**BUCHAREST ACADEMY OF ECONOMIC STUDIES**

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# THE DYNAMICS OF TERM STRUCTURE ON THE ROMANIAN GOVERNMENT BOND MARKET

(Summary)

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**KEYWORDS**

Romanian government bonds, Romanian yields, Romania's yield curve, yield curve estimation, principal component analysis, fixed income instruments, portfolio management, risk management, duration, duration risk, primary market, secondary market, primary dealers, inverted V-pattern of yields, government securities auctions.

**Ph.D. THESIS SUMMARY**

This PhD thesis provides an in-depth analysis of the dynamics of Romanian government bond yields issued on the local market, together with internal and external factors influencing these developments.

As for **the motivation** for choosing this topic, the applicability of information on the dynamics of government securities is relevant to a wide range of economic actors, such as risk and portfolio managers, monetary policy makers, debt issuers, and economic analysts.

The **structure of the thesis** comprises 3 parts and 4 chapters. In the **first part (Chapter I)**, the interdependence between the primary and secondary markets of Romanian government securities is discussed as an influencing factor in determining short-term yield developments. According to the conclusions in the literature, primary dealers tend to liquidate part of their holdings before an auction due to their limited risk-bearing capacity. This leads to upward pressure on yields before the auction, which is often reversed afterward. Based on **our research results**, including a counting-based analysis and an autoregressive model (ARMA), it was identified that the emergence of a complete or partial inverted V-shaped yield pattern around an auction day is statistically significant for Romanian government bonds with maturities of 2, 4, and 5 years. In addition to what has been researched in the literature, for the period between April 2018 and March 2019, this pattern was also analyzed using high-frequency (intraday) data.

Furthermore, the amplitude of the auction cycle was evaluated under different volatility regimes. Several Markov-switching estimates indicated that, in a high-volatility environment, larger auction-driven yield movements on the secondary market are statistically significant only for sovereign bonds with maturities of 4 and 5 years. This observation, consistent with the findings of Eisl and Ochs (2019), is relevant given the higher liquidity of the medium-term segment of the yield curve. Thus, in the event of a risk event, there is a higher probability that government bonds in the intermediate maturity range will be the first to be liquidated by primary dealers.

In **the second and most extensive part of the thesis (Chapters II and III)**, yield variability is explained using Principal Component Analysis (PCA), a machine learning statistical method based on unsupervised learning. **Chapter II** explains the use of PCA in reducing the inherent complexity associated with multivariate data sets, by extracting principal components from correlated variables, throughout an orthogonal transformation. In our study, to give greater weight to recent market developments, the covariance matrix used in deriving the principal components was calculated based on exponentially weighted moving average (EWMA) data. The **personal contribution** of this study involves using PCA to describe the dynamics of the yield curve on the Romanian government bond market, under the impact of major events such as the Covid-19 pandemic or the Russian-Ukrainian war. The **results** revealed that when financial markets are affected by extreme stress events, the first principal component explains yield curve variability more significantly than under normal market conditions.

**Chapter III** discusses another use of PCA in the fixed income domain, namely providing a probabilistic framework useful in the scenario-based approach to yield curve forecasting, by quantifying the plausibility of the shape and amplitude of term structure dynamics. The **results** of this analysis indicated that the magnitude of the market movements recorded in the week following the onset of the pandemic (yield increases of up to 80-100 basis points across the entire curve) was particularly unlikely from a historical perspective, although the shape of the shock was plausible. In the final part of this chapter, we used the forecasting model proposed by Nogueira (2008) to derive the entire composition of the yield curve in Romania, incorporating the portfolio manager's view on benchmark rates.

The raw **database** used in implementing the aforementioned was composed of daily and intraday quotes of Romanian government bond yields denominated in RON, available on the Refinitiv and Bloomberg platforms, as well as the results of government bond auctions conducted during the analyzed period.

Finally, **the fourth chapter** of this thesis provides a comprehensive review of the economic and financial climate that has characterized global financial markets in recent years, starting with the Covid-19 pandemic, the war in Ukraine, and culminating in one of the most extensive and accelerated cycles of monetary policy rate hikes in history. These events were discussed from the perspective of their impact on global yields and, implicitly, on those of the Romanian government bond market, which, beyond specific domestic factors, are strongly influenced by developments in the major world economies, namely the US and the Eurozone.