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Monetary policy shocks and narrative restrictions: why policy rules matter



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Abstract

Understanding the real and financial effects of monetary policy shocks remains a central – and contested – question in macroeconomics. These effects are often estimated with Vector Autoregressive (VAR) models, which require assumptions that separate endogenous policy responses from genuine monetary policy surprises. We show that combining two popular identification strategies – narrative restrictions and policy-rule restrictions – often seen as substitutes by academics and economists working in policy circles and think tanks, substantially improves our ability to recover credible monetary policy shocks, their effects on real and financial variables, and the Phillips multiplier.

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Motivation

The macroeconomic literature has long relied on Structural VARs (SVARs) to study how monetary policy affects inflation, real activity, and financial indicators. Identification is the key challenge: researchers must disentangle the central bank's endogenous responses to economic conditions from true exogenous policy shocks.

A common approach, pioneered by Faust (1998), Canova and De Nicolò (2002), and Uhlig (2005), imposes *sign restrictions* on the dynamic responses of selected variables to uncover the (unrestricted) responses of other variables of interest - such as output or financial spreads. For a contractionary monetary policy shock, for example, the policy rate should rise while prices and liquidity should fall.

However, sign restrictions alone have proven insufficient for reliably identifying monetary policy shocks, particularly with respect to output responses (see Wolf 2020 and the literature therein). Two recent contributions aim to strengthen this approach:

1. **Narrative restrictions** (Antolín-Díaz and Rubio-Ramírez, ADRR, 2018) require monetary policy shocks to explain key historical episodes – e.g., the October 1979 Volcker shock must be driven primarily by an identified monetary policy disturbance.
2. **Policy-rule restrictions** (Arias, Caldara, and Rubio-Ramírez, 2019) impose economically meaningful constraints on the systematic component of monetary policy, ensuring that the policy rate responds to inflation and output with the correct sign.

