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Monetary policy inertia: More a fiction than a fact?

Agostino Consolo, Carlo A. Favero *

IGIER-Bocconi University, IGIER, Department of Finance Bocconi University, and CEPR, Italy

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ABSTRACT

Empirical estimates of monetary policy reaction functions feature a very high estimated degree of monetary policy inertia. This evidence is very hard of reconcile with the alternative evidence of low predictability of monetary policy rates. In this paper we examine the potential relevance of the problem of weak instruments to correctly identify the degree of monetary policy inertia in forward-looking monetary policy reaction function of the type originally proposed by Taylor [1993. Discretion versus policy rules in practice. Canergie-Rochester Conference Series on Public Policy, 39, 195–214]. After appropriately diagnosing and taking care of the weak instruments problem, we find an estimated degree of policy inertia which is significantly lower than the common value in the empirical literature on monetary policy rules.

1. Introduction

Since the seminal paper by Taylor (1993), instrument rules have shown the ability to mimic the time series behaviour of monetary policy rates as a function of the deviations of some measure of the output gap and the deviation of (expected) inflation from a target. One outstanding empirical feature of estimated instruments rule is the high degree of monetary policy gradualism, as measured by the persistence of policy rates and their slow adjustment to the equilibrium values determined by the monetary policy targets. This evidence of very strong persistence was first found in US data (see Clarida et al., 2000) and similar results have been subsequently obtained on Euro area data (Castelnuovo, 2007).

Rudebusch (2002) and Soderlind et al. (2005) have argued that the degree of policy inertia delivered by the estimation of Taylor-type rules is heavily upward biased. In fact, the estimated degree of persistence would imply a large amount of forecastable variation in monetary policy rates at horizons of more than a quarter, a prediction that is clearly contradicted by the empirical evidence from the term structure of interest rates.[1] Rudebusch (2002) related the "illusion" of monetary policy inertia to the possibility that estimated policy rules reflect some persistent shocks that central banks face. In this paper we analyse the issue of the illusion of monetary policy inertia by considering a different point of view, related to the GMM estimation framework commonly used to estimate parameters in monetary policy rules and to the quality of the set of instruments.

* Corresponding author. IGIER, Via Rontgen 5, 20124 Milan, Italy.
E-mail address: carlo.favero@uni-bocconi.it (C.A. Favero).

[1] In a nutshell, high policy inertia should generate high predictability of the short-term interest rates, even after controlling for macroeconomic uncertainty related to the determinants of the central bank reaction function. This is not in line with the empirical evidence based on forward rates, future rates (in particular federal funds futures) and VAR models.

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As a consequence of the lags with which monetary policy normally operates, interest rate rules contain expected future values of the macroeconomic variables determining monetary policy, typically inflation and the output gap. Parameters in the rule are estimated by rewriting the relation between monetary policy rates, lagged monetary policy rates and future expected macroeconomic variables as a relation between monetary policy rates, lagged monetary policy rates, future ex-post observed macroeconomic variables and an error term. Such an error term is a linear combination of forecast errors for macroeconomic variables and it is therefore orthogonal to any variables included in the information set of the agents at the time in which expectations are formed. Obviously, ex-post observed macroeconomic variables are correlated with the error term in the re-specified rule, but the orthogonality condition could be exploited to construct valid (i.e., orthogonal to the error term) instruments for the relevant endogenous variables. The issue on which we concentrate in this paper is not the validity of the instruments but rather their strength. Instruments that are not sufficiently correlated with the variables that they are instrumenting are labelled as "weak" in the econometric literature (Staiger and Stock, 1997; Yogo, 2004). Weak instruments affect the consistency of all estimates and they can therefore explain the "illusion" of high monetary policy persistence. In the traditional Taylor rule case the root of the problem of the high observed persistence could therefore be weak instrumenting of future inflation or/and of future output gap. When we run tests for weak instruments based on the first-stage reduced form regression for the endogenous variables on the relevant instruments (Cragg and Donald, 1993; Stock et al., 2002) we have clear evidence of the importance of the weak instruments problem, which turns out to be of particular importance for future inflation. GMM estimates are based on moment conditions and, as pointed out by Yogo (2004)[2], moment conditions could be expressed in different alternative ways when there are many variables involved in such conditions. In a situation in which the impact of the weak instrument problem is different on the relevant variables the optimalspecification of the Euler equation for estimation is the one in which the variable mostly affected by the weak instruments problem is used as dependent variable in the specification so that instruments are adopted where they have more strength. Our empirical evidence shows that if a monetary policy rule is specified as a reverse regression in which future inflation is the left-hand side variable, and therefore it is not instrumented, then a much lower value estimate of monetary policy persistence than the one usually found in the literature emerges.

2. Forward-looking Taylor rules and weak instruments

Following the seminal paper by Taylor (1993), monetary policy has been successfully described by empirical rules in which the policy rate reacts to deviations of inflation from a target and to a measure of economic activity usually represented by the output gap. The informational and operational lags that affect monetary policy (Svensson, 1997), together with the objective of relying upon a robust mechanism to achieve macroeconomic stability (Evans and Honkapohja, 2003), justify a reaction of current monetary policy to future expected values of macroeconomic targets. Partial adjustment mechanisms have been considered (Clarida et al., 2000; Woodford, 2003) to capture monetary policy gradualism. Interestingly, in a framework with learning-based expectations, Bullard and Mitra (2002) have shown a high degree of policy gradualism quickens convergence to the rational expectations equilibrium.

The specification of a monetary policy rule is obtained by first posing a baseline rule that relates target monetary policy rates, r_t^*, to a constant equilibrium nominal rate (given by the sum of the equilibrium real rate, rr^*, and the target inflation π^*) deviations of future inflation expected from period t for period $t+k$, $E_t\pi_{t,k}$, from the central bank target, π^*, and future output gap (expected deviation of output from its potential level) expected from period t for period $t+q$, $E_tx_{t,q}$,

$$r_t^* = rr^* + \pi^* + \beta(E_t\pi_{t,k} - \pi^*) + \gamma E_t x_{t,q} \tag{1}$$

Target monetary policy rates, r_t^*, are then mapped into effective monetary policy rates r_t by posing a partial adjustment mechanism

$$\begin{aligned} r_t &= \rho(L)r_{t-1} + (1-\rho)r_t^* \\ \rho(L) &= \rho_1 + \rho_2 L + \cdots \rho_p L^p \\ \rho &= \sum_{i=1}^{p} \rho_i \\ r_{t-i} &= L^i r_t \end{aligned} \tag{2}$$

In the simplest specification partial adjustment is modelled only by including one lag of the policy rate (see, for example, Woodford, 2003), although in their original paper (Clarida et al., 2000) have adopted a two-lag specification on US quarterly

[2] Yogo (2004) concentrated on GMM estimates of the elasticity of intertemporal substitution estimated in the context of an Euler equation involving consumption growth and returns on wealth. There are two ways of specifying such a relationship as a linear equation for estimation. In fact one can either use consumption growth as the dependent variable and instrument returns on wealth on the left hand or run the reverse regression and instrument consumption growth on the right-hand side. Yogo (2004) showed that the estimates of the elasticity of intertemporal substitution coefficient are different in the two cases as a consequence of the different strength of the instruments for consumption growth and returns on wealth.