Vladislav Lyubomirov Lyubenov

CURRENT PROBLEMS IN VALUING EQUITY SHARE INSTRUMENTS

ABSTRACT

OF A DISSERTATION FOR THE AWARD OF AN EDUCATIONAL AND SCIENTIFIC DEGREE "DOCTOR" DOCTORAL PROGRAM"FINANCE,MONEY CIRCULATION,CREDIT AND INSURANCE(FINANCE)"

> Scientific advisor: Prof. Stefan Marinov Simeonov, PhD

> > Svishtov 2025

The dissertation work was discussed and directed for defense in accordance with the Law on the Development of the Academic Staff of the Department of Finance and Credit of the Dimitar A. Tsenov Academy of Economics - Svishtov at a meeting held on 04.03.2025.

The dissertation has a total volume of 255 pages and contains: introduction -8 pages, main text, placed in three chapters -226 pages, conclusion -8 pages, list of cited and used literary sources -1036 and declaration of originality. The dissertation is illustrated with 11 figures and 13 tables.

The open meeting of the scientific jury for the defense of the dissertation will take place on 06.06.2025 at 11:00 at in the Rectorate Conference Hall of D. A. Tsenov Academy of Economics – Svishtov.

All materials related to the defence shall be available at the Department of Doctoral Studies and Academic Staff Development.

ABSTRACT CONTENTS

I. General characteristics of the dissertation work	.4
1. Relevance of the topic	.4
2. Object and subject of the study	.7
3. Research thesis	. 8
4. Purpose of the dissertation	.9
5. Research objectives and methodology	. 9
6. Scope of the study	10
7. Applicability of the research results	10
II. Structure and content of the dissertation	11
III. Main content of the dissertation	13
Introduction	13
CHAPTER ONE. THEORETICAL BASIS, RESEARCH AND CONCEPTS FOR STOCK VALUATION	13
CHAPTER TWO. METHODOLOGY OF EMPIRICAL RESEARCH OF FINANCIAL MARKETS	17
CHAPTER THREE. EMPIRICAL STUDY OF THE IMPACT OF THE RETURN FROM FINANCIAL INSTRUMENTS ON ECONOMIC INDICATORS	20
Conclusion	33
IV. Directions for future research on the topic of the dissertation	35
V. Reference to the scientific contributions in the dissertation work	36
VI. Publications on the topic of the dissertation	38
VII. List of participations in national and international scientific conferences and forums	39
VIII. Certificate of compliance with the national requirements under the Regulations for the Implementation of the Act on the Development of the Academic Staff in the Republic of Bulgaria	40
Declaration of originality of the dissertation work	41

I. General characteristics of the dissertation work

1. Relevance of the topic

In this dissertation we examine the contemporary issues of the analysis of investment instruments in the form of stock shares and shares of exchange-traded funds. As a result of current events and the development of scientific literature, we turn to the relationship between capital return on investments and macroeconomic indicators. Through the conducted dissertation research, contributions have been made to the existing knowledge on the topic by compiling a model for forecasting inflation, which includes the stochastic discount factor of capital return as the main forecasting variable. The author's research has been continued by analyzing the relationship between the structure of consumption and the return on capital investments at the macroeconomic level.

The current influence of the topic stems from the imperfection in scientific knowledge regarding systematic risk in investments, which in turn is related to the expected return on capital investment instruments. In the years before writing the dissertation, we have noticed an increasing correlation between the individual segments of the capital market, which practically means that diversification and stock selection have a decreasing importance for the management of investment portfolios. Therefore, we observe an increasing systemic influence in the global capital market, which is the reason for compiling new quantitative studies aimed at modeling the influence of exogenous macroeconomic factors on investment and capital returns.

The existing scientific literature reaches theoretical conclusions about the relationship between the return on investments in equity instruments and economic indicators such as inflation. Such a direction could be considered at both the macro and micro levels. To build our models, we choose to examine data on the index return of capital assets in the form of returns on exchange-traded

funds. The results of the data reaffirm the established old hypotheses about the existence of a quantitatively measurable relationship between the economy and the stock market value of stocks. However, in our opinion, there is a still lack of knowledge in this area. One example of this is the lack of clear principled reasoning for the movement of global equity indices during the peak of the COVID pandemic. During this period, we observed a seemingly crisis decline in the price of equity instruments within about a month of the beginning of the pandemic, after which the market recovered its levels and began to grow rapidly. At the same time, after the pandemic passed, we observe a decrease in the overall levels of capitalization income. The main reason for this is the results of the macroprudential and monetary policies of various governments and central banks. The data we observe lead to the conclusion that there is a mismatch between the timing of the structural crisis in capital markets and the subsequent shocks to inflation and consumption. In order to model these timing mismatches, we turn to time series analysis methodology as well as to the author's models from previous research.

We are further motivated by the fact that the need for new mathematical models in the field of crisis management is growing. The evolution of the fight against financial crises requires a gradual change in the understanding of the economy, which also gives rise to changes in financial economics and statistics. Government structures are becoming increasingly readywith time for financial crises. In this dissertation we work in specific aspects for a better understanding of the financial dependencies that accompany economic shocks. Specifically, we are talking about the dependency between the capital market, inflation and consumption. The subtopics considered in the dissertation are relevant despite the previous work already done by scientists due to the changing economic situation and the lack of clarity in the understanding of the field at the moment.

We seek empirical solutions to fundamental questions that affect the entire economy through the profitability of the capital market. In order to achieve the set goals of the study, we step on a large literary basis by tracing the development of valuation, statistical and intuitive methods for studying and interpreting the market and intrinsic value of equity instruments. After achieving an established basis, we turn our attention to a narrower range of current problems, through the study of which we create added value in the dissertation. Similar to previous dissertation works, we work within the framework of three chapters, representing a theoretical and general part, a methodological part and an empirical study.

The data in the dissertation study are extensive, with a time range reaching back to 1985. Unlike previous studies, we examined the dependencies of the working hypotheses at both monthly and quarterly time intervals. As a result, we reached new conclusions about the short-term time relationships between equity exchange-traded instruments and inflation and consumption.

