Data uncertainty and the role of money as an information variable for monetary policy

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Abstract

In this study, we perform a quantitative assessment of the role of money as an indicator variable for monetary policy in the euro area. We document the magnitude of revisions to euro area-wide data on output, prices, and money, and find that monetary aggregates have a potentially significant role in providing information about current real output. We then proceed to analyze the information content of money in a forward-looking model in which monetary policy is optimally determined subject to incomplete information about the true state of the economy. We show that monetary aggregates may have substantial information content in an environment with high variability of output measurement errors, low variability of money demand shocks, and a strong contemporaneous linkage between money demand and real output. As a practical matter, however, we conclude that money has fairly limited information content as an indicator of contemporaneous aggregate demand in the euro area.
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1. Introduction

Many macroeconomic time series are subject to substantial revisions, and hence such data only provide imperfect information about the true state of the economy at a given

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point in time. In light of these data limitations monetary policymakers and researchers alike have long been interested in identifying indicator variables that provide precise and timely information. At least since the early 1970s, research on the information content of alternative indicators has highlighted the potential usefulness of monetary aggregates; these evaluations have typically been conducted in reduced-form models and models with adaptive expectations. [1] More recently, research on Taylor-style interest rate rules has re-emphasized the importance of "real-time" data uncertainty for the design of monetary policy albeit without considering money's potential role as an information variable. [2]

In this study, we perform a quantitative assessment of the role of money as an indicator variable for monetary policy in the euro area. We begin by analyzing the sequence of revisions to euro area-wide data, and find that measures of real output have been subject to substantial revisions over a period of up to nine months, whereas measures of prices and money have generally been subject to relatively minor revisions that occur within a short period of the initial data release. Given this pattern of euro area data revisions, monetary aggregates have a potentially significant role in providing information about the current level of aggregate demand and hence about incipient pressures on the inflation rate.

We then proceed to analyze the information content of money in a forward-looking model in which money has no causal role in influencing output or inflation. [3] In particular, our analysis builds on the estimated rational expectations model of the euro area developed by Coenen and Wieland (2000); we augment this model with a calibrated specification for the output revision process, and with the estimated M3 demand equation of Coenen and Vega (2001), which was found to provide a remarkably stable representation of euro area money demand. We assume that the central bank optimally sets the short-term nominal interest rate to minimize a weighted average of inflation volatility and output gap volatility, subject to a small penalty on nominal interest rate movements. We further assume that the central bank and private agents share the

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[1] Examples of this line of research include Kareken et al. (1973), Friedman (1975, 1990), Tinsley et al. (1980) and Angeloni et al. (1994).

[2] In particular, a number of studies with U.S. data have found that uncertainty arising from revisions of output gap and inflation measurements may lead to a significant deterioration in the performance of such interest rate rules; see Orphanides (1998), Orphanides et al. (2000) and Rudebusch (2000). For a large-scale analysis of the differences between alternative vintages of U.S. macroeconomic data the reader is referred to Croushore and Stark (1999).

[3] That is, the short-term nominal interest rate is the instrument of monetary policy, and the money stock does not enter directly into any of the behavioral equations. These assumptions are typical of the current generation of macroeconomic models, including small stylized models (e.g., Rotemberg and Woodford, 1997; Fuhrer, 1997; Orphanides and Wieland, 1998) as well as large-scale policy models such as the Federal Reserve Board's FRB/US model (cf. Brayton and Tinsley, 1996), the ECB's Area-Wide Model (cf. Fagan et al., 2001), and the multi-country model of Taylor (1993a). An alternative approach, which allows for direct effects of money on inflation, would be the P* model of Hallman et al. (1991) estimated more recently for Germany by Tödter and Reimers (1994) and for the euro area by Gerlach and Svensson (2000). For analysis of this issue in models with explicit microeconomic foundations, see Ireland (2001), McCallum (2001) and Leahy (2001).