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DEVELOPMENT OF THE GOVERNMENT SECURITIES MARKET IN THE REPUBLIC OF MOLDOVA

Summary of the doctoral thesis in economic sciences

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CONCEPTUAL GUIDELINES OF THE RESEARCH

The relevance of the research topic. In the current economic conditions of the Republic of Moldova, mobilizing additional capital from investors is essential for supporting budgetary funds, highlighting the relevance of developing the government securities (GS) market. Market volatility influences the implementation of debt management strategies and the profitability of GS investments. Therefore, a more precise estimation of GS interest rates positively impacts both the issuer and the investor.

The necessity of developing the domestic GS market has increasingly drawn attention following various economic crises. A developed GS market brings numerous benefits. At the macroeconomic level, it provides the opportunity to finance budget deficits, avoiding accumulating debt denominated in foreign currency. It can also contribute to the implementation of the monetary policy, including achieving inflation-targeting objectives. At the microeconomic level, developing a domestic GS market can enhance overall financial stability and improve financial intermediation by increasing competition and developing infrastructure, products, and financial services. Last but not least, the GS yield curve provides information on how the market anticipates future changes in interest rates. Another significant benefit of the GS yield curve is that it can be used as a benchmark for introducing new financial products.

Description of the situation in the field and identification of research problems. One of the important reason for researching the domestic GS market is the need for more diversification of the investor base. On the one hand, the banking sector predominates in the investor base. On the other hand, there is a requirement for more institutional investors, such as investment and pension funds, and individuals to have a comprehensive understanding of the process of investing in GS. In this context, the short-term instruments dominate in the primary market, contributing to increasing the refinancing risk. Moreover, in the secondary market, the volume and number of transactions with GS are limited, leading to market illiquidity. Under these conditions, developing a GS yield curve has proven to be a challenging task. Furthermore, market volatility has contributed to discrepancies in the state budget between the initially projected volume for net issuance of GS issued in the primary market and the realized volume due to the challenges in forecasting the interest rate of GS issued through auctions.

The degree of study of the research topic. Internationally, theoretical and applied aspects of the GS market have been addressed by the different authors, including: F. J. Fabozzi, F. J. Jones, S. V. Mann, M. Choudhry, F. S. Mishkin, F. Chakroun, F. Abid, S. K. Parameswaran, Y. S.

Stander, C. R. Nelson, A. F. Siegel, Lars E. O. Svensson, J. Preunkert, M. Carpinetti, H. Hashimoto, T. Endo, I. Gill, B. Pinto, S. Orsag, B. Baskot, M. Arnone, I. Ihnatov, C. Kyriakopoulos, A. N. Burenin, O. A. Școlic, R. T. Balachina, V. I. Țibulnicova etc. Notably, F. J. Fabozzi is one of the most influential researchers in the field of the financial market, presenting the theory and practice of financial instruments, including GS.

At the national level, although the research of the GS market has been and remains highly relevant, only some research studies have been identified on this subject. In 1999, O. Şcerbaţchi and C. Zaman, in collaboration with A. Radziwiłł mentioned about the GS market in the Republic of Moldova in the publication "Financial Crisis in Moldova - Causes and Consequences". Other studies worth mentioning in this context belong to author I. Luchian, who published a doctoral thesis in 2002 with the title "Management of the government securities market in the Republic of Moldova", conducted an analysis of the GS market in the Republic of Moldova and formulated practical recommendations for improving the management process of the domestic GS market. Additionally, local authors such as A. Timuș, M. Cojocaru, R. Perciun, V. Ganea, T. Gutium, and A. Filip have carried out some research related to the GS market.

The purpose of the research: identification the constraints on developing the government securities (GS) market in the Republic of Moldova and determination the measures to remedy them, aiming to optimise funding sources for budgetary expenditures and enhance the attractiveness of the GS market.

To achieve the proposed purpose, the following research **objectives** were defined: (i) analysis of the theoretical aspects of the financial market and identification the most recent financial instruments issued in the market; (ii) identification of the risks associated with GS and analysis of risk indicators; (iii) sustainability assessment of the GS market in the Republic of Moldova and comparative analysis in relation to other countries; (iv) determination of the parametric and regression models for the development of the GS yield curve and their application in the market of the Republic of Moldova; (v) determination of the impact of primary dealers' activities on the development of the GS market in the Republic of Moldova; (vi) formulation of the recommendations for the development of the GS market in the Republic of Moldova to optimize budgetary planning and enhance the attractiveness of the GS market.

Research hypothesis. The predictability of the GS market in the Republic of Moldova is essential for its development. Therefore, the interest rate of GS issued through auctions can be forecasted based on the forward curve, which will significantly impact the accuracy of state budget planning. Additionally, the relationships between the spot and forward curves can predict trends of the inflation.

Research methodology. In order to achieve the objectives, various research methods were used in the research process, including: (i) theoretical synthesis – for analysis specialized theoretical information to define various financial market concepts and develop complex typologies of financial instruments; (ii) systemic analysis – was applied to conduct a comprehensive study of the GS market in the Republic of Moldova, including legal, managerial, and other aspects; (iii) statistical method – was used for collecting, analysing, and interpreting data related to the GS market; (iv) comparative analysis – was used to identify various issues and divergences in the GS market of the Republic of Moldova in comparison to other countries; (v) empirical method – was applied for the case study of various researches regarding the developing of the yield curve; (vi) Monte Carlo method – was used for forecasting the evolution of the debt stock.

Informational support. As information sources, various studies and specialized publications were used, along with the legislative acts of the Republic of Moldova and the European Union (EU), including the Development Strategy for Public Finance Management for the years 2023-2030, the Medium-Term Debt Management Program, as well as statistical data published on the official websites of the Ministry of Finance (MoF), National Bank of Moldova (NBM), Court of Accounts, International Monetary Fund (FMI), World Bank, etc. As well, the author used scientific-practical materials from the diverse trainings, conferences, and workshops in the Republic of Moldova, Austria, Georgia, Slovenia, Romania, Bulgaria, and Ukraine, organized by the IMF, World Bank, EU, Joint Vienna Institute, Asian Infrastructure Investment Bank, etc.

Additionally, were taken into consideration the recommendations of international experts within the projects: (i) "Technical Assistance to Improve Public Finance Policy and Public Financial Management in Moldova", and (ii) "Support the Moldovan Government in Identifying and Preparing Projects Linked to the Implementation of the Association Agreement".

The important scientific problem solution. Optimizing the state budget's expenditure planning for the debt service of GS based on the forward curve development method due to minor discrepancies between the estimated forward rate on treasury bills (TB) and the market rate.

Scientific novelty and originality: (i) researching theoretical approaches regarding securities and their typology; (ii) identifying risks associated with GS and risk analysis; (iii) validating and applying the debt dynamic model for assessing the country's level of indebtedness; (iv) determining the inverse relationship between the state budget balance and the net issuance of the GS issued in the primary market; (v) comparative analysis of the GS market in the Republic of Moldova in relation to other countries; (vi) adjusting the methodology for evaluating the

performance of the primary dealers to optimize the development of the GS market; (vii) establishing the interdependence relationship between the forward curve and the spot curve based on the forward curve development method; (viii) identifying minor discrepancies between the forward rate for treasury bills (TB) and the market rate; (ix) formulating the recommendations for developing the GS market in the Republic of Moldova based on advanced practices.

The theoretical significance of the study: the comprehensive definition of the concept of securities, the development of a complex typology of GS, the identification of risks associated with GS, and specification the concepts related to risk indicators.

The applicative value of the paper: ((i) optimising the GS market in the Republic of Moldova through legal framework adjustment; (ii) establishing criteria for evaluating the primary dealers' activity; (iii) participation at the elaboration of the GS yield curve in the Republic of Moldova; (iv) presenting proposals for automating the process of generating allocation options of GS within auctions; (v) recommendations accepted at the elaboration of the Action Plan for developing the GS market in the Republic of Moldova.

Approval of scientific results. The research results conducted by the author have been disseminated in 14 scientific papers both nationally and internationally, including the United Kingdom, Bulgaria, and Romania (including in Scopus). Additionally, the conceptual ideas, conclusions, and main recommendations outlined in the thesis have been presented at various national and international scientific conferences.

Implementation of the scientific results. the most significant research findings were appreciated and accepted by the Ministry of Finance of the Republic of Moldova and the Moldova State University, as confirmed by implementation certificates.

Thesis structure. Considering the research purpose, objectives, and writing requirements, the thesis includes the following structure: introduction, three chapters, general conclusions and recommendations, bibliography of 173 titles, 11 annexes, 129 pages of main text, 27 tables, 57 figures, and 33 formulas.

Keywords: government security, financial market, primary market, secondary market, public sector debt, risk indicator, sustainability, yield curve, primary dealer.

CONTENT OF THE THESIS

Chapter 1, "Theoretical and conceptual approaches of securities in the financial market context", provides a bibliographic synthesis regarding the evolution of the financial market's development. Additionally, it presents characteristics of securities, mainly GS. Special attention is given to analysing risks associated with GS from both the issuers' and investors' perspectives, highlighting their common risk – interest rate risk.

Analysing the concept of the financial market, the author found that it varies depending on the perspective from which it is defined. In terms of functionality, the financial market represents a system through which the collection and transfer of capital take place. From an institutional standpoint, the financial market constitutes an infrastructure that facilitates trading financial instruments.

