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Monetary policy implementation and overnight rate persistence

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A B S T R A C T

Overnight money market rates are the predominant operational target of monetary policy. As a consequence, central banks have redesigned the implementation of monetary policy to keep the deviations of the overnight rate from the key policy rate small and short-lived. This paper uses fractional integration techniques to explore how the operational framework of four major central banks affects the persistence of overnight rates. Our results suggest that a well-communicated and transparent interest rate target of the central bank is a particularly important condition for a low degree of overnight rate persistence.

1. Introduction

Overnight money market rates play a crucial role for signaling the intended interest rate level and the stance of monetary policy. In recent years, central banks redesigned their monetary policy instruments to ensure that the overnight rate closely follows the central bank's key policy rate and that its volatility remains well contained. Mean and variance of the *policy spreads*, i.e. the deviation of the overnight rate from its policy-intended level, are often seen as indicators for the effectiveness of monetary policy implementation.

This paper argues that controllability of the overnight rate additionally requires that the *persistence* of the policy spread remains sufficiently low. If the persistence of the policy spread is too high, the lasting impact of shocks would impede the signaling role of the overnight rate and the central bank's control over interest rates. Recently, Cassola and Morana (2008) and Hassler and Nautz (2008) showed

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that the policy spread of the European Central Bank exhibits long memory implying that the central bank's control of the overnight rate is weaker than expected.

The current paper sheds more light on the role of the monetary policy design for the persistence of overnight rates. We explore how institutional differences in monetary policy implementation are reflected in the persistence of policy spreads. To that aim, we consider the policy spreads of the U.S. Federal Reserve, the European Central Bank, the Bank of England, and the Swiss National Bank where the reserve requirement system, standing facilities, open market operations and the implementation of the policy rate feature notable differences.

Our paper adds to the growing literature on the role of monetary policy implementation for the behavior of interest rates. Following the seminal paper by Hamilton (1996), most contributions adopt the (E)GARCH framework to analyze cross-country differences in overnight rate volatility (Bartolini and Prati, 2006) or its transmission along the yield curve (Colarossi and Zaghini, 2009; Nautz and Offermanns, 2008). Moreover, Pérez Quirós and Rodriguéz Mendizábal (2006) show that the introduction of the ECB's symmetrical interest rate corridor has significant effects for overnight rate dynamics. Thornton (2006) and Nautz and Schmidt (2009) discuss the role of operating procedures for the Fed's policy spread.

In all these contributions on the dynamics and volatility of overnight rates, the policy spread is assumed to be integrated of order zero (I(0)) and the possibility of long memory is neglected. However, ignoring long memory may imply an underestimation of the persistence of shocks and adversely affect estimation results, see Sun (2006). Since the focus of our attention is on the persistence of overnight rates, we apply fractional integration techniques to allow for the presence of long memory in the policy spreads of central banks.[1]

Our results indicate that there are partially offsetting effects of a central bank's monetary framework on the persistence of the policy spread. Nevertheless, the evidence obtained for different central banks and monetary policy implementation regimes suggests that a well-communicated and transparent interest target plays a particular role for keeping the persistence of the policy spread sufficiently low.

The remainder of the paper is organized as follows. Section 2 briefly recalls the features of long memory models for measuring the persistence of time series. Section 3 discusses how the operational framework of a central bank could be related to the persistence of the policy spread. Section 4 introduces the data and presents the empirical results. Section 5 contains some concluding remarks.

2. Long memory models

2.1. Fractional integration and persistence

If a central bank considers the overnight rate as operational target of monetary policy, its deviations from the policy rate should be short-lived and stationary. Restricting the attention to I(0) and I(1) processes, empirical contributions on the dynamics of overnight rates typically conclude that policy spreads are integrated of order zero (I(0)). In fact, assuming a non-stationary I(1) policy spread would imply that the central bank lost any control over its operational target. However, recent evidence on the ECB's policy spreads indicate that the central bank's impact on the overnight rate might be weaker than expected. In particular, Hassler and Nautz (2008) and Cassola and Morana (2008) found that the Eonia spread is stationary but exhibits long memory with a fractional order of integration $d \approx 0.25$. Long memory behavior in policy spreads implies that there is a long range dependence between the overnight rate and the policy rate which cannot be captured by I(0) processes like e.g. standard short-memory ARMA models.

Let y be fractionally integrated of order d such that it can be transformed into an $I(0)$ process s by fractional differencing[2] of order d,

[1] Fractional integration techniques have been applied in various economic contexts. Recent examples include the changing persistence of inflation (Kumar and Okimoto (2007)), unemployment rates (Caporale and Gil-Alana (2007)), and foreign exchange rates (Cheung and Lai (2001)).

[2] L is the lag operator. The expansion of $(1-L)^d$ is given by $1 - dL - \frac{d(1-d)}{2!}L^2 - \frac{d(1-d)(2-d)}{3!}L^3 - \cdots$.