An empirical test was conducted of an inflation forecasting model developed by the author using the stochastic discount factor from the capital market. After a detailed review of the data, we came to the conclusion that there is a leading trend in the capital market compared to the inflation time series. This means that the capitalization income of equity instruments serves to derive a forecast for future inflation. We argue the statements made in the dissertation empirically and also theoretically, providing additional explanations and theorizing the model we have compiled further in the study. The main contribution of this part of the work is the modeling of the relationship between capitalization income and inflation. Despite the already available literature on this problem, previous studies do not comment on the inflation-capital dependence as a forecasting model, but rather examine the inflation premium. Compared to most of the studies, our study produces results with a very high degree of statistical probability, which is also a conclusion from the different database implemented in our models. The conclusions lead to opportunities for continuing the topic with other developments that expand the formula apparatus of the model proposed by the author, as well as for compiling practical and applied empirical research.

6

In the second half of the empirical part of the dissertation, we present a study of the wealth effect, which is an empirical relationship between the return on equity instruments and consumption as a macroeconomic variable. Again, we derive statistically significant results through the application of G eneralized Method of Moments model on a selected database. The findings from both parts of the empirical dissertation research can be combined, because consumer spending also reflects inflation. At the same time, the movement of the capital market expresses a relationship with both quantities, but the relationship between the capital market and inflation, and the capital market and consumption is different from an empirical and semantic point of view. We find that capitalization income from the equity market has a factorial impact on the household budget compared to a linear relationship, which we observe through GMM regression. Comparably, the relationship between inflation and the capital market is a linearlag relationship, i.e. shocks to inflation from the capital market occur within a wider time interval, while shocks from the capital market to consumer spending are timely.

In fact, the conclusions of the two studies presented in the dissertation are semantically related. Inflation is a consequence of consumption and at the same time inflation and consumption are influenced by the capital market. We investigate the question of the extent and meaning of this influence. Many previous authors have commented on the topics in various forms. The semantic continuation of the scientific contributions to the literature leads to the present empirical modeling, carried out in the third chapter of the dissertation.

2. Object and subject of the study

The **object** of the research in the dissertation are the stocks and shares of exchange-traded funds, as well as the closely related indicators from the real economy, specifically inflation and household consumption.

The **subject** of the interrelationships between the capitalization return on investments in equity instruments and inflationary processes on one hand, as well as the dependence on household spending.

3. Research thesis

The main **research thesis** upon which the dissertation is based is the existence of a stable relationship between the capital income from stocks and inflationary processes. This interdependence can be used to improve short-term inflation forecasts, with the relationship partially realized through the wealth effect on consumer behavior. The thesis of the dissertation is a natural continuation of previous research in the field of stock valuation and investment. Some past studies have explored the relationship between market prices of stocks and the development of economic indicators like GDP. What we find different is that the capital market can be viewed not only as a reflection of real economic processes, but also as a factor influencing certain financial and economic phenomena.

Based on the current knowledge in the field, we develop the following working hypotheses, from which the main tasks of the study arise:

1. The separate valuation and forecasting models for stock prices, systematic risk and the macroeconomic impact on the capital market has different effectiveness and semantic interpretation according to the factor quantities used.

2. The time horizon has a significant impact on the accuracy of market forecasts.

3. Capitalization yield on stocks has predictive potential and can be used as a predictor of inflation.

8

4. There is a relationship between changes in consumer behavior, inflation dynamics and the market price of shares and, accordingly, the value of broad stock market indices.

4. Purpose of the dissertation

The **purpose** of the dissertation is to expand knowledge in the field of equity instrument valuation through innovations in understanding the relationship and reflection of stock valuation on the real economy.

5. Research objectives and methodology

To achieve the main goal and in accordance with the defined working hypotheses, we set ourselves the following more specific tasks:

- To develop a model to enrich the toolkit for analyzing the relationship between inflation and financial markets by integrating the stochastic discount factor as a fundamental component in asset valuation theory, allowing for a more precise determination of the fair value of equity instruments;
- To explore possibilities for more accurate forecasting of inflation, which is of key importance in assessing future cash flows and determining the real profitability of financial instruments, especially in conditions of variable inflation;
- To reveal statistically significant relationships between financial markets, macroeconomic indicators, consumer behavior and the effect of welfare on aggregate demand, which would help to better understand the mechanisms for the formation of risk premiums and the valuation of equity instruments;

The methodology used in the dissertation belongs to the basic descriptive statistics, regression analysis and time series analysis. Basic statistical indicators such as standard deviation, arithmetic mean, variance, correlation, etc. are applied. In the third chapter, regression models with the calculation of coefficients using the Generalized Method of Moments are used and time series models for forecasting inflation using financial market data are also applied. The theory regarding the methodology used in the dissertation is described in the second chapter.

6. Scope of the study

The **scope** of the dissertation work includes the study of the practice and theory regarding the valuation of stocks, joint-stock companies and units of exchange-traded funds, the description and application of statistical methods for conducting empirical financial research, specific models for the financial market, inflation, the welfare effect, etc.

Out of the **scope** of the dissertation are a large number of financial and equity instruments such as preferred shares, shares of narrow equity indices, a large number of specific exchange-traded funds, shares of actively managed investment funds, etc. The reason for this is the precise direction of the dissertation work, through which it is aimed to achieve greater depth in the research

7. Applicability of the research results

The dissertation contributes to the theoretical and practical development of the understanding of the financial evaluation process in the context of the economy and stock markets. It outlines and synthesizes investment practices through the evaluation of stocks and portfolio construction. Various practical approaches are discussed in relation to the current perspective. Scientific-practical empirical methods and models for conducting various types of financial research are presented. The conclusions from the dissertation work demonstrate the connection between the real economy and the stock market, with these findings being applicable in different areas. The conclusions serve to advance general knowledge in the field. From a more practical standpoint, the findings of this dissertation can be used for analyses in various sectors such as the investment sector, government macroeconomic and monetary analyses, and other types of analyses and publications.

