Monetary Policy, Excess Reserves and Credit Supply: Old-Style vs. New-Style Central Banking

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Research Question

Does the transmission mechanism of conventional monetary policy differ across central banks' operational frameworks?

Motivation

The Great Financial Crisis forced a **switch in the operational framework** of the Federal Reserve, from a so-called "corridor" to a "floor" system.

Figure 1: The figure on the left depicts the aggregate reserve holdings by commercial banks that are in excess of their required reserves, calculated as in Afonso et al. (2019). The figure on the right presents the total amount lend in the Federal Funds market decomposed by size categories. In both figures the red vertical line indicates the switch date (2008Q3) of the operational framework, i.e., to the left from this line the Fed implemented monetary policy using an old-style corridor system, and to the right of the red vertical line using the new-style floor system.

Bank-lending Channel:

(à la Bernanke & Blinder, 1988)

- Key assumption: **Binding reserve requirements**
  $Res = \mu Dep$, with $\mu \in (0; 1)$.
- Contractionary Monetary Policy via OMOs:

  Reserves $\downarrow \longrightarrow$ Deposits $\downarrow\downarrow \longrightarrow$ Bank Lending $\downarrow \longrightarrow$ Aggregate Demand $\downarrow$

Post-2008 facts:

- $ER/TR \in (0.92, 0.98) \Longrightarrow Res > \mu Dep$
- Sizable changes in levels of liquidity in the Federal Funds market volume and participants.
- Bank's liquidity management costs linked to operational system switch given the new liquidity-related regulations.

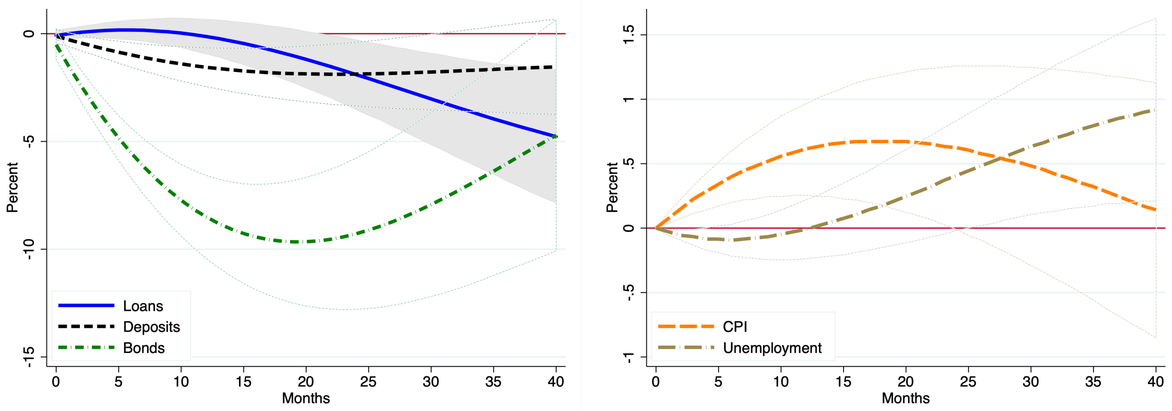
Empirical Evidence

Hybrid-VAR

- Data: Fed's Monthly H.8 dataset
- Appropriate instrument for conventional monetary policy during the ZLB.
  $\rightarrow$ Use Swanson's (2021) high-frequency identified "Federal Funds Rate Factor", i.e., **shocks from conventional monetary policy**.
- Monthly SVAR(1) with 6 variables:
  (à la Bernanke & Blinder, 1992)
  1. Macro variables: unemployment rate, the log of the CPI.
  2. Conventional Policy Shock.
  3. Balance sheet variables: log of real deposits, bonds and loans.

Impulse responses to contractionary policy shock

Old-Style Sample (1991m7-2008m9)



New-Style Sample (2008m10-2019m6)

