Should Unconventional Monetary Policies Become Conventional?

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Motivation

- Since the beginning of the Global Financial Crisis, major central banks have used unconventional monetary policies.
- These policies included large scale purchases of domestic assets (government bonds, MBS) and liquidity and refinancing operations. As a result, central banks balance sheets expanded to unprecedented levels (CB Assets/GDP):
  - Fed: from 5.7 percent (1955-2007) to 23.7 percent (2016).
  - BOE: from 6.5 percent (1955-2007) to 22.5 percent (2015).
  - ECB: 13 percent (2006) to 34.1 percent (2016).
  - BOJ: 21 percent (2007) to 88.7 percent (2016).

Motivation

Should unconventional monetary policies (large scale asset purchases) be part of the conventional toolkit?

- Avoids "Greenspan conundrum": under conventional monetary policy, CB affects the short term rate. But it might not be able to affect long term rates, which have stronger macro effects, with the same precision.
- But ...
  - Central bank losses could affect fiscal policy,
  - It could be inefficient for central banks to intermediate credit or direct credit to a specific sector.
- And diminishing returns to UMP: QE1 vs. QE2, QE3, most likely because the state of the economy was different.

The "lift-off" FOMC statement (Dec. 16, 2015) suggested keeping UMP at current levels in order to "maintain accomodative financial conditions":

"The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction, and it anticipates doing so until normalization of the level of the federal funds rate is well under way. This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions."

Our Contribution

- Evaluate the usefulness of UMP (asset purchases) in *normal times* (**many papers** at the ZLB: Del Negro et al., 2016; Chen et al. 2012).
- Extend Gertler and Karadi (2013) with long-term debt.
  - Both private and public sector debt.
  - Private sector issues long term debt because of "lumpy" investment.
  - Financial intermediaries engage in maturity transformation.
- Estimate the model over the Great Moderation period.
- Counterfactual exercises with UMP in place.

Main Results

- Under an estimated Taylor rule, welfare gains from using UMP policies can be up to 1.45 percent of steady-state consumption.
- UMP is mostly useful to react to financial shocks. It does not help with normal "business cycle" (supply and demand) shocks.
- Large scale asset purchases of corporate or government bonds deliver a similar result.
- Similar welfare gains from UMP under strict inflation targeting, but lower from optimized Taylor rules.

- "Standard" DSGE model shocks and frictions (Smets and Wouters, 2003; Justiniano et al., 2013):
  - Sticky prices and wages: conventional monetary policy has real effects.
  - Real frictions to fit the data: habit formation in consumption, adjustment costs to investment.
- Financial frictions: Agency problem by bankers (Gertler and Karadi, 2011). Inefficient spread between long-term lending rates and short-term deposit rates, which can be undone with UMP.
- Lumpy investment decisions (Sveen and Weinke, 2002; Andreasen et al., 2013): firms upgrade the capital stock at random intervals and issue long-term debt. Nominal lending rates are fixed for the duration of the contract.

- Every period a fraction $1-\theta_k$ of intermediate goods producers adjust their capital stock.
- When adjusting to the new capital stock $\bar{K}_t$, firms purchase capital financed by credit obtained from financial intermediaries at a constant rate $\bar{r}_t^L$ over the contract period.
- In addition, they pay a fee to capital goods producers: $\omega \mathscr{P}_t^K \bar{K}_t$, as compensation for providing support and maintenance on installed capital.
- Old capital is purchased by capital-producing firms at the original price. Relationship resembles a leasing relationship.

Banks use their real net worth (n_t) and real household deposits (d_t) to provide credit to intermediate good producers (len_t) and to the government (b_t):

$$len_t + b_t = n_t + d_t$$

Real lending and revenues to the private sector are defined as:

$$len_t = (1-\theta_k)\frac{\mathscr{P}_t^K \bar{K}_t}{P_t} + \theta_k \frac{P_{t-1}}{P_t} len_{t-1}$$

$$rev_t = (1-\theta_k)\bar{R}_t^L \frac{\mathscr{P}_t^K \bar{K}_t}{P_t} + \theta_k \frac{P_{t-1}}{P_t} rev_{t-1}$$

and the average return is:

$$R_t^L = \frac{rev_t}{len_t}.$$

Agency problem as in Gertler and Karadi (2011). The value of a bank $\mathscr{V}_t$ must exceed the amount a banker can divert:

$$\mathscr{V}_t \geq \lambda_t \left(len_t + \Delta_t b_t \right).$$

where Δ_t, λ_t are AR(1) processes in logs. With a binding participation constraint:

$$\left(R_t^L - R_t \right) > 0$$

and:

$$\left(R_t^G - R_t \right) = \Delta_t \left(R_t^L - R_t \right)$$

Rest of the Paper

- GMM estimation for the 1964:2-2009:4 period (same as JPT, 2013). Seven macro variables plus two spreads.
- We estimate the model by taking a **second order approximation** to the equilibrium conditions. We match 63 moments in the data.
- GMM estimator:

$$\hat{\Theta}_{GMM} = \arg\min \left\{ \frac{1}{T} \sum_{t=1}^{T} M_t - \mathbb{E}[\mathbf{M}(\Theta)] \right\}' \mathbf{W} \left\{ \frac{1}{T} \sum_{t=1}^{T} M_t - \mathbb{E}[\mathbf{M}(\Theta)] \right\}$$

- Use a microfounded welfare criterion to perform counterfactual exercises with UMP during that period:
  - Credit provided by the CB to the private sector.
  - CB purchases of government bonds.

GMM Estimation: A Few Comments

- Parameter estimates are reasonable and similar to others in the literature (but no priors!).
- Model specification J-test: p-value is 0.71.
- Model fit to means, variances, correlations and autocorrelations is very good, sometimes better than similar models estimated with Bayesian methods.
- TFP and Preference shocks main drivers of fluctuations. Financial (bank capital) shocks somewhat important: 15.8 of GDP Growth, 28.4 of Investment Growth, and 18.2 of Hours.

Introducing UMP

- Purchases of corporate bonds. Aggregate lending is given by:

$$len_t = len_t^p + len_t^{cb}.$$

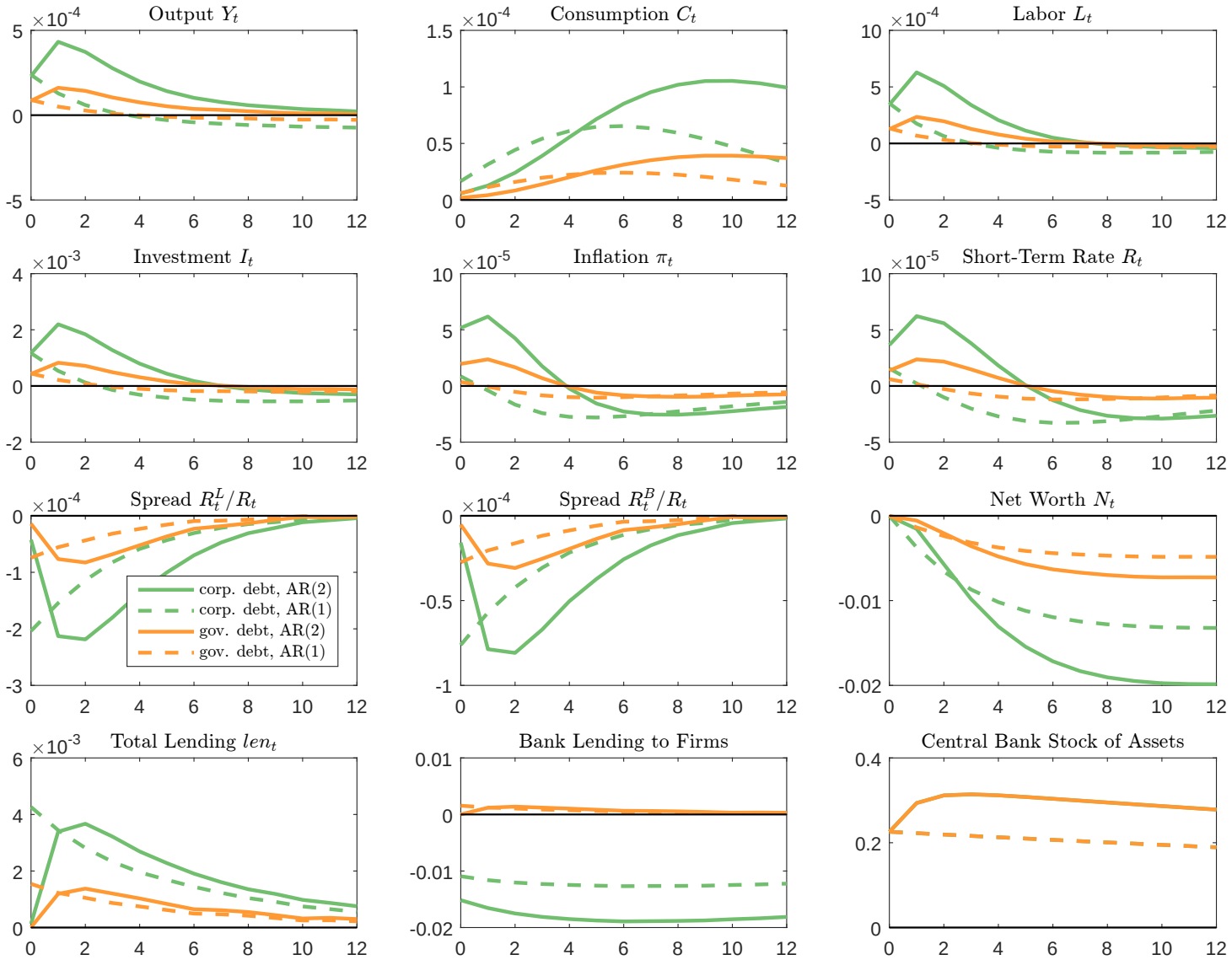
so central bank lending reduces corporate spreads, increases investment and employment.