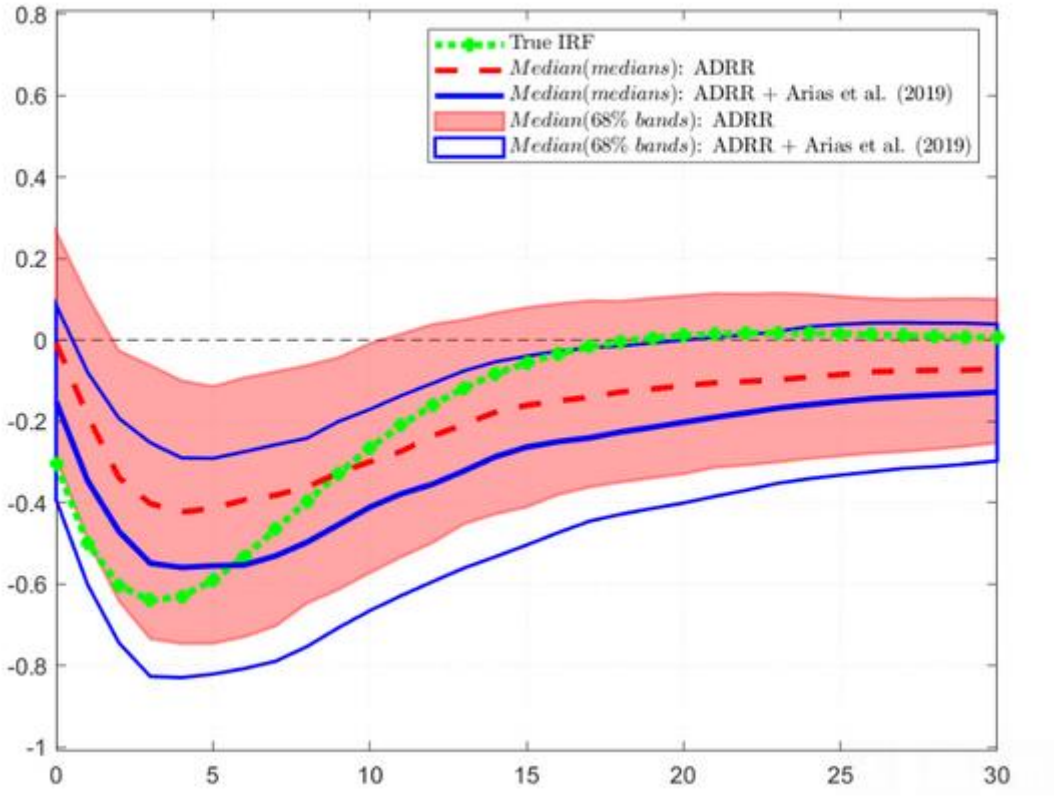
Contribution

In Castelnuovo, Pellegrino, and Særkjær (2025), we make a simple but powerful argument: Reliable identification of monetary policy shocks requires restricting both the shock and the monetary policy rule. In other words, narrative restrictions and policy-rule restrictions are complements, not substitutes. When using these restrictions jointly, we find that impulse responses are more correctly estimated, and that the estimation precision of statistics of interest, such as the Phillips multiplier, significantly increases.

Simulation evidence

We demonstrate this insight through Monte Carlo experiments using the Smets–Wouters model as the data-generating process. Because the true impulse responses are known in simulations, empirical estimates can be evaluated directly. Our results show that augmenting narrative restrictions (NRs) with policy-coefficient restrictions (PCRs) markedly improves the estimated output response to a monetary policy shock. In the short to medium run, the "combo" (ADRR + Arias et al. (2019) produces impulse responses that lie much closer to the true model-implied dynamics than using narrative restrictions alone.

Figure 1. Monte Carlo simulations, response of real GDP to a monetary policy shock under different identification strategies

