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Interest-rate rules and transitional dynamics in an endogenously growing open economy

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Abstract

This paper sets up an endogenous growth model of an open economy in which the monetary authority implements a gradualist interest-rate rule with targets for both inflation and economic growth. We show that, under a passive rule, a monetary equilibrium exists and is unique. Moreover, the equilibrium is locally determinate. By contrast, an active rule implies either two equilibria, one high-growth and one low-growth, or none. In the case of two equilibria, the high-growth equilibrium is locally determinate, while the low-growth equilibrium is a source. Besides, the stabilization and growth effects of alternative target policies are also explored in this study. Moreover, in departing from the existing literature, we turn to focus on the analysis of transition with a particular emphasis on the case of imperfect credibility.

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1. Introduction

The interest of economists in interest-rate rules has been sparked by early studies by Sargent and Wallace (1975) and McCallum (1981) and revived by Taylor (1993) in the light of

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description for U.S. monetary policy.[1] Taylor (1993) shows that since 1987 U.S. monetary policy can be well described in terms of a simple rule whereby the central bank sets the short-term nominal interest rate as an increasing linear function of a measure of inflation and the output gap with coefficients of 1.5 and 0.5, respectively. According to various coefficients of inflation, interest-rate rules can be divided into two distinctive styles. If a feedback rule has an inflation coefficient greater than unity (which satisfies the Taylor principle), it is dubbed an *active* interest-rate rule (or Taylor's rule). By contrast, a *passive* rule involves an inflation coefficient of less than unity. Taylor (1999) claims that the active feedback rule is widely judged to have been unusually successful in the United States, suggesting that the rule is worth adopting as a principle of behavior. In fact, in many industrialized countries their monetary policies can be also classified into various styles of interest-rate rules (see Clarida et al., 2000).

Ever since Taylor's (1993) seminal work, the related issues have been extensively analyzed in a wide variety of models that include interest-rate rules aimed at inflation targets and/or output targets.[2] Nevertheless, this is still a contentious issue that deserves more careful investigation. There exist two facts which are neglected by the theoretical literature.

First, traditionally, interest-rate rules followed by central banks have been regarded as devices for macroeconomic stabilization in the *short run*. However, in practice, central banks do not focus solely on welfare gains from stabilization in economic environments with uncertainty (the short run goal), but they also pursue *long run* development goals, such as economic growth.[3] For example, since 1997 the Bank of England's *Inflation Report* has reported projections for four-quarter inflation and real GDP growth for an eight-quarter forecast horizon. Since 1992 Sweden's Riksbank has published forecasts for Q4/Q4 real GDP growth and December/December CPI inflation for the current year and the two following ''out'' years (see Kuttner, 2004). Similar projections were also made by the central bankers of New Zealand, Australia and Canada though some of these projections may be not available publicly.

Second, there is an evident fact that in an open-economy environment, real-world central banks have the option to trade foreign assets at a world interest rate. The presence of foreign assets, traded freely by home agents (including the central bank), and the prevalence of a (fixed) world interest rate, will redefine the mechanics that underlie interest-rate targeting by central banks. Once this extra device in the hands of central bankers − the foreign assets − creates an essential mechanism for managing real money balances, the capital account and the foreign interest rates will become very important forces behind the impact of interest-rate targeting on the macro-economy. However, in spite of its importance, with few exceptions (Taylor, 2001; McCallum and Nelson, 2001; Erceg, 2002), economists have paid relatively little attention to the discussion regarding the performance of interest-rate rules in an open economy.

Based on these two facts, this paper makes a theoretical attempt to analyze the macroeconomic and growth implications by viewing interest-rate targeting as a *policy regime* that can

[1] Sargent and Wallace (1975) claim that interest-rate rules are undesirable, because they lead to price level indeterminacy in models with forward-looking agents. However, McCallum (1981) argues that determinacy is possible if the interest rate feeds back to endogenous state variables such as the price level.

[2] See Benhabib and Farmer (1999), McCallum (2003), and Woodford (2003) for a literature review.

[3] To our knowledge, in some recent empirical studies, such as Erceg and Levin (2003), Smithin (2002), and Kuttner (2004), the growth rate target is embedded in the interest-rate rules.