MONETARY TRANSMISSION MODELS FOR BANKING INTEREST RATES
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KEYWORDS: Interest rate risk, Switching linear models, Administered bank rates.

1 General Framework
The dynamics of administered interest rate variations in response to changes in the benchmark money market rate is of particular interest, especially in the light of the recent financial crisis, which has introduced a regime switching. Chong et al. (2006), using an error correction model, showed that a tightening monetary policy takes a longer time to impact administered rates and, hence, the economy, with respect to an expansionary monetary policy.

In this paper we examine the validity of the above conclusion in the recent time period, characterised by very low monetary rates. The current state of almost zero interest rates is of particular relevance, as it has never been studied before.

Our main conclusion is that the error correction model can be replaced by an alternative, simpler to interpret model, that retains (and actually improves, for the data at hand) predictive performance. We have also shown the implications of the new model in terms of interest rate risk.

2 Introduction
Monetary policies, either actual or perceived, cause changes in monetary interest rates. These changes impact the economy through financial institutions, which react to changes in the monetary rates with changes in their administered rates, on both deposits and lendings.

To investigate the above issues we focus on a southern european country, Italy, for which the transmission of monetary impulses is particularly prob-
lematic, given the importance of the banking sector and the difficult economic situation.

For the purposes of our analysis, we have collected monthly time series data on monetary rates (1-month Euribor) and on aggregate bank deposits administered rates from the statistical database provided by the Bank of Italy, for the period ranging from January 1999 until December 2014. According to the existing literature, bank interest rates should positively react to changes in monetary rates, but this relationship has not been satisfied during the recent years. In particular, the current state of close-to-zero interest rates is of particular relevance and, to our knowledge, has not been yet fully investigated.

Indeed, the recent financial crisis has had a major impact on the banking sector, which has led to a change in the relationship between monetary and administered rates and, therefore, to the transmission mechanisms of monetary policies. In the European Union, characterized by one monetary authority (the European Central Bank) that regulates still fragmented national markets, this effect is particularly evident: southern European countries, differently from northern ones, have benefited very little from the drop of monetary rates that has followed the financial crisis.

The need of modelling the previous situation is very relevant, in the context of interest rate risk modelling, both within an economic and capital perspective. This is especially true for the interest rates on customer deposits.

The adjustment of interest rates charged on customer deposits as a result of changes in the monetary rate is of fundamental importance in the transmission mechanism of monetary policy, especially in banking systems characterized by traditional intermediation, where short-term funding finances loans to medium and long term.

The treatment of customer deposits is indeed an area of significant criticality in asset and liability management of banks, given the particular characteristics of these components of the budget, namely: (i) the absence of a contractual maturity with some ability of the applicant to withdraw the funds at any time; (ii) the stability of the masses in time, along with the diversification of counterparties that makes basically constant the total volumes; (iii) the partial and delayed reaction rate charged by banks on such balance sheet items as a result of changes in the monetary rate in the presence of financial conditions subject to revision at the discretion of the same bank.

Although the regulatory framework of Basel 2, updated with Basel 3, does not establish any requirement of minimum capital necessary to cover interest rate risk, the current industry practice is to measure it within the internal capital measurement of the second pillar of Basel II. This has obvious implications
on the activity of lending to be calibrated on the basis of the internal capital available to cover the interest rate risk.

3 Background

Chong et al. (2006) examined the dynamics of administered interest rate changes in response to changes in the benchmark money market rate. They showed that a tightening monetary policy takes a longer time to impact administered rates and, hence, the economy, with respect to an expansionary monetary policy. This conclusion was obtained from the application of the Engle and Granger (1987) error correction model to the Singapore market.