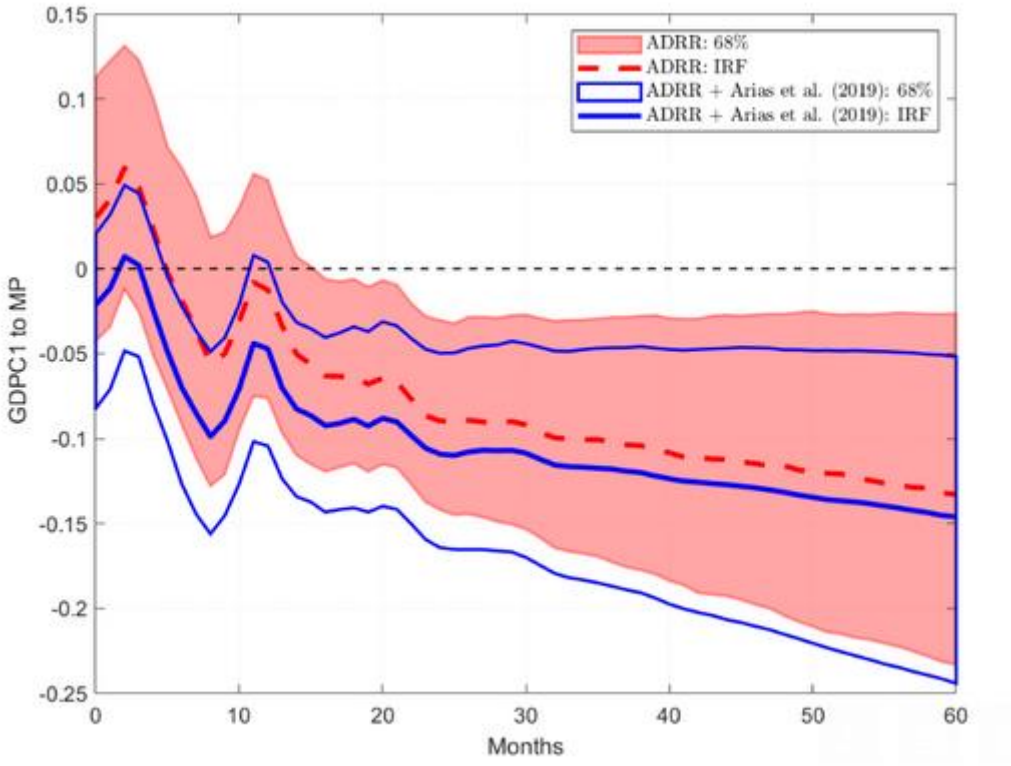


Note: The green line with circles represents the output response to a monetary policy shock in the Smets and Wouters (2007) DSGE model. The red shaded (blue contoured) area represents the median of the 68 percent credible sets for the output IRF across the 100 different datasets, and the red dashed (blue solid) lines are the median of the median IRFs of output across the 100 datasets when using Sign Restrictions plus Narrative Sign Restrictions à la Antolin-Diaz and Rubio-Ramírez (2018) (ADRR) or the "combo" of Sign Restrictions plus Narrative Sign restrictions à la ADRR plus Policy Coefficient Restrictions à la Arias, Caldara, and Rubio-Ramírez (2019). Five narrative events are considered when implementing Narrative Sign restrictions. The monetary policy shock has been normalized to have an impact of 25 basis points on the federal funds rate.

US data: Output response to a monetary policy shock

Using Uhlig's (2005) original U.S. dataset, we replicate the exercise with actual data. Antolín-Díaz and Rubio-Ramírez's narrative restrictions already improve the output response relative to Uhlig's. Yet adding policy-coefficient restrictions further sharpens the short-run contractionary effect, as shown in Figure 2.

Figure 2. US data, real GDP response to a monetary policy shock: Role of policy coefficient restrictions



Note: The red shaded (blue contoured) area represents the 68 percent credible sets for the output IRF, and the red dashed (blue solid) lines are the median IRF of output when using the ADRR restrictions (Arias, Caldara, and Rubio-Ramírez (2019) in addition to ADRR ones). The monetary policy shock has been normalized to have an impact of 25 basis points on the federal funds rate.

What drives this improvement? A look behind the scenes

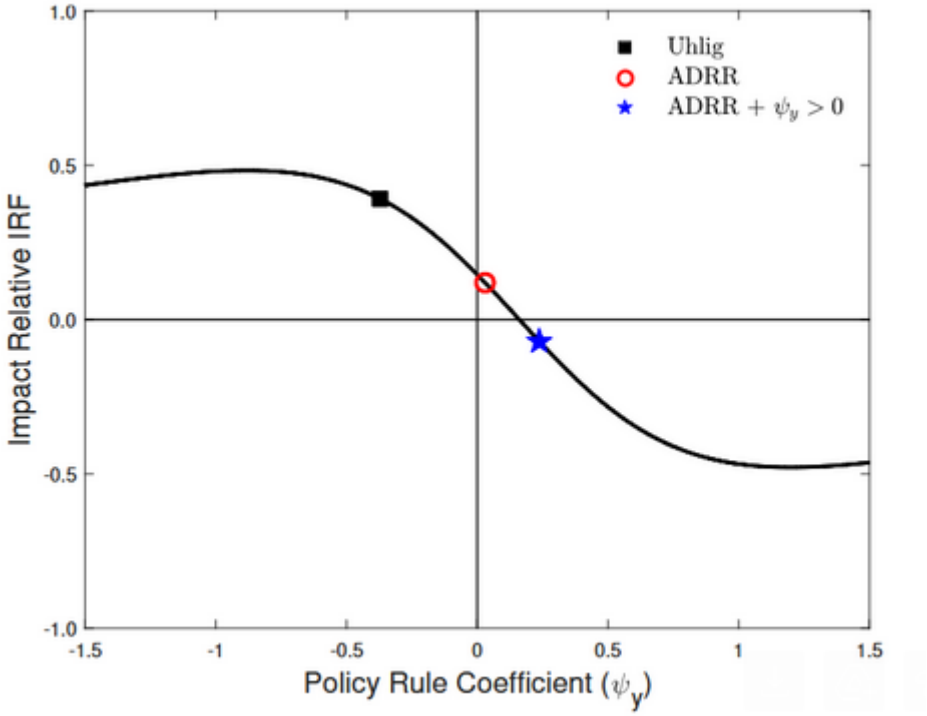
To understand why identification improves, we examine the implied systematic monetary policy rule. Interestingly, two patterns emerge:

1. Narrative restrictions ensure correct shock attribution for specific historical dates but do not guarantee a plausible Taylor-rule–type systematic response. For example, without policy coefficient restrictions, the output coefficient can be negative or unrealistically small.