- Purchases of government bonds: the central bank reduces government bonds spreads, which in turn reduces corporate spreads.

- Key assumption: banks do not accumulate excess reserves.

Effects of UMP

UMP Shock as an AR(1) or AR(2) process



Introducing UMP

- We compute welfare by taking a second order approximation to the utility function and the equilibrium conditions, and maximize over the coefficients of the rule.

$$len_t^{cb} = \rho_\Psi len_{t-1}^{cb} + \gamma_\Psi (R_t^L/R_t - R^L/R)$$
$$b_t^{cb} = \rho_\Psi b_{t-1}^{cb} + \gamma_\Psi (R_t^L/R_t - R^L/R)$$

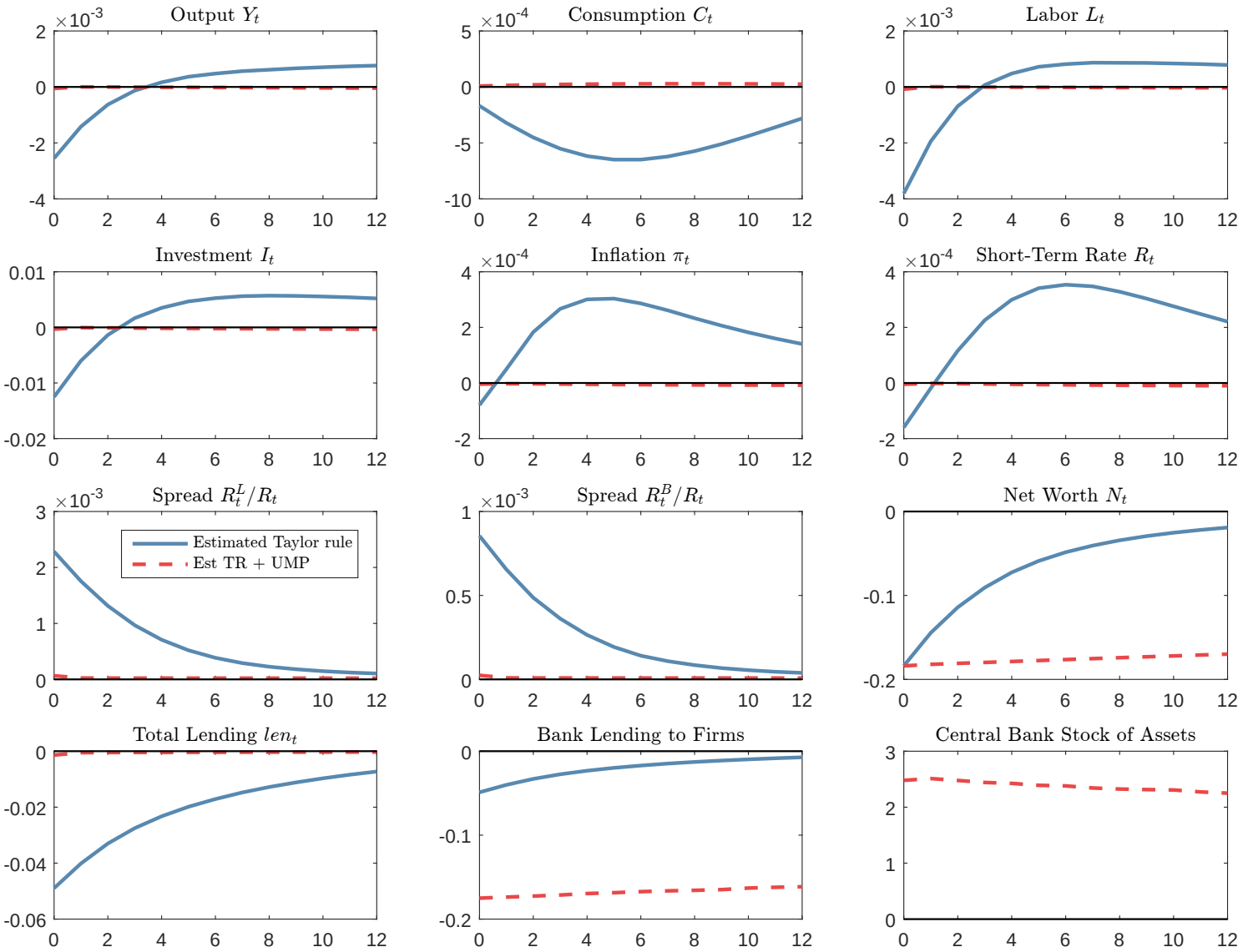
Table 7: Optimal UMP Policy

Policy	ρ_Ψ	γ_Ψ	$\mathbb{W}_t$	C.E. (in %)
Corp., $\bar{R}_t^L - R_t$	0.972	3142.9	-577.72	1.41
Corp., $R_t^L - R_t$	0.636	37992.7	-577.56	1.45
Gov., $\bar{R}_t^L - R_t$	0.786	56688.6	-577.8	1.4
Gov., $R_t^L - R_t$	0.767	65934.6	-577.56	1.45
Gov., $\bar{R}_t^B - R_t$	0	0	-583.6	0
Gov., $R_t^B - R_t$	0.953	37985.4	-577.66	1.43