II. Structure and content of the dissertation

The dissertation has a total volume of 255 pages, structured in three chapters as follows:

Introduction

CHAPTER ONE. THEORETICAL BASIS, RESEARCH AND CONCEPTS FOR STOCK VALUATION Error! Bookmark not defined.

1. Scope and logic of stock valuation

- 1.1 Nature of shares and their place in the general framework of the financial market
- 1.2 The time value of money as the basis of discount models
- 1.3 Discount models for valuing stocks through dividends
- 1.4 Valuing stocks by discounting the free cash flow of the stock
- 1.5 Fundamental valuation within a diversified portfolio and the long-term view of the market

1.6 Discounting the amount of expected profit for future periods (Residual Income Model) – the empirical approach to discount models

2. Stock valuation ratios

- 2.1 Valuing stocks using P/E and similar ratios
- 2.2 Other stock valuation ratios
- 2.3 Financial analysis in the context of stock valuation

3. Concepts for measuring the risk of owning shares

- 3.1 Market risk in stock valuation
- 3.2 Linear models for assessing comparative risk
- 3.3 Application of VaR methods in stock valuation
- 4. A look at technical analysis from the perspective of stock valuation
- 5. Application of ARIMA, GARCH and VAR in stock valuation

CHAPTER TWO. METHODOLOGY OF EMPIRICAL RESEARCH OF FINANCIAL MARKETS

1. Statistical modeling of financial data

- 1.1 Linear Regression
- 1.2 Hypothesis testing for parametric models
- 1.3 Multivariate Linear Regression

2. Time series in financial markets

- 2.1 AR and MA time series modeling
- 2.2 ARMA, ARIMA and GARCH time series modeling

2.3 VAR

2.4 Time series model tests and selection

3. Financial models for risk and return on investment instruments

3.1 Methods for calculating returns

3.2 VaR

3.3 Portfolio theory

3.4 Defining the discounting process and market expectations

3.5. Frequency analysis of variability and trend

CHAPTER THREE. EMPIRICAL STUDY OF THE IMPACT OF THE RETURN FROM FINANCIAL INSTRUMENTS ON ECONOMIC INDICATORS

1. Stochastic discount factor and inflation - an overview of dependencies and forecasts

1.1 The Phillips Curve and Other Previous Theoretical Models of the Inflation Dependence on the Real Economy

1.2 The ADL-SDF model and inflation forecasting using the stochastic discount factor

1.3 Comparison between models

1.4 Conclusions from the modeling of the authors' ADL-SDF, NKPC-SDF and the comparative analysis of models

2. The effect of capital market wealth examined through the GMM methodology

2.1 The wealth effect and the dependence of consumption on the capital market

2.2 Description of the data used in the study

2.3 Research methodology

2.4 Empirical research and discussion of the results

2.5 Summary of the results achieved from the study

Conclusion

Literature

III. Main content of the dissertation

Introduction

In the introduction, key thematic areas of the dissertation are outlined. The object, subject and thesis of the dissertation research are defined. An introductory justification for the essence of the topic and its current application is written. The main tasks that the author performs in the dissertation are also indicated.

CHAPTER ONE. THEORETICAL BASIS, RESEARCH AND CONCEPTS FOR STOCK VALUATION

The first chapter of the dissertation is divided into five main points. The opening paragraph sets outWe present the basic theoretical understandings of the intrinsic value of shares as an object of valuation. In accordance with the logical arrangement of the dissertation, discount models are presented as the most basic for the development of financial valuation. The paragraph begins with specifying the scope and basic concepts that are worked with further in the dissertation. Then, parallels are drawn between the way the capital market works and discount valuation. An author's commentary is written to the explanations of the valuation methodology using models such as Dividend Discount Model, Discounted Cash Flow, Residual Income Model, etc. Clarifications are made regarding the implementation of discount models in practical investing, carried out in relation to the methods of various types of professional investment funds and institutional investors. We present a critical analysis of the modern vision of discount models, in which their relevance and contemporary applicability are commented on. In addition to the models and basic concepts, several scientific studies are presented, which justify the use of discount models through empirical results for their accuracy and applicability.

In the second paragraph of the dissertation, we discuss stock valuation ratios as a method for the valuation selection of assets from the capital market. At the beginning of the paragraph, a parallel is drawn between the intrinsic value of stocks and the price-to-earnings ratio (P/E). Different points of view on the interpretation of the ratio are described, mainly relating to its applicability in stock valuation. An attitude is taken regarding the estimated profitability and estimated risk of stocks with different P/E values. The most popular varieties of the P/E ratio are shown and commented on, with the author's reasoning applied regarding their practicality and usability within the framework of capital selection.

Further in the paragraph other types of ratios for valuing stocks, other than those similar to P/E, are commented on. Emphasis is placed on the dividend yield and the ratios between the market price of stocks and the different types of cash flows. Explanations are made in the form of reasoning about the relationship between the ownership of the stock and the ownership of the profit, dividends and cash flows of the company. From there, a parallel is presented to the valuation of stocks and the signals from the values of the different ratios that have an impact on the valuation are explained. Finally, the paragraph examines ratios from the financial analysis and financial management of companies from the perspective of financial valuation. It is explained how the financial structure of the company affects the assessment of its intrinsic value and how the financial management and efficiency of the company affect the risk-return profile of stocks. Again, the author substantiates his views by presenting empirical results from the scientific literature that explores the topic of financial valuation of tradable stocks.

Riskis considered as a component of the assessment within the framework of the valuation of shares. At this point, reflections are made on the practical impact of the degree of risk on the valuation process. The difference between market risk and individual risk in stock market investing is commented on. Theoretical justifications are given regarding portfolio diversification and the influence of the degree of investment diversification on the intrinsic value of shares for the investor. The relationship between market risk and the discount rate of required return in discount valuation models is explained, and in this regard, reflections on the topic from a theoretical and practical-applied point of view are presented.

