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Time-varying equilibrium real rates and monetary policy analysis

Bharat Trehan[a], Tao Wu[b,*]

[a]*Economic Research, Mail Stop 1130, Federal Reserve Bank of San Francisco, 101 Market St, CA 94105, USA*
[b]*Economic Research, Federal Reserve Bank of Dallas, 2200 N. Pearl Street, TX 75206, USA*

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Abstract

We show how a positive correlation between the equilibrium real interest rate (ERR) and trend growth matters for two widely debated issues in monetary policy. First, a simple Taylor rule is more robust to uncertainty about the trend growth rate than suggested by some analyses of the increase in U.S. inflation during the 1970s, because the policy mistake made when measuring the change in trend growth gets offset by the accompanying mistake in measuring the change in the ERR. Second, ignoring this correlation when estimating policy rules results in coefficients that exaggerate both the degree of interest rate smoothing and the strength of the monetary authority's response to inflation.

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1. Introduction

The 'Taylor rule' provides a benchmark for monetary policy in terms of three arguments: the equilibrium real interest rate, the output gap, and the inflation rate.

*Corresponding author. Tel.: +1 214 922 5230.
E-mail addresses: Bharat.Trehan@sf.frb.org (B. Trehan), Tao.Wu@dal.frb.org (T. Wu).

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Despite its apparent simplicity, it turns out to describe recent monetary policy in the U.S. rather well. It has also been used extensively to analyze the conduct of policy, both in the U.S. and abroad (Taylor, 1999). Most of this analysis has been carried out under the assumption that the equilibrium real rate (ERR) is constant. By contrast, recent empirical evidence suggests that there is significant time variation in the ERR (Laubach and Williams, 2003; Clark and Kozicki, 2004). In this paper we examine how a time-varying ERR can alter the evaluation and interpretation of monetary policy.

More specifically, we use a simple, backward-looking quarterly model of the U.S. economy to look at two well-known arguments involving the Taylor rule. First, several authors have argued that a central bank which uses a Taylor rule to set policy could accidentally generate large changes in the inflation rate following an (initially) unperceived change in the trend growth rate. In a series of widely known papers, Orphanides (2001, 2003) explores the implications of mismeasuring potential output (or, equivalently, the natural rate of unemployment) in real time and concludes that the Federal Reserve's inability to detect a slowdown in trend growth was the primary cause of high inflation in the 1970s. Bullard and Eusepi (2003) use a well-specified DSGE model to examine how the economy reacts to an unexpected change in trend productivity growth under learning and conclude that misperceptions about trend productivity growth could lead to substantial inflation even if a Taylor rule is implemented. Similarly, Orphanides and Williams (2002) argue that the fact that inflation did not fall noticeably when productivity accelerated in the 1990s suggests that the Federal Reserve was no longer using a rule that depended upon the level of the (unemployment) gap.

We show that these arguments capture only part of what happens in a world where the ERR varies over time, and in particular, where it is positively related to the trend growth rate. In such a world, slower trend growth (for example) will be accompanied by a lower ERR, so that a policy authority which takes a while to recognize that the rate of growth has slowed will also take a while to recognize that the equilibrium interest rate has fallen. These two mistakes will tend to offset each other: policy will be 'too easy' because it will fail to realize that growth has slowed and 'too tight' because it will fail to realize that the ERR has fallen. As a result, policy will not be as stimulative as suggested by analyses which ignore the link between the trend growth rate and the ERR. A key implication of this argument is that the simple Taylor rule is likely to be more robust to productivity or trend growth uncertainty than previous research would suggest.

As we show below, the inflation path generated in such an exercise depends crucially upon how quickly the monetary authority learns about the change in the economy. A monetary authority which knows the structure of the economy (but not the shocks hitting the economy) can filter the data in an efficient manner and so learn about changes in the trend relatively rapidly; as a consequence, it does not generate very large changes in the inflation rate when the trend growth rate changes. However, more realistically, a monetary authority that does not know the structure of the economy will not be able to filter the data as efficiently and so will take longer to learn about the change in trend growth (and in the ERR).