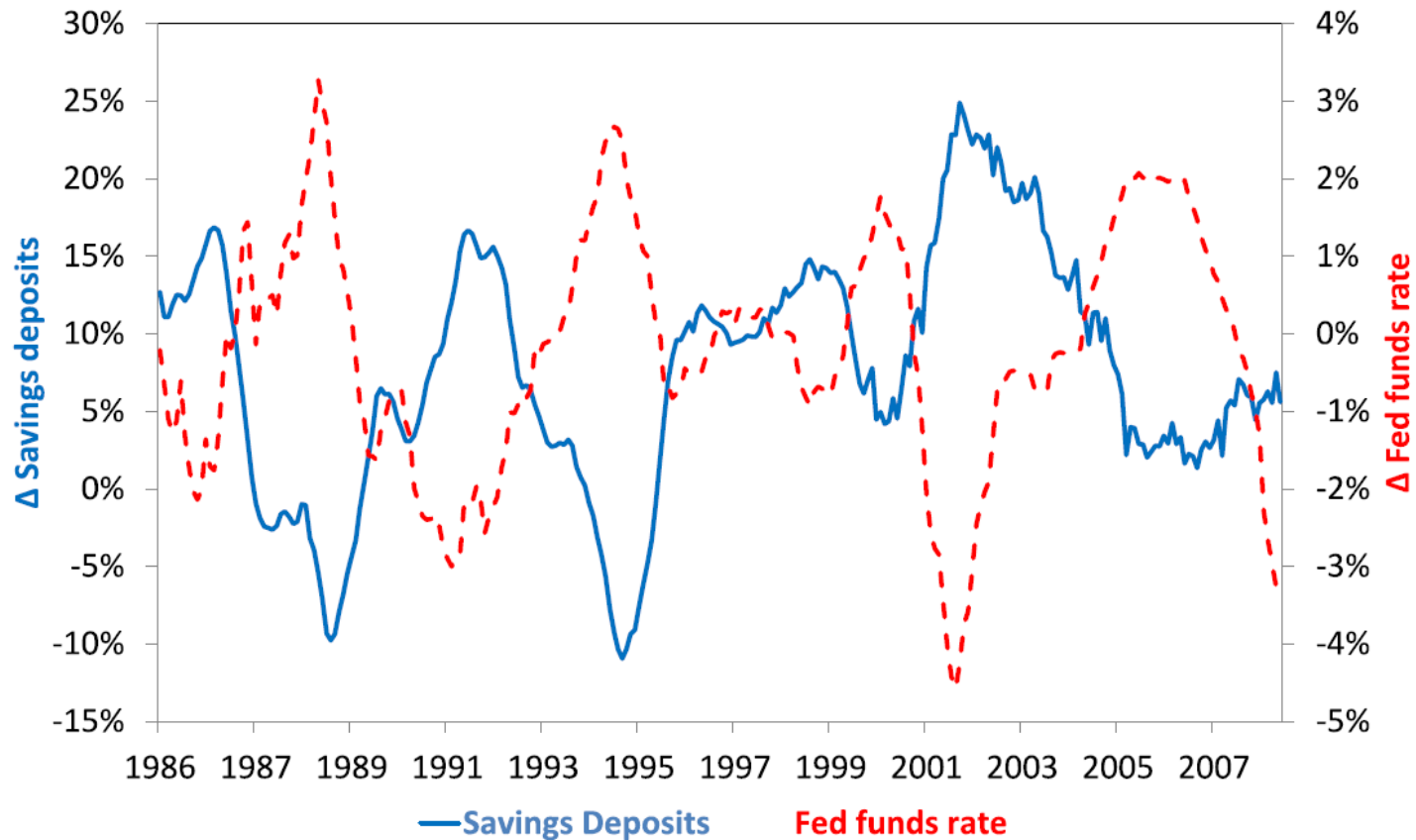


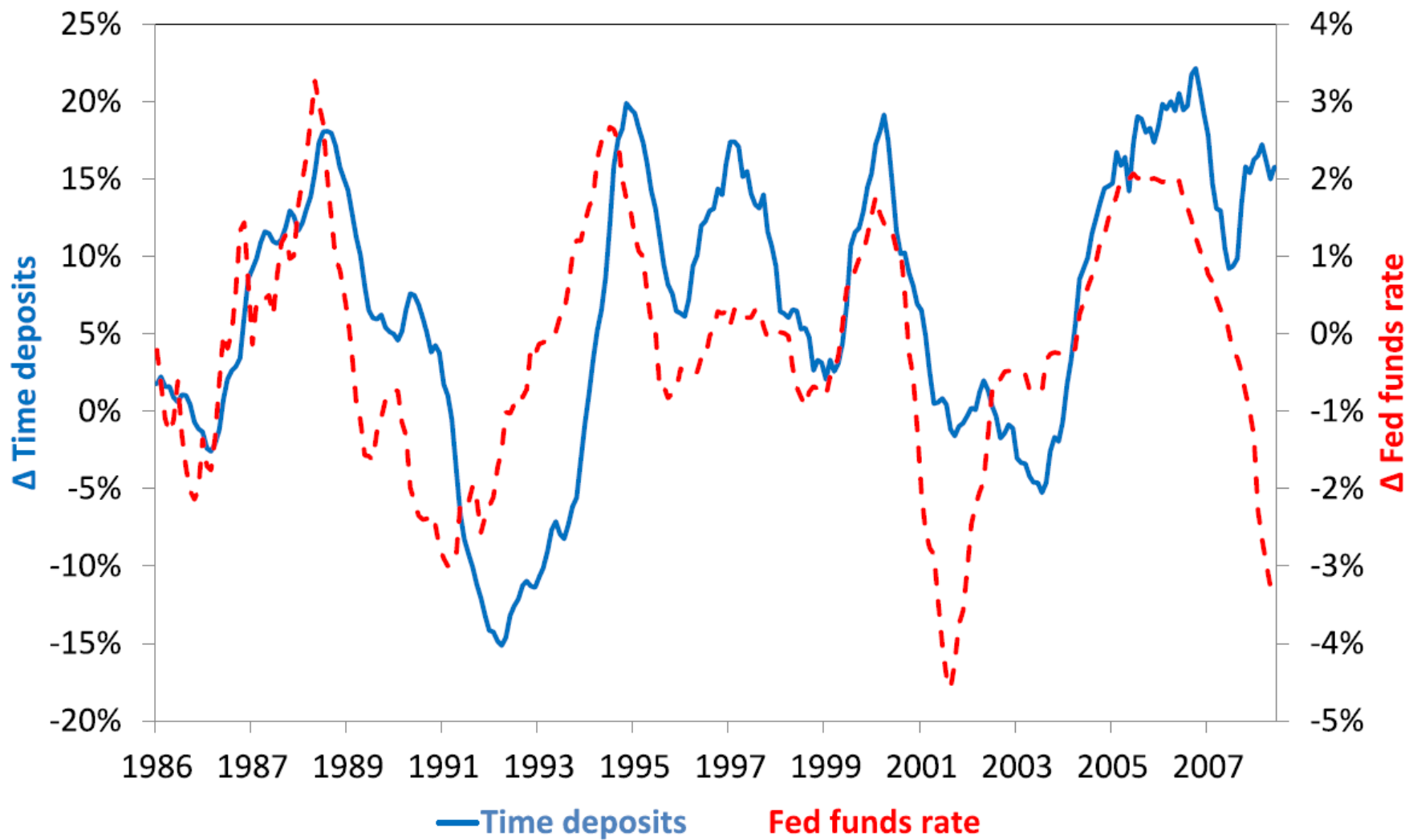
Figure 2: Deposit flows and monetary policy

This figure plots year-over-year changes in savings deposits (Panel A), checking deposits (Panel B), time deposits (Panel C), and total deposits (Panel D) and year-over-changes in the Fed funds rate. The data are from the Federal Reserve Economic Database (FRED) and the Flow of Funds. The sample is from January 1986 to June 2008.

Panel A: Savings Deposits



Panel C: Time Deposits



THE REACHING-FOR-YIELD CHANNEL

- Basic idea: when short-term nominal rates are low, various intermediaries become more willing to take on risk, so term premiums and credit-risk premiums get compressed.
- A bank that cares about its reported accounting income.
 - If deposit franchise is important source of bank rents, low rates are bad news for bank net interest margins (NIM).
- An insurance company with long-duration liabilities.
- A hedge fund that is compensated based on raw nominal returns, and has some fixed operating costs.

