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Technology shocks and monetary policy: assessing the Fed's performance ☆

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Abstract

The purpose of the present paper is twofold. First, we characterize the Fed's systematic response to technology shocks and its implications for U.S. output, hours and inflation. Second, we evaluate the extent to which those responses can be accounted for by a simple monetary policy rule (including the optimal one) in the context of a standard business cycle model with sticky prices. Our main results can be described as follows: First, we detect significant differences across periods in the response of the economy (as well as the Fed's) to a technology shock. Second, the Fed's response to a technology shock in the Volcker–Greenspan period is consistent with an optimal monetary policy rule. Third, in the Pre-Volcker period the Fed's policy tended to overstabilize output at the cost of generating excessive inflation volatility. Our evidence reinforces recent results in the literature suggesting an improvement in the Fed's performance.

JEL classification: E31; E58

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1. Introduction

Since the seminal work of Taylor (1993), many macroeconomists have shifted their attention to the analysis of the endogenous component of monetary policy, and its role in shaping the responses of nominal and real variables to different shocks. The contribution of the present paper to that research program is twofold. First, we study the behavior of the Federal Reserve (Fed) in response to a specific source of fluctuations: technology shocks. Second, we evaluate the extent to which that policy response approximates the optimal one, using a standard dynamic sticky price model as a reference framework.[1]

We provide evidence on the economy's response to a technology shock that is based on a structural VAR, estimated using U.S. quarterly data for the period 1954–1998. Following the strategy adopted in Galí (1999), we identify a technology shock as the only source of the unit root in labor productivity. We analyze the estimated dynamic responses of a number of real and nominal variables to that shock, and assess how the observed Fed reaction may have influenced the economy's response. Furthermore, and motivated by recent evidence pointing to significant changes over time in the Fed's monetary policy rule, we analyze the differences across two subperiods: the Pre-Volcker period and the more recent Volcker–Greenspan era. [2]

Our theoretical analysis focuses on three alternative monetary policy rules. First, we derive and characterize the optimal policy. In the context of our model that policy is the one that fully stabilizes prices. Second, we derive the equilibrium responses to a technology shock of a number of variables under such a rule, and compare those responses to the ones generated by two alternative specifications of monetary policy: a simple Taylor rule and a constant money growth rule. We then confront the three sets of theoretical responses with the empirical ones, and try to ascertain which rule—if any—provides a better approximation to the systematic response of the Fed to the supply shocks under consideration.

Our main results can be summarized as follows. First, we detect significant differences across periods in the response of interest rates, prices, and output to a technology shock. Second, the Fed's response to that shock in the Volcker–Greenspan period is consistent with an optimal rule. Third, in the Pre-Volcker period the Fed's policy tends to overstabilize output, thus generating excessive inflation volatility. Hence, our evidence reinforces recent results in the literature suggesting an improvement in the Fed's performance.

The remainder of the paper is organized as follows. In Section 2 we derive and characterize the economy's equilibrium under the three rules considered. In Section 3 we present our evidence on the Fed's systematic response to technology shocks, and compare the empirical responses with the theoretical counterparts. Section 4 concludes.

[1] Dotsey (1999) emphasizes the role of the systematic component of monetary policy in determining the economy's response to any type of shock.

[2] See, e.g. Taylor (1999), Judd and Rudebusch (1999), and Clarida et al. (2000) for evidence of a regime change around the time Paul Volcker became the Fed's chairman.