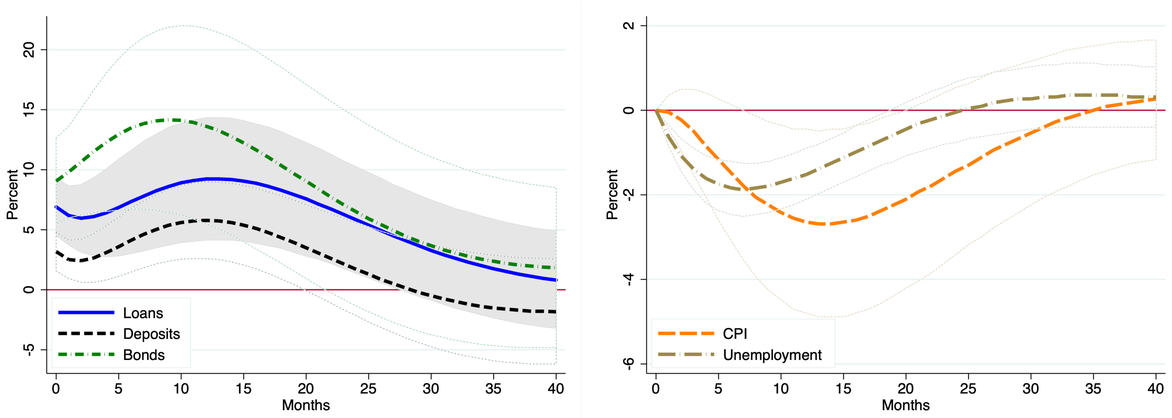


Figure 2: Impulse responses (in percent) to a +50 bps contractionary policy shock. The dotted lines or gray area around each impulse response provides 68% confidence intervals.

Theoretical Model

I develop a **regime-switching TANK model with credit-supply frictions** à la Gerali et al. (2010) **and an interbank market.** The central bank implements monetary policy using OMOs, and thus its target rate is determined as an interbank market outcome. The bank's wholesale branch choose loans (B_t), reserves (TR_t) gov. bonds (b_t^B) and deposits (D_t) to **maximize the discounted sum of (real) cash flows**

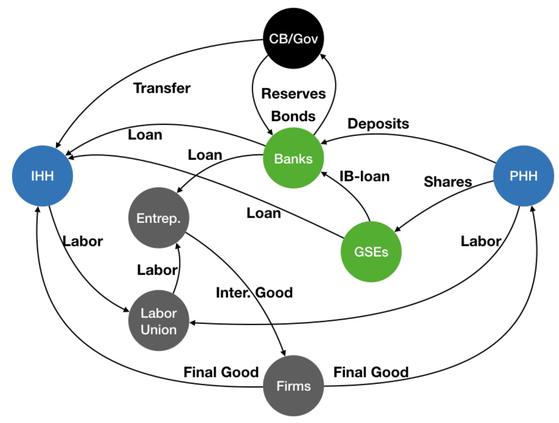


Figure 3: Model's Overview. "PHH" and "IHH" stand for Patient and Impatient Households, respectively. "IB-Loan" represent interbank loans and "CB/Gov" stands for the consolidated central bank and government

$$\max_{\{B_t, b_t^B, TR_t, D_t, IB_t\}} R_t^b B_t + r_t^{res} TR_t + r_t^{GB} b_t^B - R_t^d D_t - r_t^{ib} IB_t - \Phi_t^{\mu}(\widetilde{TR_t}) D_t$$

subject to a balance-sheet constraint $b_t^B + TR_t + B_t = D_t + IB_t$,
and to an **occasionally binding reserve-requirement constraint** $\mu D_t \leq TR_t$.

Bank's liquidity management costs (Φ_t^{μ}) are increasing in the aggregate amount of total reserves capturing the fact that banks have limited balance-sheet capacity due to liquidity-related regulations (e.g., LCR, SLR, Resolution Plans). **The first-order conditions** are given by

$$\Lambda_t(\mu D_t - TR_t) = 0 \quad (1) \qquad R_t^b = r_t^{ib} \quad (4)$$

$$r_t^{ib} - r_t^{res} = \Lambda_t \quad (2) \qquad R_t^d = r_t^{ib} - \Phi_t^{\mu}(\widetilde{TR_t}) - \Lambda_t \mu \quad (5)$$

$$r_t^{GB} = r_t^{ib} \quad (3) \qquad D_t + IB_t = b_t^B + TR_t + B_t \quad (6)$$

Liquidity Management costs introduce a friction

$$R_t^d = r_t^{ib} - \Phi_t^{\mu}(\widetilde{TR_t}) < r_t^{ib} = r_t^{res} = R_t^b \quad (7)$$

