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# Interest rate pass through in a Markov-switching Vector Autoregression model: Evidence from Greek retail bank interest rates

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## ABSTRACT

In this paper, we investigate the relationship between Euro Overnight Index Average interest rate (EONIA) and retail Greek bank interest rates in a Markov-switching Vector Autoregression model. Monthly data is used for household and corporate deposit and credit rates since 1999. Two regimes are defined based on high and low interest rate volatility. A separate set of impulse responses for each Markov regime are drawn in order to identify any differences in the retail rates transmission. The results prove that banks in order to assure their resources for a longer term during high variance periods increase significantly their deposit rate after an interbank rate positive shock. They also present a preference to corporations over households. The duration of the responses for deposit rates over the turbulence periods of high volatility show the vital role of Greek deposits on funding of Greek banks.

## 1. Introduction

In this paper, authors investigate the relationship between Euro Overnight Index Average interest rate (EONIA<sup>1</sup>) and the Greek banking system's interest rates during low and high volatility periods. During the recent years, there has been a renewed growing interest on the interest rate pass through especially during crisis periods (see among others Wang, 2013; Belke, Beckmann & Verheyen, 2013; Gaina and Philippas, 2013; Philippas and Siriopoulos, 2013; Von Borstel, Eickmeier, & Krippner, 2016). According to some studies (Aristei & Gallo, 2014; Hristov, Hülsewig, & Wollmershäuser, 2014), in the case of Eurozone the effectiveness of interest rate pass through has been changed over the crisis periods. Apart from high and low uncertainty, another factor that may affect the effectiveness of interest rate pass through may be the level of central bank transparency (Papadamou, 2013).

Interest rate pass through may be different among household and non-financial corporate interest rates as Belke et al., (2013) mentioned. In this line, Angeloni, Mojon, Kashyap, and Terlizzese (2002) underline that, when conducting monetary policy it would be necessary for a central bank to track interest rates for households and corporations. Moreover, the monetary policy actions that cause changes in retail interest rates highlight expectations about the economy and the future monetary policy (Andersson, Dillen, & Sellin, 2006). Additionally, given that the inflation-targeting regime is a widely implemented policy, the importance of the pass through mechanism increases (Ozdemir and Altinoz, 2012). Investigating interest rate pass through in bank rates may reveal useful information

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<sup>1</sup> EONIA is a daily reference rate that expresses the weighted average of unsecured overnight interbank lending in the European Union and the European Free Trade Association (EFTA). It is closely related with the ECB marginal lending key rate, one of the major tools of the Euro zone's monetary policy.

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about the management strategies followed by banks and the effectiveness of central bank policy.

The Greek banking system presents an interesting case study for investigating interest rate pass through due to the fact that during the recent debt crisis banks faced particular risks (credit and liquidity risks). Therefore, by studying Greek retail banking interest rates during a period from the creation of Euro currency to the recent financial crisis period, we can define high and low volatility regimes and investigate asset and liability management over various conditions.

When unexpected changes on interbank market conditions take place, all market participants need to adapt themselves in order to protect their interests and to react in an effective manner. When attempting to shed light on this process it is necessary to follow two basic steps. The first step is to investigate for possible pass-through effects between the effective overnight reference rate for the Euro (EONIA<sup>2</sup>) and the different household and non-financial corporate interest rates. The second one is to investigate for any differences between tranquil versus crisis periods.

According to Von Borstel et al. (2016), EONIA instead of Euribor is usually applied as an approximation to the monetary policy rate in the relevant interest rate pass-through literature, due to its preferable time series properties and its short-term horizon.<sup>3</sup> Thus, EONIA can be considered as the trigger for banks to respond and adapt their retail interest rates in order to secure their profit margins and implement asset and liability management.

The method that authors employ is the Vector Autoregressive modeling, embedding the stochastic dimension of Markov switching approach, describing the situations of high and low volatility. The contribution of this stochastic method is to overcome certain weaknesses of the pure VAR modeling concerning its prediction ability in the volatile economic environment of the interest rates.

This paper contributes to existing literature of interest rate pass-through two folds. First, in an Asymmetric VAR framework proposes combination of retail rates with EONIA<sup>4</sup> in order to identify asset and liability management strategies by banks over a high and low risk period. By using suggested combination of retail interest rates, useful and innovative implications can be drawn for bank pricing policies under normal and stressed periods. More specifically, our proposed combinations of interest rates with EONIA rate allows us to identify a mixed asset and liability management strategies, but also strategies based on the one side of the balance sheet. Our analysis take into account differences between overnight versus short-term instruments for the same borrower, and/or differences across dissimilar borrowers in the same time horizons.

Second, it provides answers to a series of research questions that arise concerning the response of the retail rates, in small Eurozone country that faced a *structural change from low to high-risk conditions*, on a shock of the effective overnight reference rate for the Euro.

1. *Is there complete or partial interest rate transmission from EONIA to retail interest rates of a small Eurozone economy while high or low volatility regimes take place?*
2. *Are there any differences in transmission between high and low volatility regimes?*
3. *Do banks present any preference between households and companies, when facing an unexpected increase on cost of interbank borrowing?*
4. *Within the client category of households, are there any differences between overnight and up to one-year cost of funding for banks after a positive interbank interest rate shock?*

The answer of the questions mentioned above, will lead monetary authorities to a better understanding of the general banking responses to monetary policy shocks, and define any price discrimination among different financial instruments. All those answers are useful to all stakeholders who participate in interbank markets and in the retail banking as well.

This paper is organized as follows: In section two, there is a short literature review. In section three, the authors describe data used and the methodology of Markov Switching modeling. Section four includes the empirical results and a short discussion on them, while section five concludes.

## 2. Literature review

The effort to identify possible interdependence between two or more parameters is a continuous process that takes place in the scientific research. Concerning the field of monetary policy, there is extended and robust theory implying the high probability to lead to different paths, depending on the time and presenting different results finally (Clarida, Gali & Gertler, 2000). Having in mind that monetary policy is a major tool of Central Banks to deal with the problems of the economy; the decisions about this policy have certain consequences for the economy. Using the term of “pass-through”, the monetary literature refers to the extent to which a monetary policy shock is passing on other types of interest rates in the long- and in the short-run as well. There are a number of papers that attempt to identify the potential mechanisms driving the behavior of major economic parameters, such as interest rates, which could depict not only monetary policy but also to measure existing market risks arising from the interest rate structure (Martin, 2013).

The pass-through phenomenon has been studied extensively in the past using time series modeling methods recognizing dynamic characteristics, in an attempt to detect potential asymmetries in the transmission mechanism anticipating further instability (Kargiannis, Panagopoulos, & Vlamis, 2010; Wang, 2013). Panel Data methodology is also used in order to eliminate the expected

<sup>2</sup> Since the European Central Bank (ECB) is authorized to develop and implement the monetary policy for Eurozone (based on several principles e.g. targeting rules using judge as mentioned in Svensson, 2003), the calculation of EONIA index by ECB provides reliable assessment about the results of its policy implementation in the Eurozone Economy.

<sup>3</sup> EONIA is calculated by the ECB based on the loans made by 28 panel banks. In contrary the Euribor is calculated by Global Rate Set Systems Ltd., and only 20 banks contribute to it. See European Banking Federation (2013): <https://www.emmi%2dbenchmarks.eu/assets/files/Eonia%20Technical%20Features.pdf>.

<sup>4</sup> As a proxy of European monetary policy and interbank conditions.

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