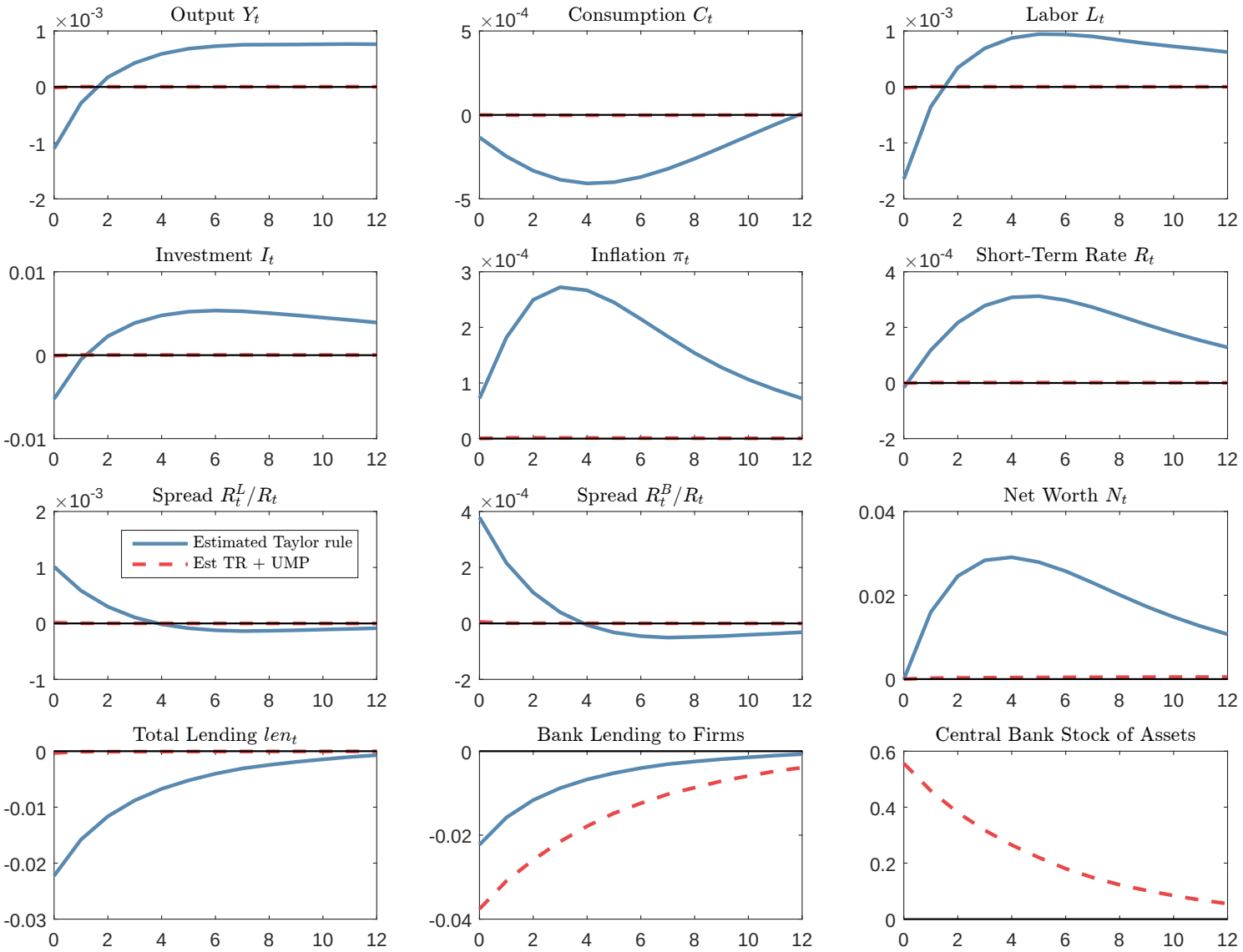
Table 8: Optimal UMP Policy, Conditional

Demand shocks				
Policy	ρ_Ψ	γ_Ψ	$\mathbb{W}_t$	C.E. (in %)
Gov., $\bar{R}_t^B - R_t$	0.05	14067.2	-575.05	0.35
Supply Shocks				
Policy	ρ_Ψ	γ_Ψ	$\mathbb{W}_t$	C.E. (in %)
Gov., $\bar{R}_t^B - R_t$	0.11	1136.9	-577.12	0.07
Financial Shocks				
Policy	ρ_Ψ	γ_Ψ	$\mathbb{W}_t$	C.E.
Gov., $R_t^L - R_t$	0.971	9292.1	-575.74	1.34