After examining the general concept of risk and distinguishing between the private concepts of general market risk and individual risk, we move on to developing the topic by examining linear models for valuing stocks. The emphasis of this part of the paragraph is placed on the most common linear models in the literature and practice. These are CAPM, Jensen's alpha, Fama & French 3-Factor Model and multi-factor proxy linear models. Their selection as representative is again refined according to the scope of the dissertation, as only the models and publications with the highest possible scientific value for the development of the dissertation are included. By examining linear models, the author distinguishes another type of concept of investment risk, which is comparative risk. Comparative risk is a type of individual or portfolio risk, the assessment of which arises from a comparison between the risk of holding a particular stock or investment portfolio in comparison with the risk of holding an exchange-traded fund replicating the total market return. The practical dimension of comparative risk is implemented through linear models. In this regard, we present the development of the models by attaching citations and current comments to the original publications, in which the different versions of the models were first presented. A variety of practical notes and practical experience accumulated and described from the practice of various investment funds is synthesized. The disadvantages and advantages of comparative risk as a component of the overall assessment of the investor's intrinsic investment value are mentioned. The relevance and contemporary applicability of comparative risk models are also commented on. More detailed explanations are given regarding the technological implementation of linear models within the framework of the valuation of stocks constituting a diversified portfolio. The technology of calculating linear models is further commented on with the accompanying formulas in the content of the second chapter.

Finally, in the structure of the paragraph, the author presents VaR analysis as a method for assessing risk. VaR is often used in practice in various financial areas. In relation to the topic of the dissertation, the development of VaR analysis in the field of portfolio management is examined. The reasons for using VaR are presented, notes are given on the technology of calculating the VaR risk value and some of the methods based on VaR are mentioned, for example MVAR, CVAR, Relative VaR, etc., which serve to supplement VaR analysis. The author presents value at risk as a type of development of risk analysis. Unlike individual and market risk, VaR can be used to analyze the risk of shocks in markets or in the investor's portfolio structure, which threaten the long-term profitability of the investment portfolio.

The first chapter of the dissertation continues with the fourth and fifth paragraphs, in which the author's reflections on the readings are made.literature sources on the practical applications of technical analysis and statistical forecasting of stock prices. The fourth paragraph is entitled "A Look at Technical Analysis from the Perspective of Stock Valuation" and in it the author defends the thesis that the goals of the technical analysis methodology do not coincide with those of the methodology for valuing financial instruments. Here the statement is discussed that technical analysis serves to implement stock market strategies by setting price targets, following technical indicators and predicting market behavior. In this way, technical analysis differs from the valuation of stocks and other financial assets, which aims to find the intrinsic value of the investment regardless of trends in market price movements.

Finally, the fifth paragraph of the first chapter of the dissertation discusses the practical value of time series analysis methods in directly forecasting the price of tradable assets for the purpose of compiling a stock exchange strategy or valuation. To achieve the goal set in the paragraph, the author uses results from studies published in the literature. The conclusions that the author synthesizes are diverse and hesitant regarding the effectiveness of the methods presented in the various studies. The conclusion is reached that price forecasting is possible, butstill an unreliable stock market strategy that falls short of the effectiveness of financial valuation.

CHAPTER TWO. METHODOLOGY OF EMPIRICAL RESEARCH OF FINANCIAL MARKETS

The second chapter of the dissertation is aimed at studying the empirical methods used in conducting a large part of financial and economic research. The chapter presents a synthesized view of the application of statistical modeling in the financial and econometric spheres. This part of the dissertation presents the mathematical evolution in econometric-financial models, which constitute the basis for the author's model and empirical research presented further.

The first paragraph of the second chapter provides a definition of the parametric statistical model. The author then proceeds to describe the computational technology of the method of least squares for calculating linear regression. The author's view on the evolution and practical applicability of various regression models is presented, to which the advantages and disadvantages of some of their mathematical varieties are mentioned. The main conclusions from the review can be synthesized in the thesis that regression modeling is relevant and widely applicable for studying dependencies and also for predicting various quantities.

From this point of view, we present a detailed explanation of the hypothesis testing process related to the verification of the statistical significance of parametric models, including linear regression and autoregressive models, etc. The methodological aspects of the Wald test, t test and p-value are described. The paragraph also includes author's comments and analyses regarding the reliability of parametric models and their testing in the practical and scientific empirical environment. Here we mainly comment on the probability of statistical testing of hypotheses in parametric models using p-value. In this way, we argue the

methodology we have chosen for statistical confirmation of the conclusions of the dissertation research. This section of the dissertation continues with an explanation of multivariate regression and the application of correlation analysis and the F test for multivariate models.

A broad overview of the topic of time series modeling is presented. The emphasis of the described theory is again methodological with author's notes and explanations regarding the meaning and use of various formulas. First of all, definitions are given for the processes that can be considered in the form of time series. Then, the various functions of the AR, MA, ARMA, VAR and GARCH series are defined, respectively. The presentation of time series models is carried out through various formulas, proofs and dependencies, which meaningfully distinguish the mathematical technology of time series analysis. Additionally, the author also considersautocovariance and autocorrelation functions as part of time series processes. We explain the concepts of strict and weak stationarity of the series and draw practical conclusions about their applicability to the understanding of the theory. Again, we compare the advantages and disadvantages of time series models mathematically and logically. What we find most suitable for our dissertation research is the VAR series, which is the logical evolution of AR, MA and ARMA. Since further in the study we aim to build a model predicting inflation through the discount factor from the capital market, we do not graze the full matrix expression of the VAR series. Instead, we present only one linear equation from the matrix of the VAR series, which statistics define as an autoregressive distribution lag.

The third paragraph concludes with a section on testing and selecting time series models. Here, the three information criteria – AIC, BIC and HIC – are described, which are used to select the type of time series and the number of lags in the series. Hypothesis tests on the parameters and statistical significance of time series models are also presented. We discuss the formula apparatus with accompanying comments on the Dickey-Fuller, Granger and Ljung–Box tests.