With the diversification of the financial instruments, the financial market can be divided into several segments, each with its characteristics and functions. In the author's view, the three main segments of the financial market are: (i) fixed-income market; (ii) equity market; (iii) derivatives market. The largest segment of the financial market is represented by the fixed-income market, followed by the equity market and the derivatives market. This distribution may vary depending on different factors such as economic conditions, legal framework, and investor preferences. Schematically, the flow of capital within the financial market can be represented as follows:

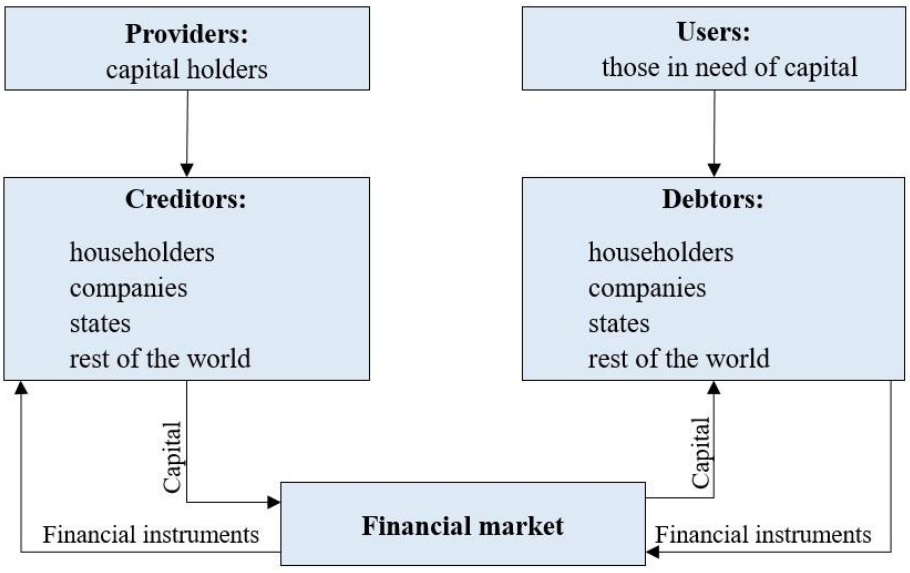


Figure 1. Capital flow within the financial market

Source: author's elaboration based on [19, p. 6]

The financial market optimizes the process of free capital rotation, ensuring its mobilization, distribution, and utilization to cover expenditure needs and achieve profits. Generally, a significant capital inflow into a specific market can contribute to the increase in the prices of financial instruments, while the flow or capital withdrawal can lead to a decrease in prices.

Based on the research, the author proposes a typology of the financial market according to multiple criteria (Figure 2).

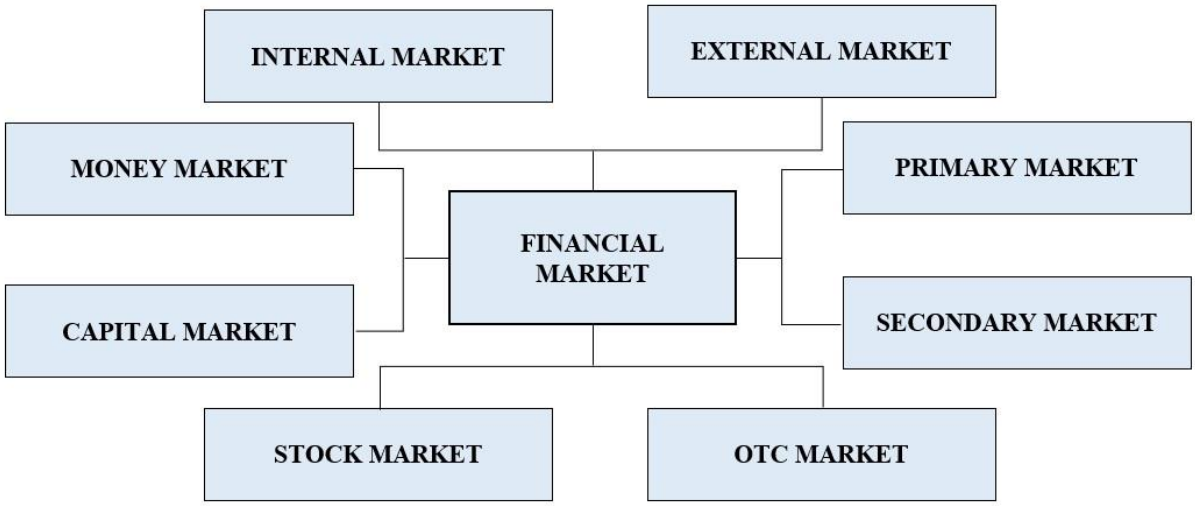


Figure 2. Typology of the financial market

Source: author's elaboration based on [19, p. 21; 21, p. 107]

- Depending on the place of issuance of financial instruments:

- *Internal market* – commonly known as the local market, represents the market where the resident issues financial instruments [5, p. 37].

- *External market* – commonly known as the international market, represents the market where the non-resident issues financial instruments [5, p. 38].

In 1963, the Italian road construction company "Autostrade" issued the first Eurobond, a financial instrument for international investors. The prefix „euro" does not exclusively refer to bonds issued in Europe or denominated in the euro currency, which is why the term can be confusing.

To distinguish non-resident markets, they have been given nicknames. For example, the market in the USA is known as the "Yankee market"; in Japan – the "Samurai market"; in the United Kingdom – the "Bulldog market"; in the Netherlands – the "Rembrandt market"; and in Spain – the "Matador market" [5, p. 38].

- Depending on the moment of transaction:

- *Primary market* – the market where financial instruments are sold for the first time, and the issuer raises the capital [21, p. 87].

- *Secondary market* – the market where financial instruments are traded after their initial issuance in the primary market.

➢ According to the place of transaction:

- *Stock market* – regulated market, where financial instruments are traded.

- *OTC market* – represents the market where the seller and buyer negotiate directly, i.e., outside the stock exchange.

➢ Depending on the term of circulation of financial instruments:

- *Money market* – the market where short-term financial instruments are issued and traded [19, p. 704].

- *Capital market* – the market where long-term financial instruments are traded.

The study of the financial market allowed the author to conclude that for the proper functioning of the financial market, each participant must fulfil their well-defined obligations, and the infrastructure should contribute to the secure execution of transactions with financial instruments (Figure 3).

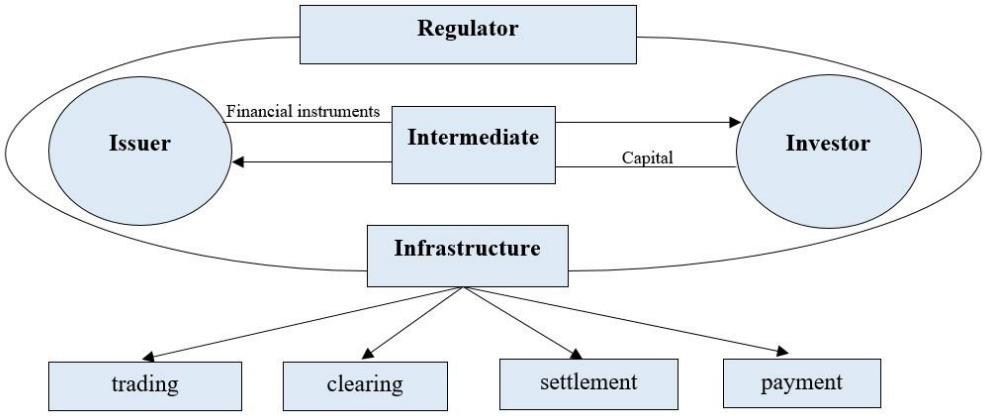


Figure 3. Relations between financial market participants

Source: author's elaboration based on [6]

In the financial market, the market regulator plays the role of overseeing and regulating the market's operation to ensure its integrity, transparency, and stability. The financial instruments are issued by the issuer to raise capital from investors, while the investor, whether an individual or entity, allocates capital in exchange for these financial instruments. As for the intermediary, it provides intermediate services between the seller and buyer of financial instruments, facilitating the trading process in the financial market. Also it is important the infrastructure related to the systems used for trading financial instruments, which fulfils functions such as trading, clearing, settlement, and payments.

Depending on the essential characteristics of financial instruments, the author distinguishes three types of securities: (i) debt securities or debt instruments; (ii) equity or stocks; (iii) units or shares of the investment fund. Additionally, analysing the purpose of securities, the following general functions have been identified: (i) financing function; (ii) investment function; (iii) hedging function; (iv) liquidity function; (v) governance function. In the author's view, the most crucial function of securities is financing, as through the issuance of various financial instruments such as stocks and bonds, the issuer can accumulate funds necessary for its expenditures. This function contributes to the growth and economic development of the issuer.

In the GS market, the government issues GS to accumulate funds, and in exchange of them, the investor becomes the holder of GS, aiming to make a profit. Therefore, the primary purpose of issuing GS is capital accumulation. The author has divided the "life cycle" of GS into three distinct stages: (i) issuance; (ii) trading; and (iii) redemption. The issuance stage involves placing GS in the primary market by the issuer through auctions or other methods stipulated by legislation. Following this, GS can be traded in the secondary market. The final stage is redemption, where investors receive the principal amount and interest. In cases where investors do not trade the GS, they go through only two stages of the "life cycle" – issuance and redemption.

The study of GS highlights its diversity and complexity. Analysing and structuring GS allows for a clearer understanding of how they operate. Taking into account the characteristics of GS, the author proposes a complex typology as follows:

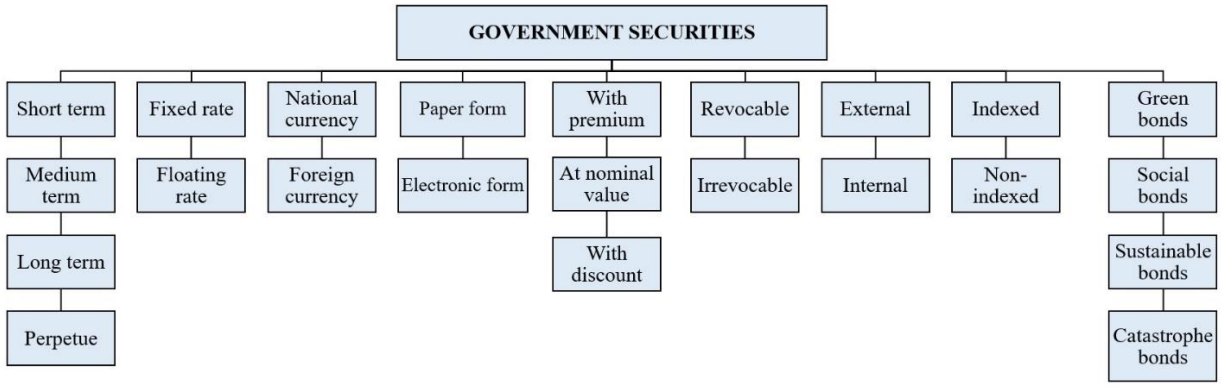


Figure 4. Typology of the government securities

Source: author's elaboration based on [5, p. 37; 9, p. 1; 12, p. 1; 17; 20, p. 23; 22, pp. 49-51]

GS differ based on several criteria, such as maturity, type of interest rate, currency of issuance, form of issuance, issuance conditions, redemption method, place of issuance, and the reference value in the case of floating-rate GS. These features come from the issuer's needs and purposes and investors' preferences regarding GS. Additionally, given the damages caused by climate change, a need to finance projects for environmental protection has arisen. In this regard, the author expands the typology of GS with new financial instruments, including green bonds.

in general, investment is a risky activity. Although GS is generally considered among the safest investment options in the financial market due to the government guarantee, history has witnessed cases of sovereign default, representing the government's inability to pay its payment obligations generated by debt. Therefore, both the issuer and the investor are exposed to risks associated with GS, which should be prudently evaluated.

