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Fiscal stimulus and systematic monetary policy: Postwar evidence for the United States

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HIGHLIGHTS

- U.S. fiscal stimulus induces a loosening of interest rates during normal times.
- The policy easing by the Fed is an indirect reaction to disinflationary dynamics.
- The supporting monetary policy stance amplifies output effects by roughly one-third.
- Evidence aligns with fiscal policy models featuring deep-habits in consumption.
- Findings question the narrative of public spending being more effective during ZLB.

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ABSTRACT

I provide structural VAR evidence that U.S. fiscal stimulus programs induce a systematic *loosening of interest rates* outside of zero-lower-bound episodes. I characterize this policy easing by the Fed as an indirect reaction to *disinflationary dynamics* unleashed by fiscal stimulus—a finding I corroborate via Taylor-rule estimations. The supporting monetary policy stance amplifies the impact of the expansion in public spending on GDP by roughly one-third. My evidence aligns with fiscal policy models featuring deep-habits in consumption. The empirical regularity of accommodating policy rates, moreover, questions the perception of stimulus being more effective when policy rates are stuck at zero.

1. Introduction

The plain-vanilla New Keynesian framework predicts endogenous contractionary monetary policy to dampen the expansionary effect of public spending, by leaning against inflationary pressure. Accordingly, theoretical contributions (e.g., Christiano et al., 2011) report an amplification of the macroeconomic consequences of public spending in the absence of a systematic monetary policy reaction, e.g., during zero-lower-bound (ZLB) episodes. Recently, Ramey and Zubairy (2018) compare fiscal multipliers in normal times relative to ZLB periods in the data, yet, finding no clear evidence for regime differences.[1] One reading of the empirical evidence could be that the marginal effect of tightening interest rates in the shock propagation is small, i.e., that it does not matter whether monetary policy contracts after fiscal stimulus or not. An alternative reading could be that the New Keynesian narrative of *tightening interest rates during normal times is not at work*. I provide structural evidence for the latter hypothesis and add a systematic analysis of the Fed's policy reaction.

Centering around a VAR capturing the interaction of fiscal policy and the macroeconomy, similar to Galí et al. (2007), I explicitly model the Fed's policy stance by adding inflation and the Federal Funds rate to a data sample ranging from 1954Q1 to 2008Q3.[2] While, in general, news on military spending do not constitute a valid instrument during the postwar era, I identify spending shocks

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[1] For historical U.K. data, Crafts and Mills (2013) also come down toward a critical view by documenting fiscal multipliers for GDP to be smaller than one during a ZLB environment.

[2] The Fed was founded in 1913, yet, the notion of its dual mandate can be traced back not earlier than the late 1940s. In addition, around WWII short-term rates were close to the ZLB such that a reasonable sample to study conventional fiscal–monetary-interactions is limited to the postwar period. From 2008Q4, the ZLB was binding in the U.S., determining the end of the sample.

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recursively, as in Blanchard and Perotti (2002). Moreover, I address fiscal foresight following Bachmann and Sims (2012) and control for contemporaneous fiscal news as in, e.g., Ramey (2011) or Fisher and Peters (2010); alternatively, I recover (un-)anticipated shocks according to Auerbach and Gorodnichenko (2012).

I document fiscal policy shocks to jointly induce a significant *slowdown* in inflation and the Federal Funds rate; both variables reach their trough at around 25bp. Taylor-rule estimates (Coibion and Gorodnichenko, 2012) reveal that an *inflation stabilization motive* appears to underlie the policy accommodation, by discarding any direct-reaction-hypothesis of monetary to fiscal policy. Ultimately, I follow the Bernanke et al. (1997)-procedure to statistically isolate the *marginal effect* of impacting policy rates in the propagation of fiscal policy. By contrasting the original VAR with a counterpart for which the Funds rate remains fixed – via counteracting Cholesky-orthogonalized monetary policy innovations – I approximate monetary policy to amplify the output repercussions of fiscal stimulus by up to one-third.

A potential interpretation of these stylized facts builds on a transmission mechanism for fiscal policy that also operates via the supply-side of the economy. In this vein, my results align with contributions that confront sticky-price models with deep-habits in (public) consumption (Ravn et al., 2006). Once consumers form deep-habits over individual products, rather than over the composite final good, firms' pricing decisions turn into a dynamic problem as contemporaneous sales affect future demand. Combining the deep-habits mechanism with imperfect competition, counter-cyclical price-markups arise, which – if sufficiently strong – are capable of depressing inflation, conditional on fiscal stimulus; a sufficiently inflation-centered Taylor-rule may then induce a softening of interest rates. For instance, in the deep-habits DSGE model presented in Zubairy (2014), an expansionary fiscal policy innovation induces a joint slowdown in consumer price inflation and the policy rate; with impulse responses of both variables being significantly different from zero for more than one year (see also Jacob, 2015).