18

The last paragraph of the second chapter discusses the technology for calculating various methods and formulas that belong to the specifics of the financial valuation of stocks and shares.of exchange-traded funds and the construction of stock market strategies. The choice between arithmetic and logarithmic calculation of returns is commented on, indicating the differences between the two approaches and specifying the appropriate situations for their use. Formula breakdowns of value at risk and its similar formulas are indicated, as well as of portfolio theory in the way it is presented by Markowitz. A representative part of the mathematical progress in the field of stock market valuation is shown. Here are comments together with formula representations of the efficient markets hypothesis and the intrinsic value of stocks in relation to valuation. The efficient markets hypothesis is aimed at understanding the dependence between market liquidity, behavior and other factors on the possibilities for implementing stock market strategies, including stock valuation. At the same time, formulas from publications by Shiller and Ohlson are also examined, which give a mathematical expression of the function of the intrinsic value of stocks over time. A review of the frequency analysis of volatility and trend is made. The conclusions we reach, according to the analysis of mathematical formulas, allow us to draw a parallel between the individual valuation of stocks and the estimates of the market and intrinsic value of the broad stock-traded index. Respectively, this statement also applies to market risk and general macroeconomic factors in the movement of the stock price level, which is measured by the broad stock-traded index and is related to individual stocks through the theories of market efficiency and the CAPM model.

CHAPTER THREE. EMPIRICAL STUDY OF THE IMPACT OF THE RETURN FROM FINANCIAL INSTRUMENTS ON ECONOMIC INDICATORS

In the third chapter of the dissertation, we present two empirical studies aimed at evaluatingthe influence of capital profitability on monetary-inflationary processes and the activity of consumer markets. The accumulation of knowledge in both areas is a consequence of a variety of previous scientific works and practical observations. Despite the current valid generally accepted conclusions, the topics have not been exhausted at an empirical level due to the need for new models and evidence that would provide statistically categorical conclusions regarding theoretical understandings.

The first study presented in the chapter is entitled "The Stochastic Discount Factor and Inflation - A Review of Dependencies and Forecasts" as the aim of the study is to model the movement of inflation using data on the yield on capital instruments. The meaning of such a model is argued as a consequence of the structural influence of monetary targets on inflation, which make the dependence with the capital yield also time-asymmetric. In the data, we observe that the capital yield predicts inflation expectations relative to a certain coefficient. We model this based on the scientific basis of neo-Keynesian models, based on the dependence in the Phillips curve.

In the written literature review we present the logical evolution of inflation forecasting as follows:

• ADL-u (Autoregressive Distributed Lag with Unemployment):

$$\pi_{t+1} = \mu + \alpha(L)\pi_t + \beta(L)u_t + v_t$$

• Gordon's triangle model:

 $\pi_{t+1} = \mu + \alpha(L)\pi_t + \beta(L)u_t + \gamma(L)z_t + v_t$

• NKPC (New Keynesian Phillips Curve):

 $\pi_t = \beta \mathbb{E}_t[\pi_{t+1}] - k(u_t - u_t^n) + v_t$

• AR (Simple Autoregression):

$$\pi_{t+1} = \mu + \alpha(L)\pi_t + \nu_t$$

• NKPC-AR(New Keynesian Phillips Curve Autoregression):

$$\pi_t = -\psi \tilde{\mu}_t + \mathbb{E}_t[\pi_{t+\infty}] + \omega_t$$

• NAIRU (Natural Rate of Unemployment):

$$\pi_t = -k(u_t - u_t^n) + v_t$$

All models use the same notation, in which π_t is the change in the inflation index, u_t is the change in the unemployment rate, z_t is the output spillover, $\mathbb{E}_t[\pi_{t+\infty}]$ is the expected inflation, μ , β and k are constants and v_t and ω_t are terms indicating the random error in the models.

The literature review continues with an analysis of the results of previous studies and other types of models. Comparisons of inflation forecasting models are reviewed. The relationship between inflation and the capital market is further associated with the classical literature on financial markets and more precisely the part of the literature that mainly concernsfactor models and risk premium.

On this basis, we analyze data on the capital market and inflation and conclude that a new model is available that complements existing knowledge. The ADL model we find has the form:

$$\pi_{t+1} = \mu + \alpha(L)\pi_t + \beta(L)r_t + v_t$$

, where r_t is the historical monthly return on capital investments while $\beta(L)r_t$ is the discount factor with lag. Practical testing of the model shows only one statistically significant lag in the autoregressive series of r_t . Therefore, the discount factor can be written simply as βr_t , which is similar to many other models and most notably the CAPM and its derivatives. This leads to the name ADL-SDF (Autoregressive Distributed Lag with Stochastic Discount Factor). To prove the implementation of the model, we present an application of the above to data on the US stock market and US inflation in the time range from 1985 to 2022.

ADL-SDF Full Sample: 1985-2022					
		Estimate	Std. Error	t-statistic	p-value
	μ	0.0012496	0.0001537	8.128	4.41e-15 ***
	r_t	0.0091687	0.0024796	3.698	0.000245 ***
	π_t	0.5397533	0.0469633	11,493	<2e-16 ***
	π_{t-1}	-0.1202474	0.0468865	-2.565	0.010657 *
	Residual st	andard error:	0.002308		
		R-squared:	0.2668		

Table 1. ADL-SDF Results

Source: author's calculations

Table 1 shows the results of testing the ADL-SDF model. The statistical significance of the coefficient on market returns in the autoregressive model is clear. We attribute the seemingly smaller value of the coefficient to larger movements in the monthly value of the financial market compared to inflation.

The ADL-SDF forecast is better than that of autoregression. In addition, the model has explanatory power, which reinforces the idea that the capital market could affect macroeconomic factors such as inflation.



The theoretical argumentation of The ADL-SDF model is based on the understanding of the inflation risk premium in the required capital return. This

hypothesis has been considered by previous studies, but nevertheless the conclusions regarding the relationship of the inflation premium to the expected return on equity instruments remain not entirely clear. The ambiguity is expressed more in empirical than in theoretical terms, as the problems encountered by previous works in the field are related to finding a coefficient or other reference value relating inflation to capital return. Our approach is different in that we look for a relationship between the capital market and future inflation rates. This leads us to conclusions related more to the expectations embedded in the value of the market than to the correlation of some kind of inflation premium.