Based on research regarding the risks associated with GS, the author highlights a series of risks that impact the investment process, including: interest rate risk, inflation rate risk, liquidity risk, exchange rate risk, credit risk, sovereign risk, volatility risk, early redemption risk of GS, etc. Additionally, from the issuer's perspective, the author emphasizes the following risks: interest rate risk, refinancing risk, liquidity risk, exchange rate risk, demand risk, and operational risk.

Measuring risk allows the identification and quantification of uncertainties related to GS. Anticipating risks enables the development of effective management strategies and policies. Investors can assess whether the potential return of GS covers the assumed risks, and issuers can take measures to prevent the risk of debt default. In general, risk measurement ensures protection against unexpected losses and aids in making well-informed decisions. To assess the risks associated with GS, the author has identified relevant indicators from both the issuer's and investor's perspectives, related to interest rate fluctuations, among which: (i) duration, (ii) modified duration, and (iii) convexity.

Identification, measurement, and monitoring of risks are key elements for the success of investments in GS and their issuances. Although the objectives of issuers are opposite to those of investors — investors aim for higher profits and are looking for higher interest rates, while issuers seek to reduce debt service of GS by lowering interest rates — they share certain risks, one of which is interest rate risk. Risk management associated with GS is an ongoing and dynamic process that involves constant monitoring and adaptation to internal and external factors.

Chapter 2, "Evaluation of the government securities market in the Republic of Moldova", present a detailed scientific study on the organization and functioning of the GS market in the Republic of Moldova.

During 1992-1995, various types of materialized GS were issued through the Savings Bank of Moldova (under liquidation).

The first auction for the issuance of GS in book entry form was organized in the Republic of Moldova on March 14, 1995. During the 28 years since then, numerous measures have been taken to develop the GS market (Figure 5).

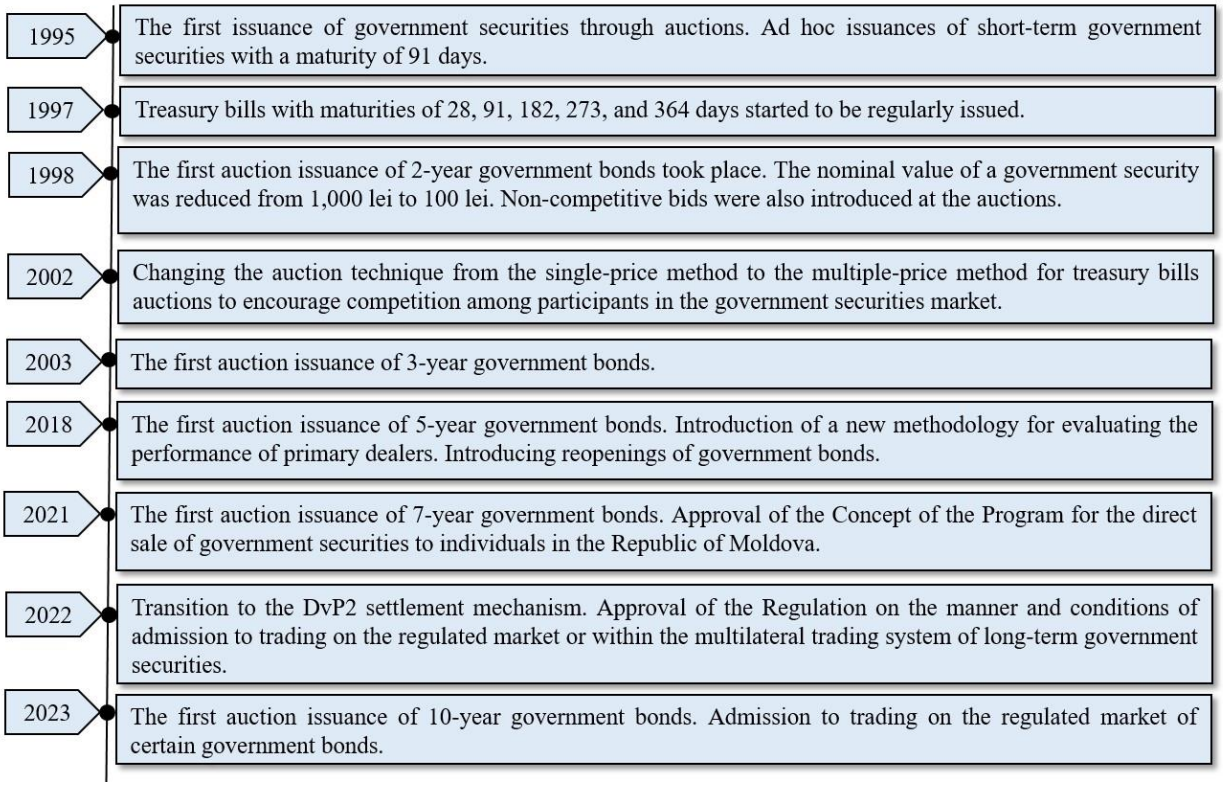


Figure 5. Chronology of events on the government securities market

Source: completed by the author based on [2, 3, 6, 7, 11, 13]

Starting from August 1995, GS issuance auctions take place according to a pre-published calendar. The maturity of GS issued through auctions has gradually been extended, reaching a maximum level of 10 years. In order to attract a larger number of investors, the nominal value of a GS was reduced from 1 000 to 100 lei. To encourage competition among participants in the GS market, the allocation technique of TB during the auction was changed from the single-price method to the multiple-price method. Additionally, non-competitive sessions were introduced at the auction.

In the author's view, significant changes in the GS market were in 2018, when a new Regulation on the issuance, trading, and redemption of GS in book-entry form was approved

(Regulation no. 170/2018). New concepts and a complex methodology for evaluating the performance of primary dealers in the GS market were introduced, based on which an annual ranking of primary dealers is developed [6]. Additionally, the IMF Technical Mission in 2018 recommended that the stock of GS be reported at nominal value, including accrued interest. As this requires configurations in the Debt Management and Financial Analysis System (DMFAS), starting from May 2020, the reporting value of the GS stock was changed from the purchase price to the face value.

Based on research regarding the reporting value of debt instruments, the author identified five distinct methods, including: (i) purchase price value; (ii) face value; (iii) nominal value; (iv) market value; (v) fair value. From English, "face value" is translated as "valoare nominală" and represents the amount to be paid at maturity. On the other hand, "nominal value" is also translated as "valoare nominală," but it has a different meaning – the value at which GS were issued plus the accrued interest. Therefore, the author suggests that the term "nominal value" used at the evaluation of the GS stock should be referred to as "accumulated value".

In 2021, the Government approved the Concept of the "Program for the direct sale of GS to individuals in the Republic of Moldova". The Program aims to develop the GS market, enhance financial literacy, and facilitate citizens' access to purchasing GS through an electronic platform.

With the entry into force of the amendments to Regulation no. 170/2018 in 2022, the settlement mechanism was changed from DvP1, which involves delivery versus payment, where both the settlement of securities and the settlement of funds are done on a gross basis, to the DvP2 settlement mechanism. The DvP2 mechanism also involves delivery versus payment, but the settlement of securities is done on a gross basis, while the settlement of funds is done on a net basis.

Moreover, in 2022, the Regulation regarding the conditions of admission for trading on the regulated market or within the multilateral trading system of long-term GS was approved. This allowed the expansion of trading channels for government bonds (GB) in the secondary market. Thus, on May 30, 2023, for the first time, some GB with maturities of 2, 3, 5, and 7 years were admitted for trading on the Moldova Stock Exchange (MSE), and on November 1, 2023, the first transaction with GB with a maturity of 5 years was concluded.

All these events on the GS market in the Republic of Moldova have contributed to the diversification of the GS portfolio. Thus, the author has identified the following typology of GS:

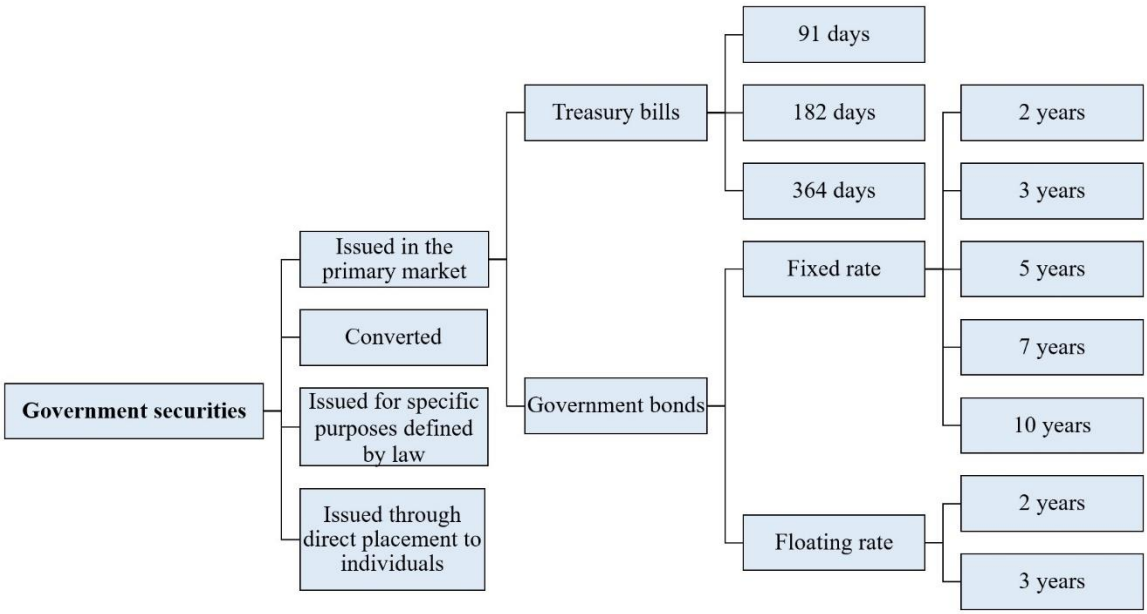


Figure 6. Typology of the government securities in the Republic of Moldova, 2023
Source: author's elaboration based on [2, 8]

The GS portfolio in the Republic of Moldova includes the following instruments:

- *GS issued in the primary market* – GS issued in the primary market through auctions. The MoF issues two types of GS:

✓ Short-term GS – TB issued at a discount and redeemed at maturity at face value, having maturity up to one year (91, 182 and 364 days);

✓ Long-term GS – GB issued with a fixed or floating interest rate with a maturity of 2, 3, 5, 7, and 10 years. Only Bonds with a maturity of 2 and 3 years have been issued with both fixed and floating rates.

