



Central bank misperceptions and the role of money in interest-rate rules ☆

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ABSTRACT

Research with Keynesian-style models has emphasized the importance of the output gap for policies aimed at controlling inflation while declaring monetary aggregates largely irrelevant. Critics, however, have argued that these models need to be modified to account for observed money growth and inflation trends, and that monetary trends may serve as a useful cross-check for monetary policy. We identify an important source of monetary trends in form of persistent central bank misperceptions regarding potential output. Simulations with historical output gap estimates indicate that such misperceptions may induce persistent errors in monetary policy and sustained trends in money growth and inflation. If interest-rate prescriptions derived from Keynesian-style models are augmented with a cross-check against money-based estimates of trend inflation, inflation control is improved substantially.

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1. Introduction

John Taylor's research on monetary policy rules changed the economics profession's focus from monetary aggregates to the interest rate as the appropriate instrument for monetary policy.¹ Even the late Milton Friedman, in his last published

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¹ Taylor (2006) writes on his progression from money to interest rates: "Taylor (1979) showed that a fixed money growth rule—a Friedman rule—would have led to better performance than actual policy in the post World War II period ... (but) a money growth rule which responded to

writing, studied Taylor's rule for interest-rate policy, though he tried to reclaim a role for money on its right-hand side.² Recent theoretical advances in new-Keynesian macroeconomics building on microeconomic foundations with monopolistic competition and price rigidity have further de-emphasized the role of money in monetary policy. As shown by Kerr and King (1996), Svensson (1997) and Clarida et al. (1999) optimal interest-rate policy in models with price rigidities is conducted with reference to inflation forecasts and output gaps but without direct concern for monetary aggregates—not unlike Taylor's rule.³ Some macroeconomists, however, have expressed concern about the disappearance of money from monetary theory and policy. Lucas (2007), for example, writes:

New-Keynesian models define monetary policy in terms of a choice of money market rate and so make direct contact with central banking practice. Money supply measures play no role in the estimation, testing or policy simulation of these models. A role for money in the long run is sometimes verbally acknowledged, but the models themselves are formulated in terms of deviations from trends that are themselves determined somewhere off stage.

It seems likely that these models could be reformulated to give a unified account of trends, including trends in monetary aggregates, and deviations about trend but so far they have not been. This remains an unresolved issue on the frontier of macroeconomic theory. Until it is resolved, monetary information should continue to be used as a kind of add-on or *cross-check*.

We address Lucas's request for a unified account of trends and deviations, including monetary aggregates, and provide a formal analysis of his proposal to use monetary information as a cross-check for policy. The central bank's beliefs regarding trends and deviations play a central role in the analysis, specifically its estimates of the economy's potential output and the implied output gap that drives inflation forecasts in Keynesian-style models.

Research on optimal monetary policy design under uncertainty usually has to rely on a priori modeling assumptions regarding unobservable variables such as potential output (cf. Svensson and Woodford, 2003; Wieland, 2006). These assumptions are needed to determine the optimal, model-based estimates of potential output, on which policy is then conditioned. Orphanides (2003) has provided an alternative approach for evaluating policies under uncertainty that avoids these particular a priori assumptions by using instead historical, real-time estimates of potential output. The true value of potential output at any point in time is assumed to be equal to the central bank's final estimate on the basis of information available many years later. We use historical series of central banks' output gap estimates for the United States and Germany from Orphanides (2003) and Gerberding et al. (2005), respectively. Both series indicate very persistent misperceptions regarding potential output.

Model simulations indicate that historical output gap misperceptions induce an inflationary bias in interest-rate policies that the central bank considered optimal conditional on its model and associated forecasts. As a result, the central bank induces trends in money growth and inflation even though it pursues a constant inflation target. Thus, as requested by Lucas, Keynesian-style models built to explain inflation deviations from trend are able to provide an account of money growth and inflation trends. This finding complements recent empirical studies that have identified proportional movements in money growth and inflation at low frequencies using a variety of filters⁴ and provides a structural explanation.

Next, a general definition of a policy with cross-checking that formalizes Lucas (2007) proposal is presented. The cross-check is characterized by a first-order condition that incorporates expected trend inflation, which is estimated from a simple monetary model. The cross-check is triggered in a nonlinear-fashion whenever a statistical test on the basis of the monetary model signals a trend shift. An earlier note, Beck and Wieland (2007), presented an interest-rate rule that incorporates such a shift⁵ and simulated a counterfactual example in the traditional Keynesian-style model with backward-looking dynamics of Svensson (1997), Orphanides and Wieland (2000) and Orphanides (2003). The present paper shows how to derive an interest-rate rule with cross-checking from an optimization problem and proceeds to implement cross-checking in the benchmark new-Keynesian model.⁶

(footnote continued)

economic developments could do even better. Since then I have found that policy rules in terms of interest rates have worked better as practical guidelines for central banks."

² Friedman (2006) notes at first that he always preferred a monetary aggregate for a policy instrument but then takes the perspective of Taylor's rule with the federal funds rate as instrument: "The Taylor rule is an attempt to specify the federal funds rate that will come closest to achieving the theoretically appropriate rate of monetary growth to achieve a constant price level or a constant rate of inflation. Suppose the federal funds target rate is equal to a Taylor rule that gives 100% weight to inflation deviations. That may not be the right rate to achieve the desired inflation target because other variables such as output or monetary growth are not at their equilibrium levels. On this view, additional terms in the Taylor rule would reflect variables relevant to choosing the right target funds rate to achieve the desired inflation target."

³ The new-Keynesian model as laid out by Rotemberg and Woodford (1997) and Goodfriend and King (1997) and developed in detail in Woodford (2003) and Walsh (2003) has quickly become the principal workhorse model in monetary economics. The case against money is perhaps made most vigorously by Woodford (2006).

⁴ See Gerlach (2004), Benati (2005), Pill and Rautanen (2006) and Assenmacher-Wesche and Gerlach (2007).

⁵ Beck and Wieland (2007) point out that such an interest-rate rule captures key elements of the ECBs description of its two-pillar policy strategy. However, the ECB has never published a formal, mathematical exposition of its strategy.

⁶ Our definition of monetary cross-checking is different from another interesting strategy proposed by Christiano and Rostagno (2001) and Christiano et al. (2006) that combines monetary targeting with Taylor-style interest-rate rules.

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