Results

1) Monetary Contraction: Old-Style vs. New-Style Central Banking

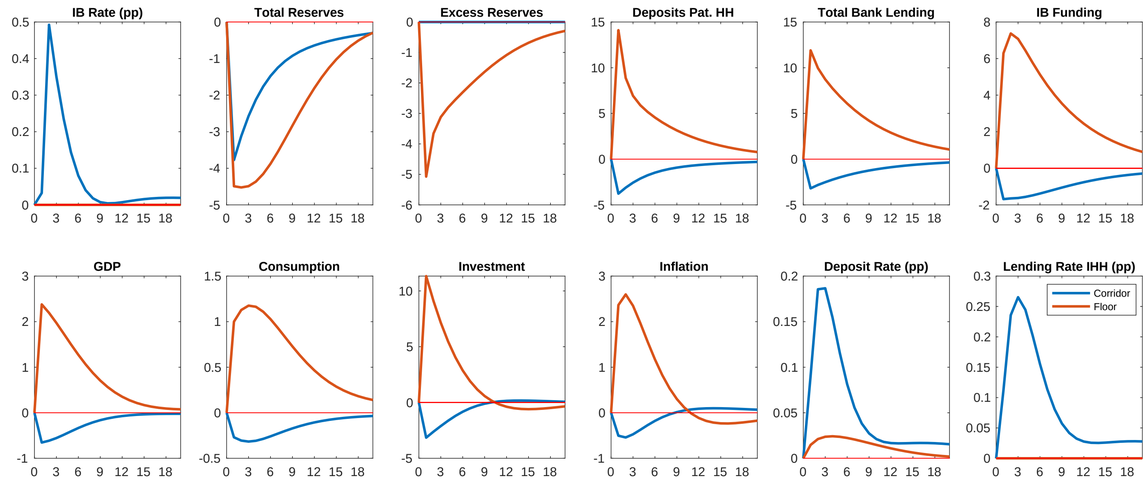


Figure 4: Impulse responses to a monetary policy shock equivalent to +50bps increase in the target rate (under the old-style system). All rates expressed in annualized percentage point deviations. All other variables in percent deviations.

- Bank-lending channel is active iff the reserve requirement constraint binds.
- Otherwise, the **bank-lending channel breaks down**.

$\Rightarrow$ **The transmission mechanism depends on the operational framework:**

- **Old-Style Corridor System** $\longrightarrow$ Reduction in reserves contracts credit supply.
- **New-Style Floor System** $\longrightarrow$ **Reduction** in reserves **stimulates** credit supply.
- **Mechanism:** Reserves $\downarrow \longrightarrow$ Liquidity Management costs $\downarrow \longrightarrow$ Deposit rate$\uparrow \longrightarrow$ Deposits $\uparrow \longrightarrow$ Bank Lending $\uparrow \longrightarrow$ Aggregate Demand$\uparrow$

2) Financial Crisis Rerun under the New-Style System?

Run on non-bank institutions (GSEs) that are active in the interbank market

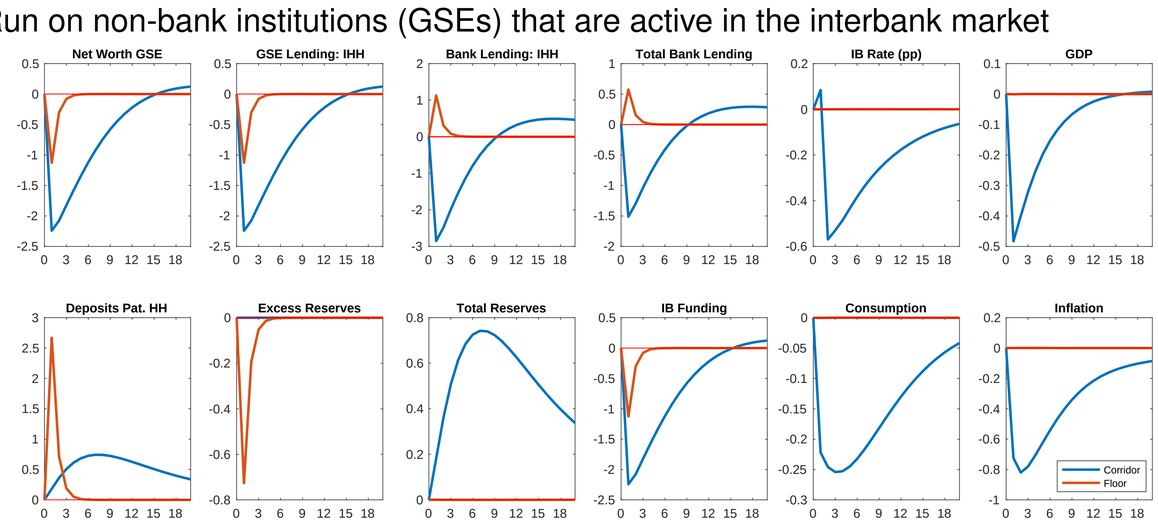


Figure 5: Impulse responses to a purely-transitory negative GSEs' net-worth shock. All rates expressed in annualized percentage point deviations. All other variables in percent deviations.

- **Interbank runs don't affect the real economy under the new Floor system.**
- The results support the 2019 decision by the Fed to maintain the new framework.

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