- *Converted GS* – GS converted from loans granted by the NBM to the government.

- *GS issued for specific purposes defined by law* – GS issued for specific purposes defined by legislation. Thus, on October 4, 2016, GS were issued to fulfil payment obligations from state guarantees granted to the NBM by the MoF to guarantee emergency loans.

- *GS issued through direct placement to individuals* – GS directly purchased by retail investors through an online platform. Currently, this type of GS is not a component of the GS portfolio. The launch of the "Program for the direct sale of GS to individuals in the Republic of Moldova" has been anticipated by the end of 2023.

To assess the contribution of each type of GS within the GS portfolio, the author conducted an analysis of their stock over 10 years (Figure 7).

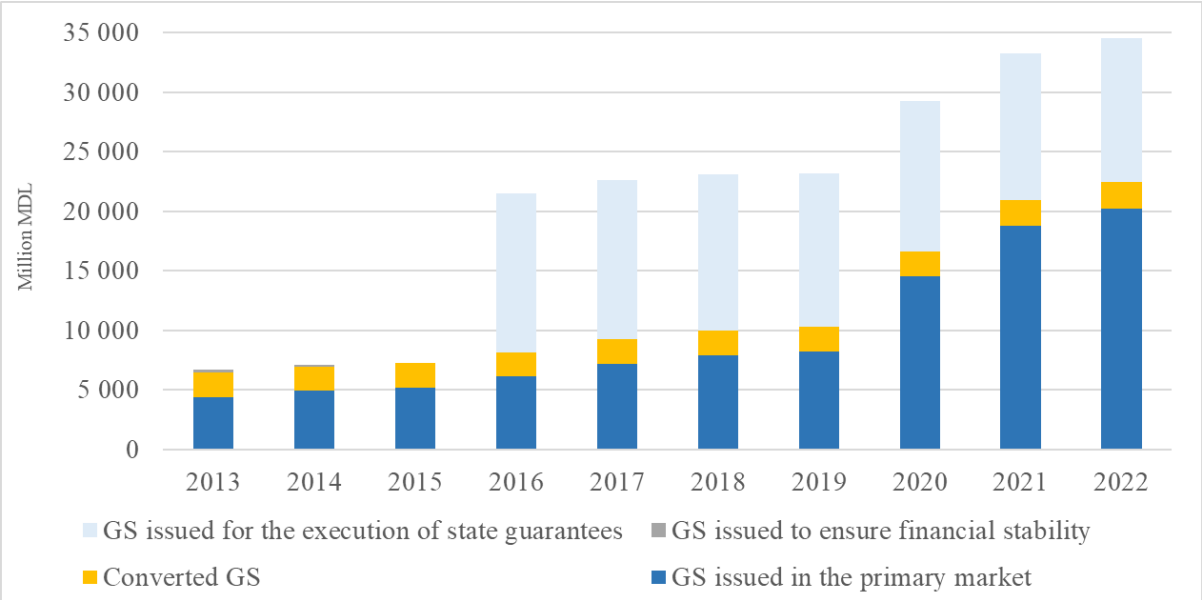


Figure 7. The evolution of the government securities stock

Source: author's elaboration based on [16, 18]

In 2012, the MoF issued GS totaling 428,5 million lei to transfer them to the Savings Bank of Moldova (under liquidation), for the purpose of acquiring its claim against "Investprivatbank" S.A. (under liquidation). This claim had arisen from providing funds to pay the deposits of individuals. By the end of 2015, the balance of GS issued for ensuring financial stability amounted to 0 lei.

Starting from the year 2016, a significant increase in the GS portfolio is observed. Such growth was influenced by the issuance of GS to fulfil payment obligations derived from state guarantees. Over seven years, their stock gradually decreased from 13 341,2 to 12 061,2 million lei. Consequently, GS, with a maturity of 1 to 6 years, totalling 1 280,0 million lei, were redeemed.

The stock of converted GS remained at the same level at the purchase price, only changing at face value. Thus, the stock of converted GS at the purchase price in 2022 amounted to 2 063,4 million lei, typically being reissued each time at the maturity date.

The stock of GS issued in the primary market represented a significant share in the total GS portfolio, except for the years 2016-2019. It exhibited an increasing trend, rising from 4 426,1 million lei at the purchase price to 20 189,8 million lei at the face value. Following the conducted research, the author observed that starting from 2020, the stock of GS issued in the primary market experienced a substantial growth, exciding the value of 14 561,0 million lei at the face value. Until 2016, the share of long-term GS was than 6,3% of the total stock of GS issued in the primary market. From 2017, this share was over 12,4%, reaching its peak at 29,9% in 2018. In 2022, the proportion of GS in the total stock issued in the primary market decreased, being the lowest value in the last 6 years.

Annually, in the State Budget Law are approved the balance of GS and their net issuance, as well as the planned amount for GS debt service. Considering the fluctuations of the interest rates in the GS market, estimating the GS ceiling becomes a challenging task, especially in estimating their debt service. Discrepancies between the initially planned volume in the state budget and the realized volume have been recorded. In 2022, a significant gap was observed when the initially planned volume was 4 900 million lei, but a negative volume of -143 million lei was recorded. This means that the volume of redeemed GS exceeded the volume of GS issued in the primary market.

Although budget amendments typically occur throughout the year, it is crucial for these adjustments not to undergo radical changes. Such alterations can have an impact on the stability of the GS market. To ensure better planning and more efficient management of public finances, a precise estimation of GS interest rates and careful monitoring is necessary. This contributes to maintaining a stable financial framework and achieving financial goals in a sustainable manner.

Following the analysis of the auction results of the GS, the author identified an inverse relationship between the net issuance (the difference between the issuance volume and the redemption volume) of the GS issued in the primary market and the level of the state budget balance. When the state budget balance decreases, the net issuance of the GS issued in the primary market increases, suggesting that the government may issue a larger volume of GS to finance this budget deficit. Similarly, in the opposite situation, when the state budget balance increases, the net issuance of GS issued in the primary market decreases (Figure 8).

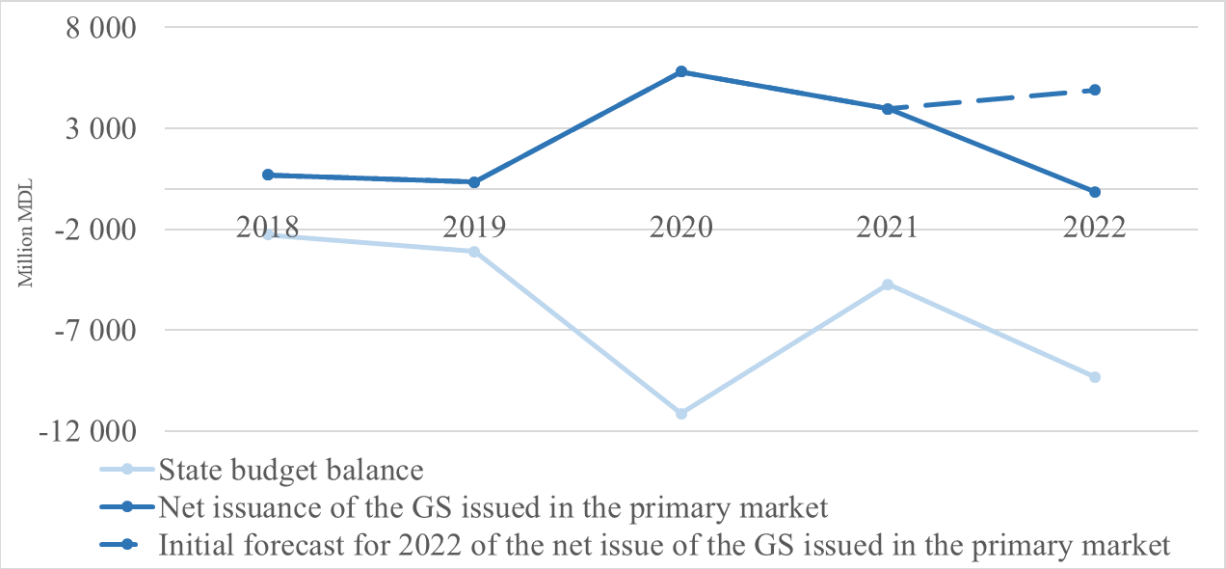


Figure 8. State budget balance *vs.* net issuance of the government securities issued in the primary market

Source: author's elaboration based on [10, 15]

According to Figure 8, the inverse relationship between the state budget balance and the net issuance of GS issued in the primary market was not registered in 2022. The author suggests that this can be explained by the fact that in 2022, there was a relatively high level of the weighted average nominal interest rate of GS issued through auctions. Consequently, the servicing costs of GS were impacted, resulting in the failure to achieve the initially forecasted volume for the net issuance of GS issued in the primary market.

