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Relationships between Effective and Expected Interest Rates as a Transmission Mechanism for Monetary Policy: Evidence on the Brazilian Economy using MS-models and a Bayesian VAR

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Abstract

This work applies *Markov-switching models* and a *Bayesian VAR* in order to verify empirical relationships between expected and effective short term interest rates in Brazil. The main results corroborate the theoretical idea according to which the Central Bank can smooth adjustments of effective short term interest rates, given that these last ones have effects on expected short term rates, thereby influencing long term interest rates, which are fundamental for controlling output activity and price changes. Besides, the MS-models show that these empirical relationships are more significant under a "higher response regime". At last, the BVAR test yields impulse-response functions showing that shocks in expected rates have more persistent impacts on effective rates than what is observed from the opposite direction. This evidence gives support for the idea of a transparent and predictable monetary policy in Brazil.

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1. Introduction

The relationship between the effective short term interest rate and expectations regarding the future short term interest rate is an important transmission mechanism for monetary policy (Woodford, 2003). In New-Keynesian models investment decisions are determined by changes in long term interest rates, which, in their turn, depend on the weighted mean associated with the current interest rate and expected future short term interest rates for all possible maturities. This method of measuring the long term interest rate is known as *expectation hypothesis of the term structure of interest rates,* and it can be expressed by:

$$(1)\ L_{t,t+n} = \alpha_0 i_t + E_t[\sum_{g=1}^{n} \alpha_g i_{t+g}] + u_t$$

Where $L_{t,t+n}$ is the long term interest rate of a relevant bond with maturity from period t to period t+n; i_t and i_{t+g} are, respectively, the current short term interest rate and expected future short term interest rates for period t+1 to t+n; α (from α_0 to α_g) is a parameter and u_t is a shock expressing variations of the risk premium that investors require to accept long term bonds instead of short term ones.

Given that the long term interest rate is formed in such a way, the monetary policy's efficiency depends on the Central Bank's ability in affecting expectations regarding future short term interest rates in the required direction, so that targets can be attained with lower social costs (Levin, Wieland and Williams, 1999; Rotemberg and Woodford, 1999; Rudebusch, 2006). According to Woodford (2003), the higher the Central Bank's commitment with an inertial instrument rule the higher the causality between current adjustments of interest rates and expectations on future adjustments, thereby moving the long term interest rate without requiring expressive volatility of the short term interest rate. A *forward-looking Taylor rule*, by incorporating *inertial behavior for short term interest rates*, can show the transmission mechanism under analysis when iterating for one period ahead, such as:

$$(2)\ E_t[i_{t+1}] = \rho(i_t) + (1-\rho)\left[E_t(i^n{}_{t+1}) + \sum_{j=0}^{n} m_{-j}\pi^*{}_{t-j} + E_t\sum_{j=1}^{n}\phi_j\pi^*{}_{t+j} + \sum_{j=0}^{n} n_{-j}y_{t-j} + E_t\sum_{j=1}^{n}\kappa_j y_{t+j} \right]$$

Where $E_t[i_{t+1}]$ is the expected short term interest rate for period t+1, ρ is a smoothing coefficient (or inertial component); $E_t(i^n{}_{t+1})$ the expected equilibrium short term interest rate for period t+1; $\sum_{j=0}^{n} m_{-j}\pi^*{}_{t-j} + E_t\sum_{j=1}^{n}\phi_j\pi^*{}_{t+j}$ is the sum between, respectively, inflation deviations from period t to period t-n and expected inflation deviations from period t+1 to t+n; at last, $\sum_{j=0}^{n} n_{-j}y_{t-j} + E_t\sum_{j=1}^{n}\kappa_j y_{t+j}$ is the sum between, respectively, output gaps from period t to period t-n and expected output gaps from period t+1 to t+n. Moreover E_t means the expectation operator in period t.

The main goal of this work is to identify a transmission mechanism between i_t and $E_t[i_{t+1}]$, that is, to verify if by adjusting the current interest rate the Brazilian Central Bank is able to affect the expected short term interest rate. On the other hand, as the long term interest rate is determined through expectations regarding future short term rates (such as in 1), the verification of that transmission suggests additionally that the BCB is also able to change the term structure in Brazil.