The idea of the influence of the economy on the capital market through the dimensions of aggregate profits, cash flows, etc. is old. We contribute to the improvement of these understandings, as in our opinion the capital premium is an indicator for a kind of assessment of the impact of monetary policy on the capital market and vice versa. The question we are considering is more focused on modeling andthe empirical evidence needed to prove such an impact.

What has been done so far leads to interest in building a model that places π_t on both sides of the equation. To do this, we transform the ADL-SDF model equation into a form similar to that of the NKPC models. We obtain the following equation: r_t

$$\pi_t = \beta \mathbb{E}_t[\pi_{t+1}] - kr_t + v_t$$

, in which is the $\mathbb{E}_t[\pi_{t+1}]$ expectation of one-period future inflation and r_t is the return on the capital market. β and k are constants. v_t is white noise. In this case, kr_t is the discount factor. We call our proposed recording the NKPC-SDF model.

The ADL-SDF model has a clearer application in terms of inflation forecasting, but the NKPC-SDF provides a theoretical argument for the role of the discount factor in inflation. The logic is directly related to the arrangement of the equation. The NKPC-SDF representation shows that inflation is equal to the ratio of future inflation, reduced by the discount factor. This gives us the idea that there is a proportional component of capital return in inflation.

We test the NKPC-SDF model in the same database as ADL-SDF and the results are as follows:

NKPC-SDF Full Sample: 1985-202					
		Estimate	Std.Error	t-statistic	p-value
	β	1.059481	0.028684	36,937	<2e-16 ***
	k	0.003820	0.001861	-2.053	0.0407 *
	Residual st	andard error:	0.001714		
		R-squared:	0.7585		

Table 2. NKPC-SDF coefficient test

Source: author's calculations

The application of the model to the data shows that $\beta \mathbb{E}_t[\pi_{t+1}]$ has the opposite direction of influence on inflation from , since the practical calculation of the coefficients is carried out according to the above formula with a minus sign. The results of NKPC-SDF are comparable to those of ADL-SDF, in which current inflation and current market yield predict future inflation or, formulated in another way, the share of the magnitude of current inflation in the forecast is reduced according to the share of capital yield

Last but not least, we compile a comparison between a large number of models for forecasting inflation in the monthly range, including those proposed by us.SDF models. We evaluate the performance of the models based on AIC, BIC, RMSE, and correlation coefficient.

Full Sample

Model	AIC	BIC	RMSE	Correlation
AR2OLS	-3835.11226309668	-3819.00879920138	0.00233551134183531	0.491400906355457
AR2ML	-3835.11223567851	-3819.0087717832	0.00233551237337334	0.491400242400202
AR3OLS	-3836.61214976282	-3816.48281989369	0.00232557365606394	0.497911991445434
AR3ML	-3836.61197440505	-3816.48264453593	0.00232557623924492	0.497910262032567
MA2OLS	-3835.83152618553	-3819.72806229023	0.00233345546364091	0.492802668970829
MA2ML	-3835.83153153668	-3819.72806764138	0.00233345596478426	0.492803847263268
ARMA1.2	-3840.19039750802	-3820.0610676389	0.00231511940957488	0.504854285953294
ursc			0.00232916359505735	0.754315712093495
PCSDF	-3823.07123387369	-3802.96611712694	0.00231230840528191	0.505666283236712
PCU	-3835.29617045115	-3811.17003035506	0.00227273297861345	0.5300546959141
PCSpread	-3815.37283398602	-3787.22567054057	0.00232271017921061	0.498985912028424
PCTiangle	-3844.62300869822	-3824.50577073342	0.002278267	0.761860787251463
OLSSDF	-3723.26800690974	-3711.19040898826	0.00268070298499792	0.026124419211067
OLSSpread	-3722.99014933863	-3710.91255141715	0.00268160271762117	0.00340068492149534
OLSU	-3744.4404008056	-3732.36280288412	0.00261302497358944	0.224730537998899
OLSUSDF	-3743.08943498	-3726.9859710847	0.0026109775364019	0.228015763280932
OLSUSDFSPREAD	-3741.09446578871	-3720.96513591959	0.00261096167252675	0.228041022986019
VAR4	-5963.12913121632	-5690.03044435683		
NKPCSDF	-4067.24716527533	-4055.19138563184	0.00170425719601679	0.917313914537263
NKPCU	-4080.36731004114	-4068.31153039765	0.00167797931466083	0.919199636780653
NKPCUwithoutE	-3509.99251486959	-3501.94561968367	0.00261236513892254	0.224656770096048
NKPCSDFwithoutE	-3501.51358568839	-3493.46669050247	0.00270716885139454	0.0260042483991735
NAIRU	-4463.75935391605	-4455.7076219684	0.000555799304276352	0.99013717787152
NAIRU2	-4787.96947086776	-4775.91369122428	0.000622623399013649	0.989883522410311
UCSV	-9.2445	-9.2056		
NAIRU(t+1)	-3661.689	-3653.647	0.001714	0.4776498

Source:author's calculations

After conducting research on all of the above models as well as other models outside the dissertation, we came to the conclusion that The VAR model with four lags of unemployment and capital return gives the best possible forecasting results in monthly inflation forecasting. Additionally, we find that in the monthly range in this type of model, capital market return could replace the change in GDP or the production spillover.

In the second paragraph of the third chapter, a study was conducted on the wealth effect by applying a GMM regression model. The welath effect itself represents the impact that changes in the price of the capital market have on consumption.

The general research framework for the effect of the wealth effect follows from the premise that individuals adjust part of their consumption to the income from their investment activity. Previous studies have further commented on social segregation and spending or saving tendencies in relation to the welfare effect.