The country's debt level is increasing but remains sustainable. Although the Republic of Moldova has recorded the highest level of the government debt in the last period, it is considerably lower compared to emerging markets and developing countries. The author highlights the importance of understanding the country's debt level and has forecasted it for five years using the debt dynamic model and the Monte Carlo method. The estimated result for the year 2027 does not significantly differ from the level of 2022 and deviates insignificantly from the level forecasted by the IMF.

Following the assessment of the GS market, it was found that the primary market is predominantly exposed to refinancing risk, as the majority of the GS portfolio consists of TB. The lack of demand for GB is also attributed to the absence of institutional investors, such as pension funds, in the investor base, which typically invest in long-term GS. Regarding the secondary market, it remains illiquid, although there has been observed an increase in the trading volume of GS. To stimulate transactions in the secondary market, the trading channels have been expanded. Starting from 2018, GS transactions can be conducted through the E-Bond system within the Bloomberg terminal, through the Central Securities Depository system, and in 2023, some GB were admitted for trading on the MSE. However, investors, especially individuals, are less acquainted with the opportunity to buy GS not only in the primary market through auctions but also in the secondary market.

Following the comparative analysis, the maturity of the GS portfolio issued through auctions in the Republic of Moldova is relatively short. For instance, in 2022, only 2% of the total GS issued in the primary market were GB, with maturity up to 7 years. In comparison, North Macedonia, as a similar country, issued 15 years GB with a share of 20% of the total GS issued in the market. The gap becomes even bigger compared to developed countries, which issue GS with maturities exceeding 50 years. Additionally, the stock of the GS issued in the primary market as a percentage of GDP in the Republic of Moldova is insignificant, standing below 10%, while in the Eurozone, it exceeds 70%.

Chapter 3, "Opportunities and perspectives for the development of the government securities market in the Republic of Moldova", is dedicated to scientific arguments regarding the GS yield curve modelling, the contribution of primary dealers in the GS market, and the constraints regarding the development of the GS market in the Republic of Moldova, being identified measures for their remediation.

The yield curve is a graphical representation of the relationship between the yield of GS and their maturity. Because the maturity of a GS is referred to as its term to maturity or simply its term, the relationship between yield and maturity is referred to as the *term structure of interest rates* [5, p. 515]. Sometimes, discussions of the term structure of interest rates in the GS market get confusing, although there is a technical difference between them. Therefore, the relationship between maturity and GS spot rates is called the term structure of interest rates [5, p. 82].

The yield curve has various shapes, distinguished by level, slope, and curvature. Therefore, in the author's view, five distinct forms of the yield curve can be identified: (i) upward-sloping curve; (ii) downward-sloping curve; (iii) flat curve; (iv) hump-shaped curve; (v) U-shaped curve. Additionally, there are various types of curves based on the type of interest rate, such as the spot curve, the par curve, the forward curve, etc. In the author's opinion, the most representative curve is the one constructed based on spot rates. Although, in practice, data on spot rates for GS with a maturity of more than one year are often not available, they can be theoretically deduced using the bootstrapping technique.

At the developing the GS yield curve, various models are applied, with parametric models such as Nelson-Siegel and Nelson-Siegel-Svensson being the most commonly used. The fundamental principle of these models involves specifying a function whose parameters that are determined by minimizing the squared deviations of the estimated prices from the market prices.

Nelson-Siegel model was developed in 1987 by Ch. R. Nelson and A. F. Siegel. Despite relying on the estimation of only four parameters, it can capture the most common shapes observed in a yield curve in practice [11, p. 475]. Zero-coupon or spot interest rate curve y(t) is equal to:

$$y(t) = \beta_0 + \beta_1 \times \frac{1-exp\left(-\frac{t}{\lambda_1}\right)}{\frac{t}{\lambda_1}} + \beta_2 \times \frac{1-exp\left(-\frac{t}{\lambda_1}\right)}{\frac{t}{\lambda_1}} - \beta_2 \times exp(-\frac{t}{\lambda_1}) \quad (1)$$

where: t – maturity; β_0, β_1, β_2, and λ_1 – parameters of the model.

The parameter β_0 is a constant representing the level of the long-term interest rate. β_1 captures the slope of the curve. If it is positive, the curve slopes downward, whereas if it is negative, it slopes upward. β_2 captures the hump or the trough in the curve. If it is positive, there is a hump, but if it is negative, there is a trough. The higher the absolute value of β_2, the more

pronounced the hump or trough. λ_1 is the shape parameter, determining the steepness of the slope and the location of the hump or trough.

Nelson-Siegel-Svensson model is an extension of Nelson-Siegel model, aiming to increase the flexibility of the curve and improve its fit by adding a fourth component, representing a second hump-shape or U-shape. In this regard, in 1994, the author Svensson proposed the introduction of two additional parameters, β_3 and λ_2:

$$y(t) = \beta_0 + \beta_1 \times \frac{1-exp\left(-\frac{t}{\lambda_1}\right)}{\frac{t}{\lambda_1}} + \beta_2 \times \frac{1-exp\left(-\frac{t}{\lambda_1}\right)}{\frac{t}{\lambda_1}} - \beta_2 \times exp\left(-\frac{t}{\lambda_1}\right) + \beta_3 \times \frac{1-exp\left(-\frac{t}{\lambda_2}\right)}{\frac{t}{\lambda_2}} - \beta_3 \times exp\left(-\frac{t}{\lambda_2}\right) \quad (2)$$

For comparison, the author implemented both parametric models in the GS market of the Republic of Moldova. Considering that the secondary market for GS is not liquid, the yields of GS issued in the primary market were utilized.

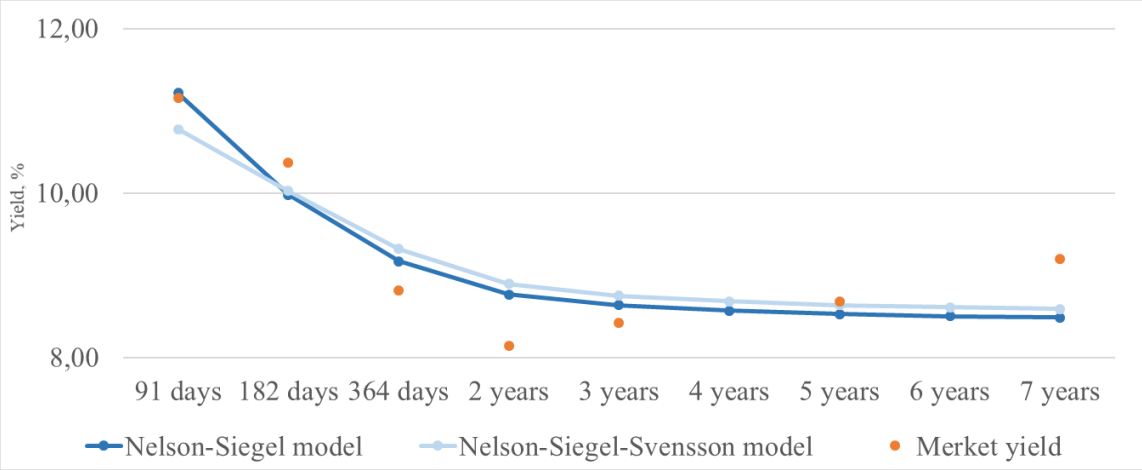


Figure 9. Government securities yield curves in the Republic of Moldova, May 2023
Source: author's elaboration based on [1]

To determine which of these two parametric models best suits the GS market in the Republic of Moldova, the author estimated multiple GS yield curves for different periods. Yields estimated based on the Nelson-Siegel model showed values closer to the market yields for short-term GS, while yields estimated based on the Nelson-Siegel-Svenson model exhibited smaller discrepancies compared to the market yields of long-term GS.

In conclusion, the author asserts that the GS yield curve should be the function that best fits all points in the scatter plot. Therefore, various models are applied in developing the GS yield curve, depending on the financial market's specific characteristics. These models have to be utilized based on market conditions, selecting the most suitable model for a given moment.

Every investor may face the dilemma of choosing between various investment options. For instance, they might find themselves deciding whether to invest in a 2-year bond or to opt for a 1-year bond and, upon its maturity, reinvest in another 1-year bond. This choice may seem challenging because, at present, the investor has information only about the current rates of 1-year and 2-year bonds but does not know what the rate of the 1-year bond will be one year from now. In other words, it is essential to know the forward rate.

A forward interest rate represents the return that is expected to be achieved between two dates in the future. Forward rates are calculated from spot rates using the arbitrage-free condition, which represents that an investment that earns interest of y_1 from t_0 up to time t_1 and is then reinvested at an interest rate of $f_{1,1}$ for the remainder of the period up to time t_2, should have the same value at the end of the investment period t_2 as an investment of the same funds that earns interest of y_2 from t_0 up to time t_2 [19, pp. 13-14]. This concept is illustrated graphically in Figure 10 and presented mathematically in formula 3.

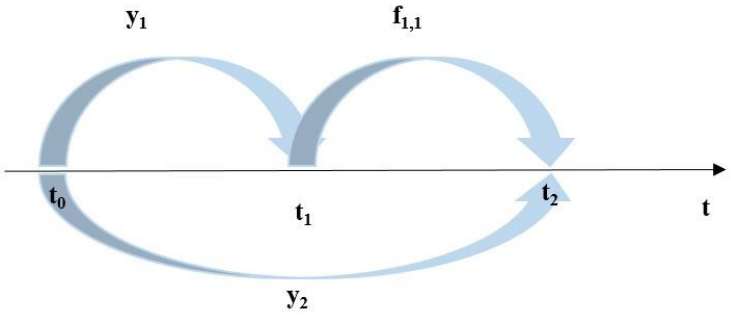


Figure 10. Relationship between spot rate and forward rate

Sursa: elaborată de autor

The forward interest rate $f_{T-i,i}$ in the absence of arbitrage is determined as follows:

$$f_{T-i,i} = \left(\frac{(1+y_T)^T}{(1+y_{T-i})^{T-i}}\right)^{\frac{1}{i}} - 1 \qquad (3)$$

where: i – maturity; T – end of the period; y – spot rate.

