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Monetary policy matters: Evidence from new shocks data

S. Mahdi Barakchian, Christopher Crowe *

Graduate School of Management and Economics, Sharif University of Technology, Tehran, Iran

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ABSTRACT

The evidence suggests that monetary policy post 1988 became more forward-looking, invalidating the identifying assumptions in conventional methods of measuring monetary policy's effects, leading to spurious and unlikely results for this period. We propose a new identification scheme that uses factors extracted from Fed Funds futures to measure exogenous changes in policy. Using this shock series in a VAR, we recover the contractionary effect of monetary tightening on output. Moreover, we find that as much as half of the variability in output was driven by monetary policy shocks, and that there is a mild price puzzle.

1. Introduction

Identifying the impact of monetary policy on the economy is a central question in empirical macroeconomics. The key identification problem is simultaneity. Hence, the focus has been on the exogenous or 'shock' component of policy changes. For the U.S., a consensus has emerged on the qualitative effects of a monetary policy shock. Christiano et al. (1999) summarize this consensus as follows:

> After a contractionary monetary policy shock, short term interest rates rise, aggregate output, employment, profits and various monetary aggregates fall, the aggregate price level responds very slowly, and various measures of wages fall, albeit by very modest amounts. In addition, there is agreement that monetary policy shocks account for only a very modest percentage of the volatility of aggregate output; they account for even less of the movements in the aggregate price level.

However, this consensus is sensitive to the period used for analysis. In particular, it is dependent on the inclusion of the 1970s and early 1980s, when shocks were large and the policymaking environment was different from the one faced today. When one attempts to identify the effects of monetary policy shocks for the period since the 1980s using the same methodologies one obtains quite different results. Notably, contractionary monetary policy shocks appear to have a small positive effect on output.

This paper presents some evidence on changes to the nature of U.S. monetary policy shocks that would cause conventional identification methods to give misleading results. In particular, we show that U.S. monetary policy has become more forward looking. Hence, VAR identification methods that ignore the role of forecasts in the policymaker's reaction function are misspecified. Identification methods (such as Romer and Romer, 2004) that allow for forward-looking variables in the reaction function but do not allow for the apparent increase in their relative weight will tend to suffer from the same problem.

* Corresponding author. Tel.: +44 2070710924; fax: +44 2070710950.
E-mail addresses: c.w.crowe@gmail.com, ccrowe@capulaglobal.com (C. Crowe).

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We turn to financial market data in an effort to uncover a measure of monetary policy shocks that is less subject to these criticisms. Following Kuttner (2001), Gürkaynak et al. (2005) and Piazzesi and Swanson (2008) monetary policy shocks are identified as the 'surprise' component of monetary policy actions, estimated using movements in Fed Funds futures contract prices on the day of monetary policy announcements following FOMC meetings.

Factor analysis is employed to efficiently capture the information contained across the maturity spectrum, uncovering the common information from six monthly contracts: the current month and up to 5 months ahead. As in Gürkaynak et al. (2005) two factors are sufficient to summarize the information across the six contracts. Moreover, in keeping with the literature on factor models of the yield curve (e.g. Piazzesi, 2010), the factors have a natural interpretation as level and slope, respectively. The former is employed as the measure of the policy shock.

We enter this new shock measure in a simple monthly VAR, similarly to Romer and Romer (2004), estimated for 1988:12-2008:06.[1] With this new measure, a contractionary monetary policy shock has a statistically significant negative effect on output. While the effect is small in absolute terms, the forecast error variance decomposition suggests that, in an era of low overall output volatility, our new policy shock measure can account for up to half of output volatility at a horizon of 3 years or more—around twice the proportion using existing shock measures. There is some evidence for a 'price puzzle': contractionary monetary policy also leads to a small, and borderline significant, increase in the general price level at a horizon of 1–3 years, although this is subsequently reversed. Efforts to eliminate the price puzzle by including a measure of commodity prices or inflation expectations in the VAR, following suggestions in the literature, are not successful.

1.1. The related literature

Our methodology builds on the insights of an increasingly influential literature on identifying monetary policy shocks using financial market data. Rudebusch (1998) is an early paper advocating the use of Fed Funds futures data, while Kuttner's (2001) focus on one-day changes in futures prices, rather than the difference between the implied futures rate and the actual policy rate, allows for sharper identification. Faust et al. (2004) propose a novel two-stage identification scheme in which the information available from the Fed Funds futures is used to partially identify a structural VAR. Gürkaynak et al. (2005) use a two factor model to combine information from futures contracts at different horizons and separately identify level and slope factors. Hamilton (2008) derives level, slope and curvature factors using three Fed Funds futures contracts, and estimates the impact of the different factors on housing market variables. Thapar (2008) uses 3 month Treasury Bill futures prices as a proxy for market expectations, in a novel identification method that combines these market-based forecasts with Greenbook forecasts of output and price variables. D'Amico and Farka (2011) uses intraday futures data to estimate the contemporaneous relation between monetary policy and stock prices within a VAR framework. Taylor (2010) carries out a slightly different exercise, using intraday Fed Funds futures data to identify the effect of macroeconomic data announcements on market expectations of future monetary policy changes.

While this paper is therefore not the first to turn to Fed Funds futures data, this paper is the first to use shocks extracted from futures contracts to identify the responses of output and inflation to monetary policy shocks. Earlier contributions have focused on the impact of monetary policy on financial rather than macro variables. Because, in our case, the policy shock is identified outside the VAR, one can avoid some of the weaknesses of structural VAR estimation. By contrast, Faust et al. (2004) use the structural VAR model to identify the monetary policy shock and to estimate the impulse responses of the macro variables to the policy shock, and as a result their method is subject to some of these weaknesses. Like Kuttner (2001) and Hamilton (2008), but unlike Rudebusch (1998) and Thapar (2008), this paper focuses on daily innovations in Fed Funds futures prices. Using daily data from policy announcement days helps to remove the impact of other news (such as economic data releases) and more cleanly identifies the impact of exogenous policy shocks. Moreover, as Kuttner (2001) has argued, focusing on innovations to the futures price helps to strip out the impact of fluctuations in term and risk premia.

This paper also contributes to a smaller literature on the instability over time of identified impulse responses from VARs. Boivin and Giannoni (2006) test for instability in a small structural VAR, and find evidence for a structural break. Owyang and Wall (2009) estimate aggregate and regional VARs and find that the estimated impact of monetary policy on output is significantly lower in the Volcker–Greenspan period than earlier. Both papers argue that the apparent change in the impact of monetary policy shocks is a real one, reflecting fundamental changes in the transmission mechanism. Boivin and Giannoni argue that the key change is a stronger Fed response to inflation expectations. Owyang and Wall attribute the change in responsiveness to changes in the propagation mechanism for monetary policy. By contrast, our analysis suggests that although the reduction in the estimated impact reflects a real change in behavior (forecasts playing a greater role in the Fed's decision-making), the key change is to the estimated effect rather than the actual effect, because identification problems become more pronounced when the Fed's policy becomes more forward looking.

The next section briefly reviews the literature on identifying monetary policy shocks and their effects. It focuses in particular on four identification schemes that have received significant attention: Christiano et al.'s (1996) recursive VAR identification; Sims and Zha's (2006) non-recursive VAR; Bernanke and Mihov's (1998) over-identified VAR; and Romer and Romer's (2004) narrative

[1] Because the Fed Funds futures market only started trading in October 1988, we are unable to derive our shock measure for the early portion of the "great moderation". However, the results for the other identification strategies we follow in Section 2 are broadly the same whether the estimation starts in 1982, 1984 or 1988.