The description of our data shows a weak correlation between consumer spending and price movements in the capital market. The data analysis is continued by implementing the one-factor regression to model the relationships between capital returns and individual macroeconomic variables. The results show a statistically significant linear relationship between the capital market as a dependent variable and consumer spending, savings and unemployment as independent random variables. The regressions in this section use data calculated on a monthly basis.



	Estimate	Std. Error	t-value	p-value
Intercept	0.002955508	0.002121269	1.393273616	0.164231
PCE	1.204716573	0.189063171	6.372031998	0.000000



Source: author's calculations



	Estimate	Std. Error	t-value	p-value
Intercept	0.007947069	0.00204705	3.882205169	0.000119
Savings	-0.02882828	0.014005694	-2.058325633	0.040139



Source: author's calculations



Dependent	variable:	Market	Return
-----------	-----------	--------	--------

	Estimate	Std. Error	t-value	p-value
Intercept	0.007782875	0.002016498	3.859599244	0.000130
Unemployment	-0.130205462	0.030519429	-4.266313835	0.000024



Source: author's calculations

Additionally, we provide a description of theGeneralized Method of Moments regression, which is used to derive coefficients in multifactor and single-factor statistical models in this study. The dissertation provides a detailed review of the formula apparatus of the model. The model is applied to study the dependence of the wealth effect on different variables. The construction of the GMM regressions is as follows:

- Regression of monthly data:

$PCI=Intercept+\beta 1Time+\beta 2MarketReturn+\beta 3Savings+\beta 4Unemployment +ErrorTerm$

- Regression of quarterly data:

 $PCI=Intercept+\beta 1Time+\beta 2Savings+\beta 3Unemployment+\beta 4DeptPayment +\beta 5CPI+ErrorTerm$

Table 4. Results of the monthly GMM regression

GMM Results of Monthly Data Regressions

	Coefficient	Std. Error	t-value	p-valı	ie
Intercept	0.00490	0.00048	10.16018	0.00000	***
Time	-0.00001	0.00000	-2.26709	0.02338	**
Market Return	0.03560	0.01279	2.78260	0.00539	***
Savings	-0.01529	0.00933	-1.63916	0.10118	
Unemployment	-0.09334	0.01374	-6.79456	0.00000	***
Residual standard error:		0.007064			
Multiple	e R-squared:	0.5449			
	F-statistic:	132.6	***		
J-Test:		<0.00001	* * *		

Dependent variable: Personal Consumption Expenditures

Source: author's calculations

Table 5. Results of the quarterly GMM regression

GMM Results of Quarterly Data Regressions

	Coefficient	Std. Error	t-value	p-value	
Intercept	0.01195	0.00122	9.77550	0.00000	***
Time	-0.00005	0.00001	-4.71661	0.00000	***
Savings	-0.00957	0.00546	-1.75213	0.07975	*
Unemployment	-0.08272	0.00678	-12.19967	0.00000	***
Payment					
Department	-0.15821	0.09037	-1.75073	0.07999	*
СРІ	0.54078	0.09248	5.84767	0.00000	***
Residual standard error:		0.0059			
Multiple R-squared:		0.829			
F-statistic:		138.6	***		
J-Test:		<0.00001	* * *		

Dependent variable: Personal Consumption Expenditures

Source: author's calculations

Based on the results obtained, which are shown in Table 4 and Table 5, we conclude that the effect of wealth in the observed sample is manifested in the monthly, but not in the quarterly time range. This conclusion is made on the basis of p-value results and test statistics calculated by the author. Additionally, we see that the effect of well-being a reflexive relationship between the entire financial behavior of households, which means that the effect is influenced by investment-consumption choices, investment alternatives, household income, etc. factors that complement the analysis of the relationship between consumer spending and capital market returns.

The J test of the GMM regression also shows statistical significance of the models by rejecting the null hypothesis in the test of collinearity between the instruments used. The correlation of the model shown in Table 5 is higher due to the CPI index variable. Both regressions show a low standard error indicator.

Table 4 illustrates the effect of well-beingthrough the Market Return coefficient, which represents the monthly return on the S&P500. Its value compared to the other coefficients is high and is equal to 0.03560. The three-month GMM regression does not give statistically confirmable results for the presence of a wealth effect. We attribute this fact to the fact that in the three-month time range the wealth effect according to our conclusions is transformed into inflation through consumer spending trends.

Conclusion

The conclusion summarizes the main results and scientific contributions of the dissertation research, with a primary focus on the interrelationship between market valuation of shares from broad stock indices, inflation, and consumer spending.

The leading results of the research can be summarized in the following points:

- 1. A sustainable connection between market returns and inflationary processes has been demonstrated, establishing that financial markets contain significant information about future inflation dynamics, which can be used to improve forecasts.
- 2. A methodology for the statistical assessment of the forecasting ability of various models has been applied, allowing for comparative analysis and selection of the optimal toolkit according to specific conditions and time horizons. The results obtained suggest that multi-factor time series models like ADL and VAR show the greatest accuracy in forecasting causal relationships between asset prices and inflation.

- 3. A new model for forecasting inflation, based on the stochastic discount factor from the capital market, has been developed and empirically tested. This model demonstrates better forecasting ability compared to traditional tested models, such as the Phillips curve, especially for short-term horizons.
- 4. It has been empirically confirmed that including market returns as a predictor significantly improves the accuracy of inflation forecasts, particularly during periods of increased market volatility, directly confirming our third working hypothesis.
- 5. A significant connection between market returns and changes in household consumption has been established. In this way, the empirical results confirm the existence of a wealth effect on consumer behavior through changes in the value of financial assets, which corresponds to our fourth working hypothesis.
- 6. An asymmetric reaction of consumption to changes in wealth has been established or proven—declines in the market value of assets lead to a stronger contraction in consumption than the increase in consumption when wealth rises.

IV. Directions for future research on the topic of the dissertation

The dissertation forms conclusions that contribute to the broad discussion on the relevance and usefulness for society of the existence of an open capital market.and the connection of equity instruments with the real economy. The dissertation examines various topics in finance that are closely related to stock valuation and its impact on inflation and consumer behavior. The scientific value of the research conducted by the author could also be attributed to the management of financial crises.