Given the importance of knowing forward rates, the author developed the forward curve based on available data from the GS market in the Republic of Moldova, representing yield estimates for the following year. This process involved following steps:

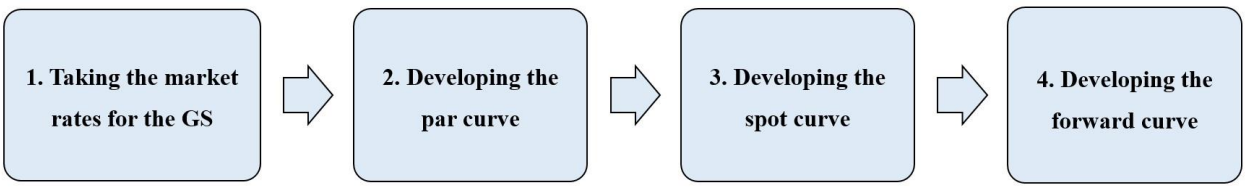
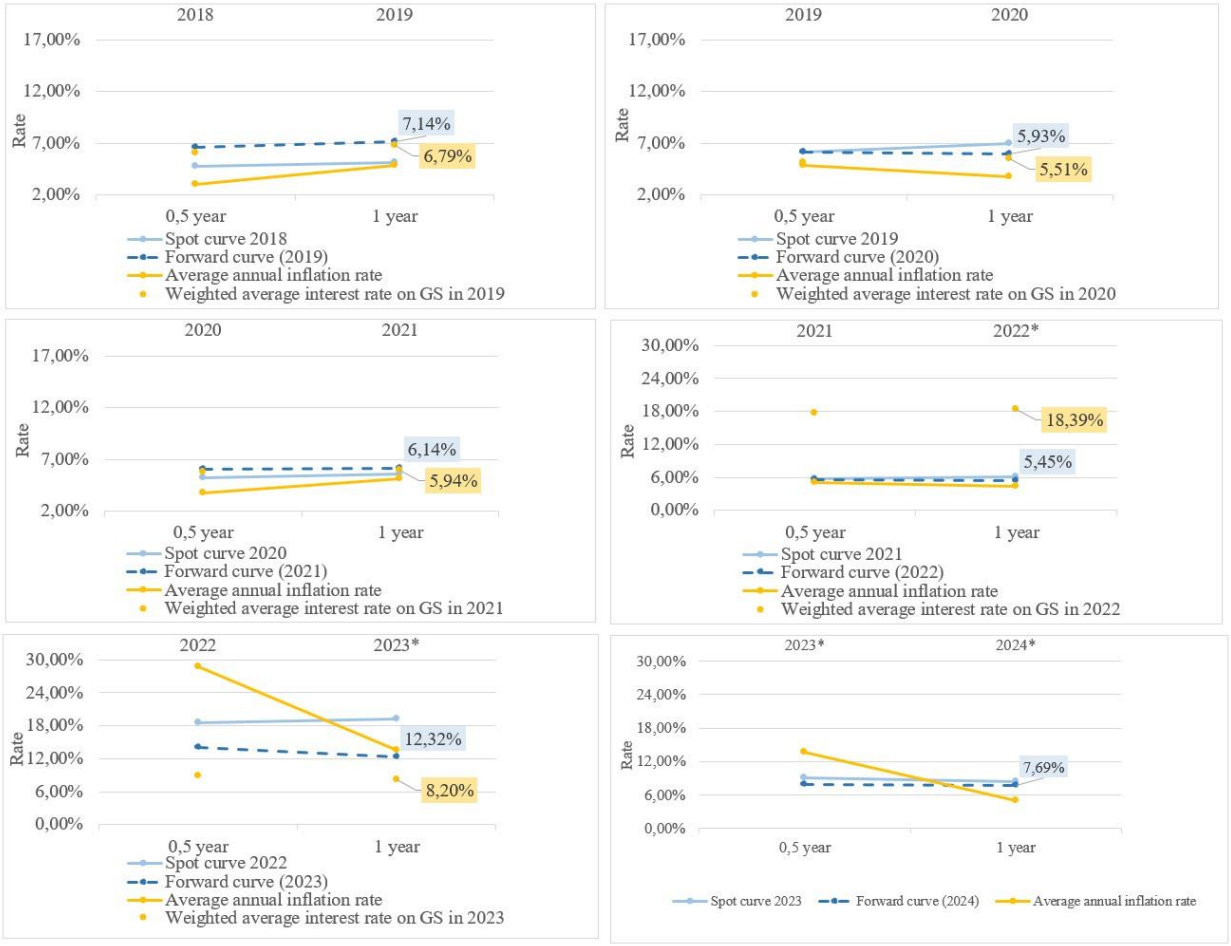


Figure 11. Steps in developing the forward curve

Source: author's elaboration

As a result, the author observed that the relationship between the forward and the spot curves indicates trends of the inflation for the following year (Figure 12).



*-projected average annual inflation rate.

Figure 12. Forward curve *vs.* spot curve, 2019-2024

Source: author's elaboration based on [2, 4, 14]

According to Figure 12, for TB when the forward curve for the following year is below the spot curve of the current year, there is a tendency for a decrease in the average annual inflation rate for the following. Similarly, when the forward curve for the next year is above the spot curve for the current year, there is an indication of an increasing trend in the average annual inflation rate for the following year. It is important to note that, for the year 2022, the forward curve indicated a decreasing trend in the level of the average annual inflation rate, which was initially forecasted [14]. However, the outcome was contrary, as 2022 experienced rampant inflation. This suggests that forecasts based on the relationship between curves may materialize differently than expected in times of crisis.

Considering that the most GS issued in the primary market consists of short-term GS, the forward rate for the TB, with adjustments as necessary, can be used to forecast the interest rate for

GS issued through auctions. As a result, discrepancies between forecasted and actual rates will be minimized, directly impacting the execution of the state budget.

Therefore, in the author's opinion, the relationship between the inflation rate and the GS yield curve can be presented as follows:

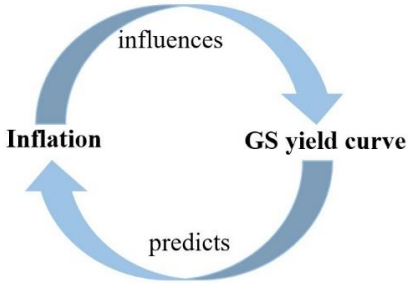


Figure 13. Relationship between inflation and the GS yield curve

Source: author's elaboration

In the Republic of Moldova, the assessment of primary dealers' performance is based on three criteria: (i) activity in the primary market; (ii) activity in the secondary market; and (iii) qualitative criteria. The maximum score that a primary dealer can obtain is 100 points [6].

With the introduction of new obligations for primary dealers, the author have noted an increase in the volume of GS issued in the primary market and those traded in the secondary market. Considering the impact of the assessment methodology on primary dealers' activities in the GS market, the author recommends adjusting it according to the specific market conditions.

To familiarize investors with the process of issuing GS through the auctions, it is schematically represented as follows:

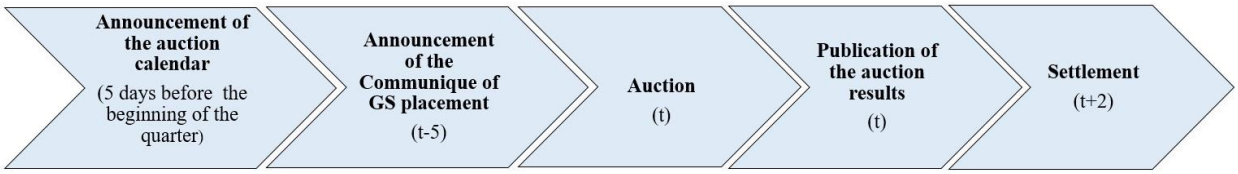


Figure 14. Process of issuing GS through auctions

Source: author's elaboration based on [6]

The institutions involved in this process, excluding primary dealers, are: (i) MF; (ii) NBM; and (iii) Central Securities Depository.

Typically, the auction for issuing GS in the primary market unfolds in two sessions: (i) the competitive session – where participants specify the price/spread for the amount they want to adjudicate; (ii) the non-competitive session – where participants only indicate the amount they want to adjudicate. This is awarded at the weighted average price of GS from the competitive session.

Therefore, clients of primary dealers, whether individuals or legal entities, have to follow the steps below when buying GS issued through the auction:

Step 1: (i) contracting with the primary dealer; (ii) opening a bank account.

Step 2: (i) monitoring announcements regarding the placement of GS; (ii) placing an order to buy GS.

Step 3: (i) tracking the results of GS auctions; (ii) receiving notifications about the execution/non-execution of the buying order of the GS.

Also, if the investors participate in the competitive session of the GS auction, they need to specify the quantity and price of the GS in the purchase order. To facilitate the calculations, the author suggests using in Excel a calculator to determine the nominal interest rate/price of the TB:

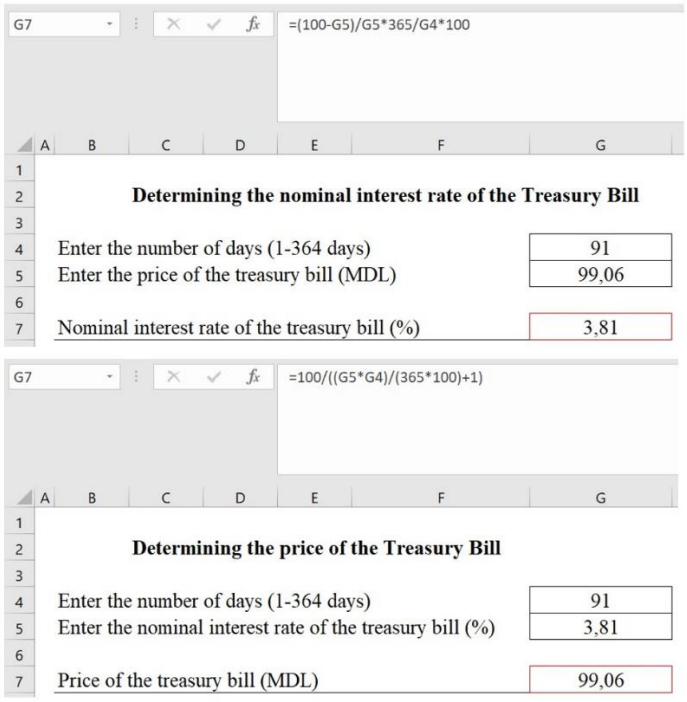


Figure 15. Calculator for determining nominal interest rate/price of the treasury bill
Source: author's elaboration

Unlike the primary market of GS, investors can buy or sell GS in the secondary market without participating in the GS auctions. The operating hours of the OTC market are between 9:00 AM and 5:00 PM on weekdays from Monday to Friday, excluding non-working holidays [7]. To buy/sell GS in the over-the-counter market, investors are required to follow these steps:

Step 1: (i) contracting with the primary dealer; (ii) opening a bank account.