2. Adding policy-rule restrictions produces systematic-policy parameters that align much more closely with empirical and theoretical priors. This, in turn, constrains the admissible shock dynamics in a way that improves the identification of impulse responses.

We demonstrate that a simple analytical expression links the impact response of output to a monetary policy shock to the systematic component of the policy rule that regulates the policy response to output fluctuations. Figure 3 illustrates this mapping: a better-disciplined policy rule leads to a more reliable estimate of the real effects of a monetary policy shock.

Figure 3. Impact relative impulse response as a function of the systematic policy response to output captured by the policy coefficient ψ_y (simple monetary rule)

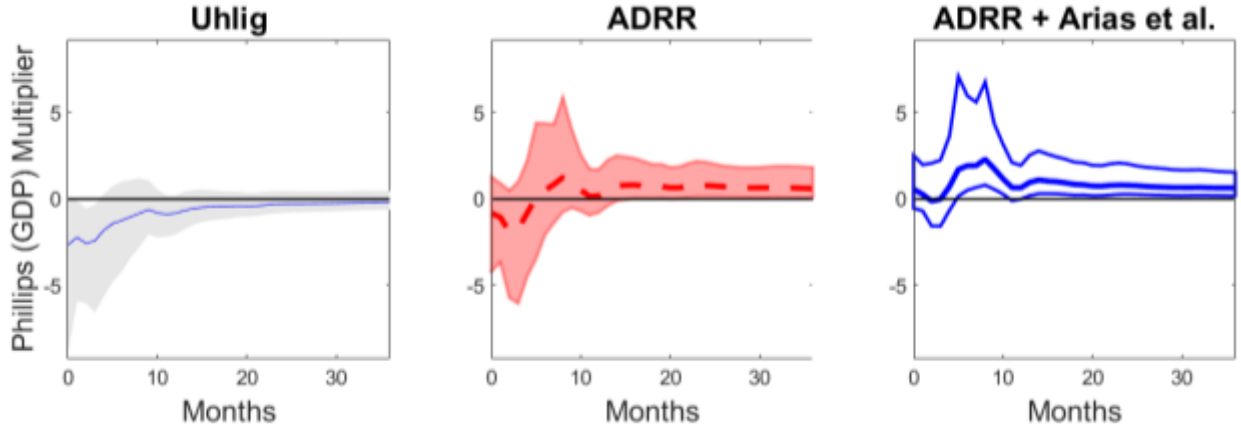


Note: The solid line plots the relationship between the relative impulse response to a monetary policy shock and the systematic response of monetary policy to output under a simple monetary policy rule that only assumes a systematic response to output.

Phillips multiplier

We also study implications for the Phillips multiplier – a central parameter for policy analysis recently investigated by Barnichon and Mesters (2021) that is correlated with the inflation-real activity trade-off faced by a monetary policymaker. Such a multiplier can be computed by combining the responses of inflation and industrial production to a monetary policy shock. Figure 4 shows that the combo not only stabilizes its estimate but also delivers narrower posterior bands, indicating higher precision.

Figure 4. Estimates of the Phillips multiplier across three different identification strategies