The following directions for future research can be indicated:

- Continuation of the empirical analysis of the impact of investment on consumption and prices;
- Integrating the author's ADL-SDF and NKPC-SDF models into practice;
- Analysis of global financial crises through market returns from broad stock market indices;
- Comparative analysis of models for studying the factor relationship between the financial market and inflation;
- Forecasting the structure of household budgets through the modeling of financial indicators such as capital market returns, etc.;
- Analysis of individual investment behavior in relation to the size of household budgets;

V. Reference to the scientific contributions in the dissertation work

Based on the results achieved in the dissertation, the following main contributions can be outlined:

- A new mathematical expression of the relationship between inflation and _ the capital market has been derived, which is established through the following models: ADL-SDF (Autoregressive Distributed Lag with Stochastic Discount Factor Model) and NKPC-SDF (New-Keynesian Phillips Curve with Stochastic Discount Factor Model). ADL-SDF is an autoregressive distribution lag of inflation from the stochastic discount factor, through which we verify the statement that the return on the capital market precedes the corresponding proportional change in inflation by one month. The presented author's model NKPC-SDF describes the same relationship through the equation of the New Keynesian Phillips curve, which we take from previous research, with a free factor of the return on the broad stock index. When testing the author's models, the null hypothesis was rejected, against which the relevance of the inflation premium in financial modeling is lost. In this way, we continue the topic of inflation and capital markets, as methodologically we directly model the relationship between inflation and capitalization yield, which has been partially studied by previous authors.
- We have reached statistically verified conclusions about the place of capitalization income from broad stock market indices in personal and household budgets, which we define as the welfare effect. By modeling in this direction, we have quantitatively characterized the welfare effect on consumer spending. Specifically, we examine the structural influence of factors such as inflation and capital markets on the allocation of household budgets and, respectively, household spending. The methodology of the study contributes to science by presenting a direct way to predict the

influence of the welfare effect on the allocation of expenses in household budgets.

- In particular, we find that the welfare effect has a proportional share in consumer spending in both quarterly and monthly terms. Monthly adjustment of the factors after statistical tests shows the unemployment rate and savings as mutually influencing variables with the wealth effect. In the quarterly regression, we also observe two other influential factors, which are household debt payments and inflation. Such contributions can contribute to studies of additional significance and can serve as a methodology for finding the place of various financial factors in household budgets.

The outlined results, with their contributory nature, provide a foundation for researching additional significant interrelationships and can serve as a methodology for identifying the role of various financial factors in household budgets.

VI. Publications on the topic of the dissertation

Articles:

Lyubenov, V. (2021). The Eurozone Yield Curve Shape during COVID19: a Projection of Investment and Macroeconomic Expectations. Economic Archive, (4), pp. 67-89.

Reports:

Lyubenov, V. (2022). The Global Portfolio in Recovery. International Symposium Experience. Knowledge. Contemporary Challenges "Opportunities for changing the Economic-Social Realities of the World", (crp. 165-172).

Simeonov, S. & Lyubenov, V. (2023). ANALYSIS OF FUTURES ACTIVITY ON MAJOR COMMODITIES, AFFECTED BY THE WAR IN UKRAINE.

Любенов, В. (2021). Влияние на коефициента Р/Е и дивидентната доходност върху цените на акциите на българския капиталов пазар. Международна научно-практическа конференция "Устойчиво развитие и социално-икономическа кохезия през XXI век - тенденции и предизвикателства", (стр. 405-412).

Симеонов, Ст. & Любенов, Вл. (2023). Анализ на борсовата активност с основни инвестиционни инструменти през периода на COVID-19 пандемията и войната в Украйна.

VII. List of participations in national and international scientific conferences and forums

Conferences:

- **1.** International Symposium Experience. Knowledge. Contemporary Challenges "Opportunities for changing the Economic-Social Realities of the World", Bucharest, Romania.
- 2. 100th International Scientific Conference on Economic and Social Development "Economics, Management, Entrepreneurship and Innovations", DA Tsenov Academy of Economics.
- **3.** International Scientific and Practical Conference "Sustainable Development and Socio-Economic Cohesion in the 21st Century Trends and Challenges", Dimitar A. Tsenov Academy of Economics, Svishtov.
- **4.** Economic Development and Policies: Realities and Prospects, Challenges and Risks in the Conditions of Overlapping Crises. Bulgarian Academy of Sciences Institute for Economic Research, BAS.

Trainings:

1. Participation in a course on econometric application of the gravity model "Trade Policy Analysis With The Structural Gravity Model", Dimitar A. Tsenov Academy of Economics, Svishtov.

VIII. Certificate of compliance with the national requirements under the Regulations for the Implementation of the Act on the Development of the Academic Staff in the Republic of Bulgaria

National requirement in number of points: 30.00

Number of articles published in non-refereed journals with scientific review, or published in edited collective volumes: 1 independent Number of points for the author: **10.00**

Number of reports published in peer-reviewed journals or published in edited collective volumes: 1 co-authored Number of points for the author: **15.00**

Number of reports published in non-refereed journals with scientific review, or published in edited collective volumes: 2 independent and 1 co-authored Number of points for the author: **25.00**

Total points: **50.00** > 30.00

Declaration of originality of the dissertation work

The dissertation work in a volume of 255 pages under the title: "Current Issues in Valuing Equity Share Instruments" is authentic and represents the author's own scientific production. It uses author's ideas, texts and visualization through graphs, diagrams, tables and formulas, complying with all the requirements of the Copyright and Related Rights Act by duly citing and referring to another author's thought, as well as data, including:

- 1. The results achieved in the dissertation and the contributions made are original and have not been borrowed from research and publications in which the author has no participation.
- 2. The information presented by the author in the form of copies of documents and publications, personally compiled reports, etc. corresponds to the objective truth.
- 3. Scientific results that have been obtained, described and/or published by other authors are duly and comprehensively cited in the bibliography.

Declarant:

/Vladislav Lyubomirov Lyubenov/