Step 2: (i) placing an order to buy/sell GS; (ii) receiving notifications about the execution/non-execution of the order for buying/selling GS.

If the client and the primary dealer have already signed a contract for GS-related services, Step 1 for buying GS in the primary market and OTC market is skipped.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

Based on the research of theoretical and practical aspects regarding the GS, as well as the achievement of the established objectives in this work, the following *conclusions* are formulated:

1. One of the main segments of the financial market is the fixed-income market, including the GS market. Based on the research, the author concludes that for the efficient operation of the GS market participants must fulfil their well-defined obligations. Considering the growing need to protect the environment and address various societal discriminations, the author has expanded the typology of GS with new types of financial instruments – green bonds, social bonds, sustainable bonds, etc.

2. The risks associated with GS impact both the issuer and the investor. Despite their opposite objectives – issuers aim to lower GS's debt service by reducing interest rates, while investors seek higher rates to maximize profits – they have common risks, one of which is interest rate risk. To manage it, the author considers opportune to measure risk indicators such as duration, modified duration, and convexity.

3. According to the results of the assessment the GS market in the Republic of Moldova, the author mentions that the maturity of the GS portfolio issued in the primary market is relatively short, implying an intensification of refinancing risk. Additionally, based on a comparative analysis of the GS market in the Republic of Moldova with other countries, it was noted that the level of national economic indebtedness is relatively low and is not expected to deviate significantly in 2027 compared to the level of 2022. These estimates were made by the author using a dynamic debt forecasting model and the Monte Carlo method.

4. Although developing a yield curve for GS in a market with low liquidity is challenging, several models have been proposed, such as the regression model and parametric models like Nelson-Siegel and Nelson-Siegel-Svensson. Applying these models to the GS market in the Republic of Moldova, was found that using the Nelson-Siegel model resulted in smaller discrepancies between estimated rates and market rates for short-term GS, whereas using the Nelson-Siegel-Svensson model led to smaller discrepancies for long-term GS. Additionally, the author elaborated for the first time in the Moldovan GS market a forward curve, representing interest rate estimates for GS over a certain period. Using the forward curve methodology, a relationship between the forward curve and the spot curve was identified. If the forward curve for the next year is positioned higher than the spot curve for GS with a maturity up to one year, it

indicates an increase of inflation and vice versa. The author also noted that the discrepancies between forward rates for TB and market rates are minor.

5. The advantages of the primary dealer system outweigh its disadvantages, contributing to the development of the GS market. Analysing international practices regarding the activity of primary dealers, the author has noticed that primary dealers' obligations and evaluation criteria are established based on the issuer's goals for development the GS market. As a result, the author significantly contributed to the implementation of a new methodology for evaluating the performance of primary dealers, relying on three criteria: (i) activity in the primary market; (ii) activity in the secondary market; and (iii) qualitative criteria.

6. The macroeconomic factors significantly influence the sustainability of the GS market. Low economic growth can contribute to an increase in the budget deficit. In this context, the author observed that when the budget balance decreases, the net issuance of GS issued in the primary market increases. Similarly, in the opposite situation, when the state budget balance increases, the net issuance of GS issued in the primary market decreases. Additionally, analyzing the results of GS auctions, the author identified that the inflation rate influences the demand for long-term GS.

The current situation of the GS market in the Republic of Moldova and international experiences regarding the development of the GS market have led to the formulation of the following *recommendations:*

1. Terminology clarification in research. As a result of the financial market's evolution, the methods for evaluating the debt instruments have been modified, by introducing various reporting approaches. In this context, new concepts such as "nominal value" and "face value" have been introduced. The term "nominal value" is translated from English as "valoarea nominală". Therefore, the author suggests using the term "nominal value" at the evaluation of the GS stock as "valoarea acumulată" to avoid any ambiguity.

2. Monitoring risk indicators. The author suggests that investors can use in Excel a proposed calculator, to determine the nominal interest rate of TB based on the price and vice versa in order to facilitate the calculations. Additionally, the author recommends that the MoF publishes information regarding the sustainability of the GS market. Through these publications, investors will be directly informed about the evolution of the GS market, which will impact investment decisions and attract new investors.

3. Reducing refinancing risk of GS issued in the primary market and increasing secondary market liquidity. It is recommended that the MoF to revise the GS issuance strategy. This revision should focus on increasing the volume of GS with long-term maturity, aiming to improve the refinancing risk evaluation indicator— stock of GS issued in the primary market maturing within

one year. Regarding enhancing the liquidity of the secondary market for GS, the proposal also includes the introduction by the MoF of benchmark issuances for GS, which will contribute to reducing market fragmentation. Additionally, to decrease the GS issuance lines, the recommendations are as follows: (i) continuing GS reopening, (ii) introducing buyback, and (iii) switch operations.

4. Selecting the most appropriate parametric model. The author recommends considering the discrepancies between estimated and market yields of GS at the elaboration of the GS yield curve. The suggestion is to choose one of the models—Nelson-Siegel or Nelson-Siegel-Svensson. The author also recommends estimating the interest rate for GS issued in the auctions based on the forward rate for TB, which is determined using the forward curve methodology. This approach would optimize the planning in the state budget of the net issuance volume of GS issued in the primary market and the debt service for GS.

5. Adjusting the methodology for evaluating the performance of primary dealers. To enhance liquidity in the secondary market, the author suggests the necessity of revising the methodology for evaluation of the activity of the primary dealers, including indicators for evaluation of the secondary market activity, as follows: (i) adjusting the scoring of existing evaluation indicators to stimulate the transactions with long-term GS – the total share of the transactions with long-term GS (20 points), the total share of transactions with short-term GS (10 points), and (ii) introducing new indicators – the number of transactions with GS (5 points) and the average volume of the transactions with GS (5 points).

6. Improving the country's credit rating. Given the inverse relationship between the country's credit rating and the GS interest rate and acknowledging that a single institution cannot influence the rating, the author recommends active collaboration and involvement of institutions responsible for developing policies for the economic growth of the country and the improvement of well-being. Improving the country's credit rating will reduce GS service costs, making the GS market more attractive to investors. Therefore, to familiarize investors with the investment process in GS, the author proposes an algorithm for investing in GS through auctions and trading them on the OTC market.

In conclusion, the most essential step in developing the GS market in the Republic of Moldova is to improve the country's credit rating, followed by other aspects that reduce GS debt service costs and increase investor attractiveness.

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7. **SPEIAN, O.** Noi criterii în tipologia valorilor mobiliare. În: *Simpozionul Internațional Experiență. Cunoaștere. Provocări contemporane „Înapoi în viitor. Provocări și perspective socio-economice",* 27-28 mai 2021, România. București: ARTIFEX, 2021, pp. 615-625, 0,5 c.a. ISBN 978-6-068-71659-6.
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10. GUTIUM, T., **SPEIAN, O.** Impactul inflației asupra activității financiare: experiența întreprinderilor mici și mijlocii. In: *Conferința Internațională „Dezvoltarea economico-socială durabilă a Euroregiunilor și a zonelor transfrontaliere”*, 28 octombrie 2022, România. Iași: Performantica, 2022, vol. XLII, pp. 229-236, 0,6 c.a. ISSN 2971- 8740.

International scientific conferences (Republica Moldova)

11. **SPEIAN, O.** Aspecte definitorii ale pieței valorilor mobiliare de stat în Republica Moldova. În: *Conferinţa Ştiinţifică Internaţională „Paradigme moderne în dezvoltarea economiei naţionale şi mondiale”*, 30-31 octombrie 2020, Republica Moldova. Chișinău: Centrul Editorial-Poligrafic al USM, 2020, pp. 353-358, 0,5 c.a. ISBN 978-9-975-15269-3.
12. **SPEIAN, O.** The profitability of the government securities: interest rate *vs.* yield. In: *International Scientific Conference „Development Through Research and Innovation – 2022”*, August 26, 2022, Republic of Moldova. Chişinău: ASEM, 2022, pp. 159-167, 0,4 a.s. ISBN 978-9-975-35905-4.

National scientific conference

13. **SPEIAN, O.** Rolul și funcțiile infrastructurii pieței valorilor mobiliare de stat: cazul Republicii Moldova. În: *Conferința Științifică Națională „Metodologii contemporane de cercetare şi evaluare”*, 22-23 aprilie 2021, Republica Moldova. Chişinău: Centrul Editorial-Poligrafic al USM, 2022, pp. 163-169, 0,4 c.a. ISBN 978-9-975-15917-3,
14. **SPEIAN, O.** Evaluarea sustenabilității pieței valorilor mobiliare de stat în Republica Moldova. În: *Conferința Științifică Națională „Științele economice contemporane: procese și contribuții”*, 14-15 septembrie 2023, Republica Moldova. 0,2 c.a.

ADNOTARE

Olesea FRIȘCU: „Dezvoltarea pieței valorilor mobiliare de stat în Republica Moldova”, teză de doctor în științe economice, Universitatea de Stat din Moldova, specialitatea: 522.01. Finanțe, Chișinău, 2024

Structura tezei: introducere, trei capitole, concluzii generale și recomandări, bibliografie din 173 de titluri, 11 anexe, 129 de pagini text de bază, 27 de tabele, 57 de figuri și 33 de formule. Rezultatele obținute sunt publicate în 14 lucrări științifice.

Cuvinte-cheie: valoare mobiliară de stat, piață financiară, piață primară, piață secundară, datorie a sectorului public, indicator de risc, sustenabilitate, curba randamentelor, dealer primar.

Scopul lucrării: determinarea constrângerilor de dezvoltare a pieței valorilor mobiliare de stat (VMS) în Republica Moldova și identificarea măsurilor de remediere a acestora în vederea optimizării surselor de finanțare a cheltuielilor bugetare și creșterii atractivității pieței VMS.