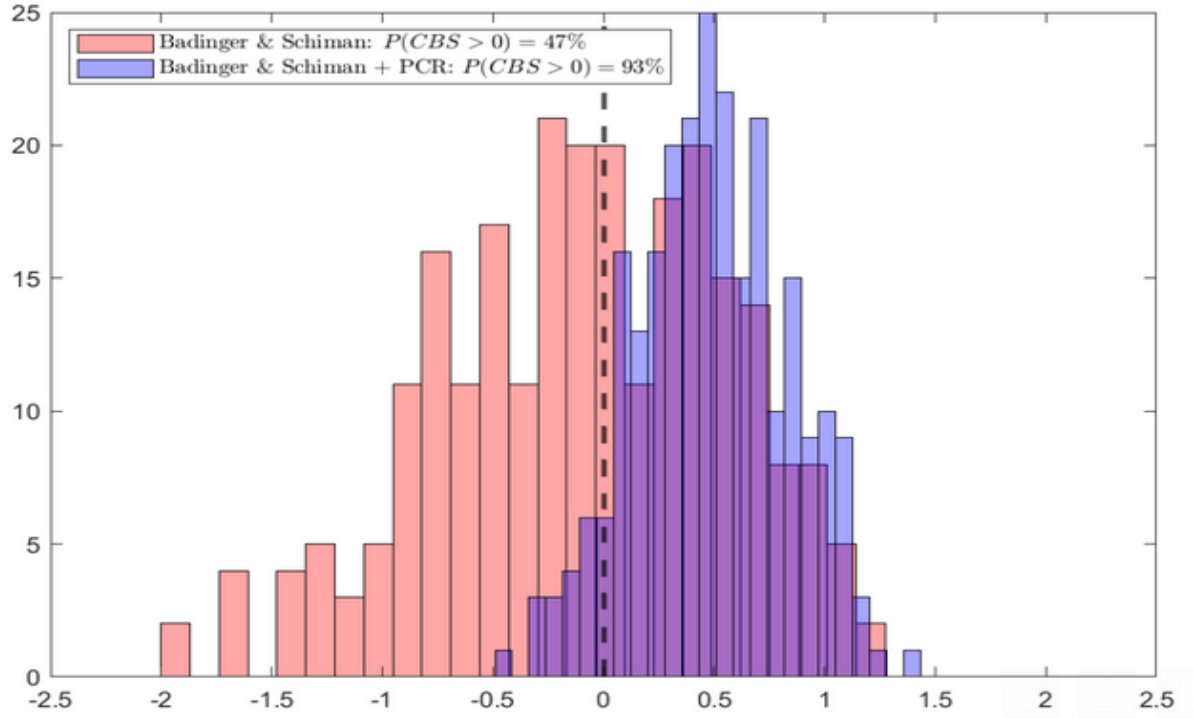


Note: Left/center/right columns: Estimates of the Phillips multiplier obtained with sign restrictions on impulse responses only/sign and narrative sign restrictions/sign, narrative, and policy coefficient restrictions.

Euro area data

To assess whether our findings are U.S.-specific, we repeat the analysis with Euro area data, focusing on the corporate bond spread (CBS). Badinger and Schiman (2023), using narrative restrictions only, find an unexpected easing of credit conditions following a contractionary policy shock. Examining the implied systematic policy rule reveals why: the estimated ECB response includes the counterintuitive feature of raising the policy rate when credit conditions tighten. Imposing the correct sign on this policy coefficient overturns this artefact. As shown by Figure 5, with the combo in place, the distribution of CBS responses shifts toward the expected tightening following a monetary contraction.

Figure 5. Contemporaneous response of the corporate bond spread to a monetary policy shock: Role of policy coefficient restrictions



Note: Histograms plot the posterior distribution of the contemporaneous response of the corporate bond spread (CBS) to a 25 basis points unexpected hike in the Eonia rate under two different identification strategies. Red histogram: Identification achieved via the narrative restrictions by Badinger and Schiman (2023). Blue histogram: Identification achieved by adding policy coefficient restrictions on the systematic response to inflation, output, and the corporate bond spread to the narrative restrictions by Badinger and Schiman (2023).

Implications

Our results carry two important messages. Empirically, researchers should jointly impose narrative and policy-rule restrictions to recover the most credible and informative macroeconomic impulse responses. From a theoretical standpoint, the improved empirical responses we obtain provide clearer and more precise targets for the calibration of models used in monetary policy and business-cycle analysis. From a policy standpoint, our evidence confirms policymakers' ability to affect the real and financial cycles, as well as the presence of an inflation-real activity trade-off that has to be accounted for by a central bank when engineering unexpected monetary policy interventions.

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