Their complete model can be formalized as follows:

\[
\begin{align*}
BR_t &= k + \beta \cdot MR_t + \varepsilon_t \\
\Delta BR_t &= \alpha \cdot \Delta MR_t + \delta_1 (BR_{t-1} - \beta \cdot MR_{t-1} - k) + \\
&\quad + \delta_2 (BR_{t-1} - \beta \cdot MR_{t-1} - k) + u_t,
\end{align*}
\]

where

\[
\begin{align*}
\delta_1 &= 0 \quad \text{if } BR_{t-1} - \beta \cdot MR_{t-1} - k < 0, \\
\delta_2 &= 0 \quad \text{if } BR_{t-1} - \beta \cdot MR_{t-1} - k > 0, \\
\delta_1 &= 0 \quad \text{otherwise}, \\
\delta_2 &= 0 \quad \text{otherwise}.
\end{align*}
\]

In equation (1) \( BR_t \) and \( MR_t \) represent, respectively, the bank administered rates and the monetary rates at time \( t \); \( \beta \) is a regression coefficient that gives a measure of the extent of the monetary rate transmitted on bank rates in a long-term perspective: in the case of \( \beta = 1 \), the whole monetary rate is transmitted on the administered rate, while a value between 0 and 1 means that only a partial transmission mechanism occurs; \( k \) is a constant that synthetizes all other factors that, in addition to the dynamics of monetary rates, may affect the transmission mechanism of the monetary policy on bank rates as, for example, the market power and the efficiency of a bank; \( \varepsilon \) is the error term of the long-run equation; \( \delta_1 \) and \( \delta_2 \) represent the adjustment speeds converge towards the equilibrium level; finally, \( u_t \) is the error term of the short-run equation.

4 Proposed Model

In this paper we examine the validity of the conclusion obtained by Chong et al. (2006) in the recent time period, characterized by important changes in the
monetary policies, that have moved from high interest rates to very low rates.

In particular, from a methodological viewpoint our aim is to enhance Chong et al. (2006), extending their proposed error correction model and providing an alternative model, easier to be implemented and interpreted in this peculiar context.

Firstly, to improve interpretability we have decomposed the error correction model in its main components, and evaluated their predictive contributions. Secondly, we have formulated an alternative, one component model, that is shown to improve predictive performance and ease of interpretation.

From a microeconomic viewpoint, as deposits are saving tools in competition with other instruments (such as bonds), it seems quite reasonable to assume that banks decide on the administered rate looking primarily at its level. Starting from the level, one can always obtain its variation through differentiation. A second consideration concerns the determinants of administered bank levels. Again, it is reasonable to think that bank deposit rates depend on both the level and on the variation of monetary rates. A third assumption, particularly important when monetary rates are close to zero, is that the level of deposit rates depends on the previous level of the same quantity, to allow for a slow and partial reaction to monetary rate changes, given that deposit rates affect considerably the income of a bank.

A macroeconomic perspective confirms the previous assumption: in particular, that is correct to consider, as a response variable, the level of the administered rate and not its variations. This because the relevant response variable for an expansion/restriction effect on the economy is represented by the level of the rates; on the explanatory side, we can model administered rate levels as a function of changes in the monetary rates, but also of their levels, which remain important even when close to zero.

On the basis of the above economic rationales, our final proposed model is the following:

\[ BR_t = k + \beta \cdot MR_{t-1} + \gamma \cdot \Delta MR_t + \delta \cdot BR_{t-1} + \epsilon_t. \]  

We have compared models in terms of their predictive performance. To evaluate model performance, we have introduced a model assessment methodology based on out-of-sample predictions.

Although the error correction model performs quite well, in a predictive sense, its policy implications are difficult to be economically interpreted and managed, being the model an assembly of two different components: a long term equation, that models the level of administered interest rates, and a short
term equation, that models the variations of the rates around their equilibrium level.

The main contribution of our paper to the existing literature is to provide further models and evidence in order to explain not only monetary transmission on the economy, but mainly its components and dynamics, in a context and in a period that are quite difficult to be modeled and predicted, being characterized by substantial structural changes.

References