Obiectivele cercetării: (i) sistematizarea aspectelor teoretico-conceptuale ale pieței financiare și identificarea celor mai recente instrumente financiare utilizate la acumularea de capital; (ii) identificarea riscurilor asociate VMS și analiza indicatorilor de risc; (iii) evaluarea sustenabilității pieței VMS în Republica Moldova și analiza comparativă a acesteia în raport cu cea din alte țări; (iv) delimitarea modelelor parametrice și de regresie în vederea elaborării curbei randamentelor VMS și aplicarea acestora pe piața din Republica Moldova; (v) determinarea impactului activității dealerilor primari asupra dezvoltării pieței VMS în Republica Moldova; (vi) elaborarea recomandărilor de atenuare a obstacolelor de dezvoltare a pieței VMS în Republica Moldova în vederea optimizării planificării bugetare și creșterea atractivității pieței VMS.

Noutatea și originalitatea științifică: (i) dezvoltarea și aprofundarea abordărilor teoretice cu privire la valorile mobiliare și tipologia acestora; (ii) delimitarea riscurilor asociate VMS și perfecționarea sistemului de indicatori cu privire la evaluarea pieței primare și secundare a VMS, precum și la evaluarea rentabilității instrumentelor de datorie; (iii) validarea și aplicarea modelului dinamic de prognozare a datoriei în vederea evaluării gradului de îndatorare a țării; (iv) determinarea relației inverse între soldul bugetului de stat și emisiunea netă a VMS emise pe piața primară; (v) efectuarea studiului comparativ al pieței VMS din Republica Moldova în raport cu cea din alte țări; (vi) ajustarea metodologiei de evaluare a performanței dealerilor primari în vederea optimizării dezvoltării pieței VMS; (vii) stabilirea relației de interdependență între curba forward și curba spot în baza metodei de elaborare a curbei forward; (viii) identificarea discrepanțelor minore între rata forward pentru bonurile de trezorerie (BT) și rata de piață; (ix) elaborarea recomandărilor cu privire la dezvoltarea pieței VMS în Republica Moldova bazate pe practicile avansate în domeniul respectiv.

Problema științifică importantă soluționată: optimizarea planificării în bugetul de stat a cheltuielilor pentru serviciul VMS în baza metodei de elaborare a curbei forward, datorită discrepanțelor minore înregistrate între rata forward estimată la BT și rata de piață.

Semnificația teoretică: definirea exhaustivă a conceptului de valoare mobiliară și elaborarea unei tipologii complexe a VMS, precum și identificarea riscurilor asociate VMS, fiind precizate unele noțiuni ale indicatorilor de risc.

Valoarea aplicativă a lucrării: (i) optimizarea pieței VMS din Republica Moldova prin ajustarea cadrului legal; (ii) determinarea criteriilor de evaluare a performanței dealerilor primari; (iii) participarea la elaborarea curbei randamentelor VMS în Republica Moldova; (iv) prezentarea de propuneri cu privire la automatizarea procesului de generare a opțiunilor de alocare a VMS în cadrul licitațiilor; (v) recomandări acceptate în Planul de acțiuni privind dezvoltarea pieței VMS în Republica Moldova.

Implementarea rezultatelor științifice: cele mai importante rezultate ale cercetării au fost apreciate și implementate de către Ministerul Finanțelor al Republicii Moldova și Universitatea de Stat din Moldova, fiind confirmate prin certificate de implementare.

ANNOTATION

Olesea FRIȘCU: „Development of the government securities market in the Republic of Moldova", PhD thesis in economics, Moldova State University, speciality: 522.01. Finance, Chișinau, 2024

Thesis structure: introduction, three chapters, general conclusions and recommendations, bibliography consisting of 173 titles, 11 annexes, 129 basic text pages, 27 tables, 57 figures, and 33 formulas. The research results are published in 14 scientific papers.

Keywords: government security, financial market, primary market, secondary market, public sector debt, risk indicator, sustainability, yield curve, primary dealer.

The purpose of the research: identification the constraints on developing the government securities (GS) market in the Republic of Moldova and determination the measures to remedy them, aiming to optimise funding sources for budgetary expenditures and enhance the attractiveness of the GS market.

The objectives of the research: (i) analysis of the theoretical aspects of the financial market and identification the most recent financial instruments issued in the market; (ii) identification of the risks associated with GS and analysis of risk indicators; (iii) sustainability assessment of the GS market in the Republic of Moldova and comparative analysis in relation to other countries; (iv) determination of the parametric and regression models for the development of the GS yield curve and their application in the market of the Republic of Moldova; (v) determination of the impact of primary dealers' activities on the development of the GS market in the Republic of Moldova; (vi) formulation of the recommendations for the development of the GS market in the Republic of Moldova to optimize budgetary planning and enhance the attractiveness of the GS market.

Scientific novelty and originality: (i) researching theoretical approaches regarding securities and their typology; (ii) identifying risks associated with GS and risk analysis; (iii) validating and applying the debt dynamic model for assessing the country's level of indebtedness; (iv) determining the inverse relationship between the state budget balance and the net issuance of the GS issued in the primary market; (v) comparative analysis of the GS market in the Republic of Moldova in relation to other countries; (vi) adjusting the methodology for evaluating the performance of the primary dealers to optimize the development of the GS market; (vii) establishing the interdependence relationship between the forward curve and the spot curve based on the forward curve development method; (viii) identifying minor discrepancies between the forward rate for treasury bills (TB) and the market rate; (ix) formulating the recommendations for developing the GS market in the Republic of Moldova based on advanced practices.

The important scientific problem solution: optimizing the state budget's expenditure planning for GS debt service based on the forward curve development method due to minor discrepancies between the estimated forward rate for TB and the market rate.

The theoretical significance of the paper: the comprehensive definition of the concept of securities, the development of a complex typology of GS, the identification of risks associated with GS, and specification the concepts related to risk indicators.

The applicative value of the paper: (i) optimising the GS market in the Republic of Moldova through legal framework adjustment; (ii) establishing criteria for evaluating the primary dealers' activity; (iii) participation at the elaboration of the GS yield curve in the Republic of Moldova; (iv) presenting proposals for automating the process of generating allocation options of GS within auctions; (v) recommendations accepted at the elaboration of the Action Plan for developing the GS market in the Republic of Moldova.

Implementation of the scientific results: the most significant research findings were appreciated and accepted by the Ministry of Finance of the Republic of Moldova and the Moldova State University, as confirmed by implementation certificates.

АННОТАЦИЯ

Олеся ФРИШКУ: „Развитие рынка государственных ценных бумаг в Республике Молдова”, докторская диссертация по экономике, Государственный университет Молдовы, специальность: 522.01. Финансы, Кишинев, 2024

Структура диссертации: введение, три главы, общие выводы и рекомендации, библиография из 173 наименований, 11 приложений, 129 страниц основного текста, 27 таблиц, 57 рисунков и 33 формул. Результаты исследования опубликованы в 14 научных работах.

Ключевые слова: государственные ценные бумаги, финансовый рынок, первичный рынок, вторичный рынок, долг публичного сектора, показатель риска, устойчивость, кривая доходности, первичный дилер.

Цель исследования: определение ограничений развития рынка государственных ценных бумаг (ГЦБ) в Республике Молдова и выявление мер по их устранению с целью оптимизации источников финансирования бюджетных расходов и повышения привлекательности рынка ГЦБ.

Задачи исследования: (i) систематизация концепций финансового рынка и идентификация новых финансовых инструментов; (ii) выявление рисков, связанных с ГЦБ, и анализ индикаторов риска; (iii) оценка устойчивости рынка ГЦБ в Республике Молдова и сравнительный анализ по отношению к рынкам других стран; (iv) определение моделей для разработки кривой доходности ГЦБ; (v) оценка влияния деятельности первичных дилеров на развитие рынка ГЦБ в Республике Молдова; (vi) формулирование рекомендаций по развитию рынка ГЦБ в Республике Молдова с целью оптимизации бюджетного планирования и повышения привлекательности этого рынка.

Научная новизна и оригинальность: (i) развитие теоретических аспектов ценных бумаг и их типологии; (ii) выявление рисков связанных с ГЦБ и их оценка; (iii) применение динамической модели для прогнозирования долга; (iv) определение обратной связи между остатком государственного бюджета и чистым выпуском ГЦБ на первичном рынке; (v) сравнительный анализ рынка ГЦБ в Республике Молдова по отношению к рынкам других стран; (vi) внесение изменений в методологии оценки эффективности первичных дилеров; (vii) установление взаимосвязи между *forward curve* и *spot curve* на основе метода разработки *forward curve*; (viii) выявление незначительных расхождений между forward-ставкой для казначейских обязательств (КО) и рыночной ставкой; (ix) разработка рекомендаций по развитию рынка ГЦБ в Республике Молдова.

Решение важной научной проблемы: оптимизация планирования в государственном бюджете расходов на обслуживание ГЦБ на основе метода построения *forward curve* исходя из небольших расхождений между оцененной forward-ставкой для КО и рыночной ставкой.

Теоретическая значимость работы: (i) определение концепции ценной бумаги и разработка комплексной типологии ГЦБ а также выявление рисков связанных с ГЦБ, с уточнением некоторых понятий индикаторов риска.

Прикладная ценность диссертации: (i) оптимизация рынка ГЦБ в Республике Молдова путем внесения изменений в законодательстве; (ii) определение критериев оценки эффективности первичных дилеров; (iii) участие в построении кривой доходности ГЦБ; (iv) представление предложений по автоматизации процесса для разработки вариантов размещения ГЦБ на аукционах; (v) рекомендации, принятые в разработке Плана действий по развитию рынка ГЦБ в Республике Молдова.

Реализация научных результатов: основные результаты исследования были оценены и приняты Министерством Финансов Республики Молдова и Государственным Университетом Молдовы, что подтверждено удостоверениями о реализации.

FRIȘCU OLESEA

DEVELOPMENT OF THE GOVERNMENT SECURITIES MARKET IN THE REPUBLIC OF MOLDOVA

522.01. FINANCE

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