2. Empirical framework

2.1. Fiscal–monetary-policyinteractions in a structural VAR

I formulate a structural VAR to jointly model fiscal–monetary-policy interactions and their repercussions to the broader economy:

$$\boldsymbol{A_0 x}_t = \sum_{l=1}^{p} \boldsymbol{A_l x}_{t-l} + \boldsymbol{\varepsilon}_t, \text{ where } \mathbb{E}\{\boldsymbol{\varepsilon_t}\} = 0 \text{ and } \mathbb{E}\{\boldsymbol{\varepsilon_t \varepsilon_t'}\} = \boldsymbol{\Sigma_\varepsilon}, \quad (1)$$

dropping the intercept for notational convenience. For lag, $l = 1, \ldots, p$, matrix $\boldsymbol{A}_l$ features the dynamic relations in the model. $\boldsymbol{A}_0$ comprises contemporaneous coefficients, and $\boldsymbol{\varepsilon}_t$ denotes mutually uncorrelated shocks. I recover the structural form of the VAR by recursively identifying public spending surprises via a Cholesky-factorization of the reduced-form variance, implying public expenditures to be pre-determined with regards to within-quarter economic conditions, as in Blanchard and Perotti (2002). In the benchmark model, I follow Bachmann and Sims (2012), and additionally *control for fiscal foresight* by accounting for impact-quarter fluctuations of news on military spending, as in Ramey (2011).[3]

$\boldsymbol{x}_t$ comprises the following time-series, in this order: military news, government spending (consumption plus investment), GDP, hours worked, consumption, non-residential investment, wages, the budget deficit, PCE inflation, and the Federal Funds rate.[4] I focus on fiscal–monetary-interactions during "normal" times; my sample thus covers a period never subject to ZLB constraints, 1954Q1 to 2008Q3. Beyond avoiding the close-to-zero interest episode around WWII, the postwar sample sidesteps identification problems emerging from price controls or rationing, and also shifting Fed regulations during the Korean war. I estimate the VAR with four lags.

Ignoring the solid blue line with crosses for now, Fig. 1 plots adjustment patterns conditional on a one standard-deviation fiscal policy surprise, across time. For the core set of macroeconomic time-series I report dynamics similar to Galí et al. (2007), despite a more recent sample and a richer specification. The newly introduced inflation and Federal Funds rate decline significantly in a hump-shaped fashion, reaching their troughs in the first and second year after the shock at close to 30 bp, respectively, before leveling off.

The inflation panel further reveals that disinflationary dynamics also emerge had I used CPI- or GDP-based inflation measures.[5] The Federal Funds rate panel, moreover, documents the endogenous policy accommodation to also propagate to long-term rates such as US-Treasury or Moody's BAA corporate bond yields. The pass-through to the yield curve appears, however, incomplete; long rates react less than one-for-one to the Funds rate. Fig. 2 illustrates that my main result is insensitive to recovering (un-)expected government spending shocks, as in Auerbach and Gorodnichenko (2012), i.e., by shocking expenditures and controlling for professional forecasts or, alternatively, by disturbing professional forecast *errors* ordered first.[6]

2.2. Why does the Fed lower rates?

To the extent that the Fed reacts more aggressively to inflation relative to output – where the latter booms in the VAR – the interest rate accommodation by the Fed is in line with conventional Taylor-rule dynamics. However, a *direct reaction* of policy rates to the fiscal stimulus itself may still partly underlie the loosening of interest rates. To test such a hypothesis, I explicitly model the Fed's reaction function as a Taylor-rule following Coibion and Gorodnichenko (2012) and add measures of (news on) fiscal policy to it. By using real-time Greenbook forecasts of the Fed staff, such a specification comes as close as possible to capturing the forward looking behavior of the central bank, by conditioning on its actual information set.

A Taylor-rule accommodating a flexible number, K, J, of AR ($\rho_{r,k}$) and MA ($\rho_{\eta,j}$) terms reads:

$$\begin{aligned} r_t = {} & c + \psi_\pi \mathbb{E}_{t-}\{\pi_{t+h_\pi}\} + \psi_{\tilde{y}} \mathbb{E}_{t-}\{\tilde{y}_{t+h_{\tilde{y}}}\} + \psi_{\Delta y} \mathbb{E}_{t-}\{\Delta y_{t+h_{\Delta y}}\} \\ & + \psi^j_{\Delta g} \Delta g^j_{t-1} \\ & + \sum_{k=1}^{K} \rho_{r,k} r_{t-k} + \eta^{TR}_t, \text{ where } \eta^{TR}_t = \sum_{j=1}^{J} \rho_{\eta j} \eta^{TR}_{t-k} + \zeta_t, \end{aligned} \quad (2)$$

[3] Using military news, as proposed in Fisher and Peters (2010), delivers very similar results. Note that my identification strategy assumes fiscal policy not to be able to react to contemporaneous fluctuations in inflation and the Federal Funds rate—a restriction often imposed on, e.g., output or consumption (Blanchard and Perotti, 2002). Relaxing this assumption delivers similar results.

[4] Except for personal income, which I only include as a robustness check, I use the variables and specifications as Galí et al. (2007) and add fiscal news, inflation, and interest rates to their VAR.

[5] For news shocks, Dupor and Li (2015) report a declining CPI *level* based on interpolated data.

[6] The sample for these estimations starts in 1966Q4, due to data availability. In addition, I conduct sub-sample analysis for the benchmark model by imposing a sample split in 1979Q3 (appointment of Fed chairman Volcker) and find consistent results.