MONETARY POLICY AND LONG-TERM REAL RATES

- Hanson-Stein (2015): a 100 basis-point shock to 2-year yield on FOMC announcement day is associated with a 42 basis-point decline in *real rate 10 years forward*.
 - Hard to argue that this reflects changes in expected future real rates 10 years later.
- This impact on long rates seems to be a change in term premium; is largely reverted away over following year.
- The mechanism: when rates fall, banks offset shock to profits in part by replacing low-yielding short-term securities with higher-yielding long-term securities.
 - In Call Report data, a 1 percentage-point increase in term spread is associated with a 1.06 percentage-point increase in SEC_{LT}/SEC .
 - Effect appears to be a bit stronger for public than for private banks.

THE ROLE OF THE DEPOSIT FRANCHISE

- Hanson-Sarin-Stein (2018): banks with a greater share of transactions and savings deposits to total deposits—i.e., banks with a more valuable deposit franchise—show the following tendencies when short rates fall:
 - A greater decline in net interest margin (NIM).
 - A stronger shift towards longer-maturity securities and loans.
- Overall: combined with DSS (2017), suggests the nature of the deposit franchise may be at the heart of both the standard bank lending channel as well as bank-driven reaching-for-yield effects.
- Builds on idea of banks as safe-asset providers that create much of their value on liability side of the balance sheet.
 - Gorton-Pennacchi (1990), Stein (2012), DeAngelo-Stulz (2015), Krishnamurthy-Vissing-Jorgensen (2015), Dang-Gorton-Holmstrom-Ordenez (2017).

WHY CARE? SOME BASIC OBSERVATIONS

- In contrast to textbook NK model, short rate is important for policy transmission in its own right.
 - And may not want to be overly focused on narrow-window impacts of FOMC announcements on long rates; these may be relatively transitory.
- In contrast to textbook NK model, can have monetary non-neutrality without sticky goods prices.
 - In old-school theory, nominal rate is the price of “permits” for issuing cheap deposits; key friction is zero rate on reserves.
 - In imperfect-competition theory, deposit runoff is increasing in nominal rates; key friction is sleepy depositors accept zero (but not negative) nominal return.
- Distributional aspects of monetary policy: small bank-dependent firms are more affected.
- Potency of monetary policy depends on bank balance sheets— weaker when bank capital is impaired, and becomes the binding constraint on lending.

FRAGILITY OF BANK FUNDING

- On one hand, a period of low rates may lead banks to take more duration and credit risk on asset side: reach for yield.
- On other hand, as rates rise, liability side of bank balance sheets becomes more fragile: stable retail deposits are replaced with flightier wholesale funding.
 - And likely, a migration out of banks altogether, to shadow banks.
 - Don't be too complacent about success of new liquidity regime for banks yet; it has not been tested.
 - A role for government debt-maturity policy: issue plentiful T-bills to crowd out more systemically dangerous wholesale private money (Greenwood-Hanson-Stein 2015).
- Move by banks to wholesale funding may stress the liquidity coverage ratio, and ultimately demand by banks for reserves.
 - Banks required to hold more liquid assets against wholesale funding.
 - With potential implications for Fed balance sheet shrink and operating regime: floor vs. corridor system.

MONETARY POLICY AND FINANCIAL STABILITY?

- **Bright side of the reach-for-yield channel:**
 - Extended period of low rates provides more stimulus, because risk premiums are compressed. Policy is more powerful per unit of funds-rate cut—especially important if ZLB can bind.
- **Potential dark side of the reach-for-yield channel:**
 - A buildup of asset-side risk on bank balance sheets. May be particularly concerned if this risk-taking reflects agency problems associated with efforts to maintain reported accounting earnings.
 - When rates rise again, these riskier assets will be refinanced with flightier wholesale funding.
 - Evidence that credit booms driven by cheap supply of credit (low credit spreads) end badly: Jorda-Schularick-Taylor (2013), Mian-Sufi-Verner (2017), Lopez-Salido-Stein-Zakrajsek (2017), Krishnamurthy-Muir (2018).
 - Easy monetary policy could contribute to supply-driven booms.
- **Monetary policy may face a meaningful intertemporal tradeoff even when inflation is not an issue.**