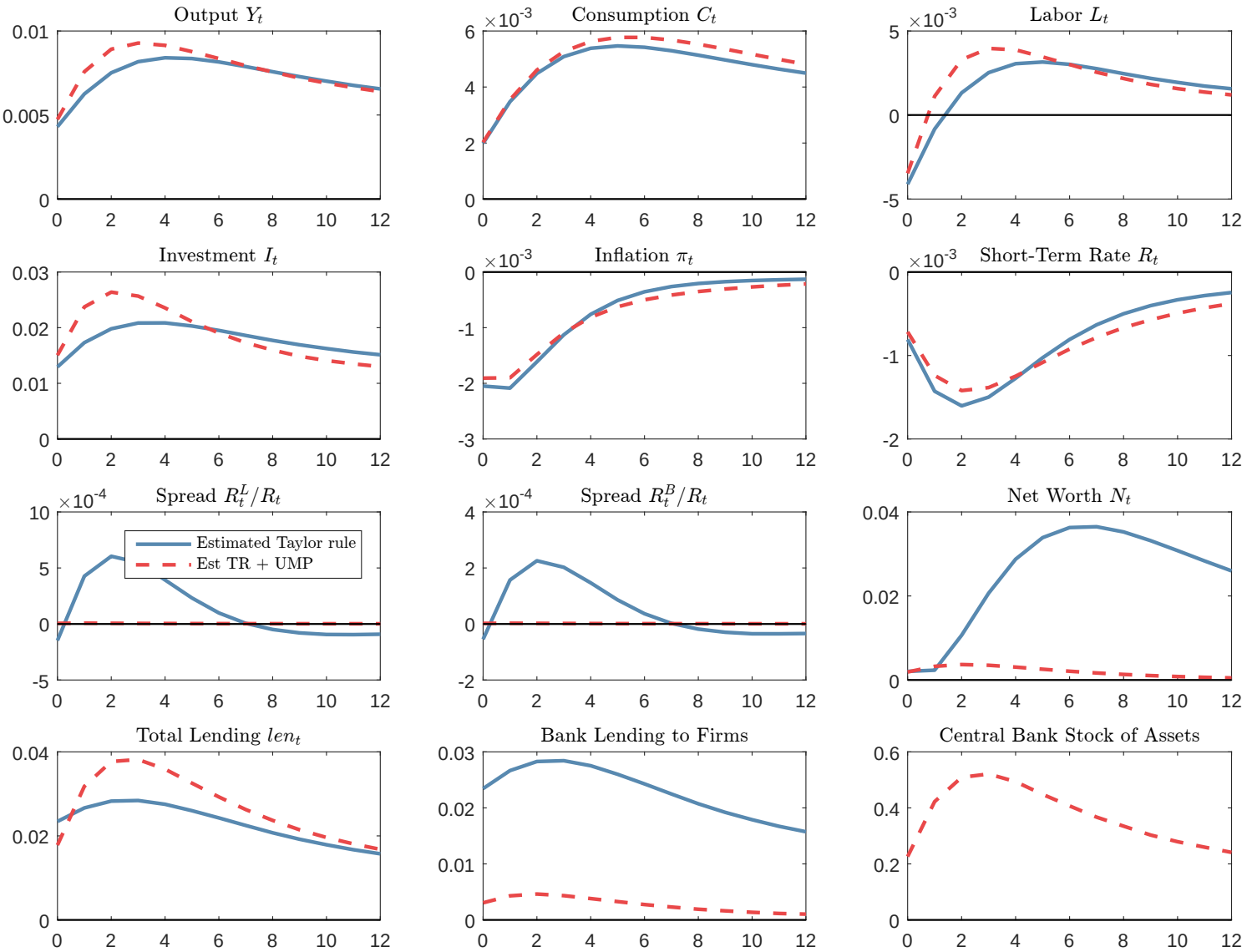
IRF to a Bank Capital Shock



IRF to a Government Debt Supply Shock



IRF to a TFP Shock



Some Robustness

- We repeat the same exercise under a strict inflation targeting rule:

Table 9: Optimal UMP Policy, Strict Inflation Targeting

Shocks	Policy	ρ_Ψ	γ_Ψ	$\mathbb{W}_t$	C.E. (in %)
All	Corp., $\bar{R}_t^L - R_t$	0.14	9.62	-553.83	1.45
Demand	Gov., $R_t^B - R_t$	0.84	1000000	-576.16	0.31
Supply	All	0	0	-553.67	0
Financial	Gov., $\bar{R}_t^L - R_t$	0.97	9163.7	-575.74	1.18

- Gains are lower under an optimized rule that targets price and wage inflation.

Summary

- We have examined if the Fed should keep UMP policies in place once interest rates normalize.
- We have found that for financial shocks, the answer is yes, because the benefits are sizable.
- Under more normal business cycle shocks such as demand or supply shocks, UMP is likely not needed.
- In normal times, large asset purchases with corporate or government bonds have similar effects.
- It depends on how we measure costs, which we have not atempted to do in this paper.