EVALUATION

by Prof. Dr. Teodor Sedlarski, Faculty of Economics and Business Administration, Sofia University "St. Kliment Ohridski", Department of Economics, Scientific field 05.02.01 "Political Economy (Microeconomics and Macroeconomics)"

of the scientific papers submitted for the competition for the academic position "Associate Professor"

in the professional field 3.8. Economics (Corporate Finance and Behavioral Finance - in Bulgarian, German and English language), announced in SG, issue 103 of 10.12.2021

of the candidate:

Bozhidar Lyudmilov Nedev, PhD in Economics 3.8 / Political Economy (05.02.01) with a defended dissertation on "Analysis of the effect of inertia of the Bulgarian Stock Exchange AD in the period 2004-2017 in terms of behavioral finance ", Chief Assistant Professor at the Department of Finance and Accounting / Faculty of Economics, Sofia University "St. Kliment Ohridski"

1. Information about the competition

The competition for awarding the scientific title "Associate Professor" has been announced for the needs of the Faculty of Economics at Sofia University "St. Kliment Ohridski "in SG, issue 103 of 10.12.2021. The composition of the Scientific Jury of the competition was determined by Order № RD38-94 of 07.02.2022 of the Rector of Sofia University "St. Kliment Ohridski "

Chief Assistant Professor Dr. Bozhidar Nedev is the only candidate in the competition.

2. General characteristics of the candidate's research activity

Chief Assistant Professor Dr. Bozhidar Nedev participates in the competition with 14 scientific publications that were not used in the previous procedure for awarding the academic title chief assistant professor. Among the submitted publications are: one monograph and one monograph based on a defended dissertation; five scientific articles in English, published in scientific journals, referenced and indexed in world-famous databases with scientific information - two authored by him and three with him as co-author; two studies in Bulgarian in scientific journals from the National reference list of contemporary Bulgarian scientific journals with scientific review; five articles published in non-peer-reviewed journals with scientific review - three in English and two in Bulgarian, three authored by him and two with him as a co-author.

The scientific publications of the candidate related to this competition can be grouped into the following thematic areas:

- 1) Behavioral economics and finance (№№ 1, 2, 3, 6, 9, 10, 11, 13). Some of these publications contain claims for theoretical contributions to the behavioral analysis methodology of financial markets.
- 2) Classic finance and capital markets (№№ 7, 8, 14)
- 3) Problems of economic growth in Bulgaria in connection with the transition to a low-carbon economy ($Noldsymbol{2}$).
- 4) Econometric research on the mental health of Europe's aging population and public policies in the field ($N \ge N \ge 4$, 5).

The submitted list of citations includes:

- Four citations in monographs and collective volumes with scientific review, of which three citations of the candidate as single-author and one citation of an article with him as co-author.
- Three citations in unreferred journals with scientific review, of which all three are articles with him as co-author.

Attached is a PhD diploma from Sofia University 2019-18, issued on 25.02.2019.

3. Assessment of the pedagogical activity of the candidate

Bozhidar Nedev graduated from the Faculty of Economics at Sofia University "St. Kliment Ohridski" - Bachelor's degree in Business Administration (2013) and Master's degree in Finance and Banking (2015). He began his academic career at the Faculty of Economics in 2014 as a part-time lecturer in the Department of Economics, and since 2015 as a doctoral student. From 2015 to 2019 he was a full-time assistant in the Department of Finance and Accounting, and from 2019 he was appointed Chief Assistant Professor in the same department. In 2019 and 2020 he signed a contract with Sofia University as a recognized researcher (R2) for research projects in the field of macroeconomic and financial effects of the transition from an economy aimed at economic growth to an economy based on sustainable development in Bulgaria, and the mental health the aging population in Europe - guidelines for public policy development.

In 2019 he defended his dissertation thesis on "Analysis of the effect of inertia of the Bulgarian Stock Exchange AD in the period 2004-2017 from the point of view of behavioral finance" in the scientific field 3.8 Economics / "Political Economy" (05.02.01).

Bozhdar Nedev conducts classes on:

Corporate finance - exercises

Introduction to Finance (in English) - lectures and exercises

Introduction to Behavioral Finance (in English) - lectures and exercises

Financial institutions and markets - lectures and exercises

Finance (in English) - lectures

Finance - lectures

Behavioral economics and finance - lectures

Analysis of financial markets - lectures

Along with teaching and research, Dr. Bozhidar Nedev is actively involved in the administrative and managerial processes of the academic unit. He is a member of the Faculty Council of the Faculty of Economics at Sofia University. He also acts as Technical Secretary of the Career Center of the Faculty - his activities include coordination and organization of events, as well as communication with business.

He holds the position of head of the master's programs "Finance and Banking" and "Finance, Investment and Fintech".

From the academic year 2020/2021 he is responsible for the relations of the Faculty of Economics and Business Administration with the German higher education institutions and academic head of the bachelor's degree program "Business Administration (in German language)".

Bozhidar Nedev is an academic mentor from the Faculty of Economics and Business Administration in the professional field 3.8. "Economics" within the Project BG05M2OP001-2.013-0001 of the Ministry of Education and Science "Student Internships - Phase 2", funded by OP SEIG.

He has been member of the Faculty Quality Management Commission until May 2021 and has supported the procedures for state accreditation of the professional field 3.8 Economics at the Faculty, as well as the accreditation of the bachelor's degree in "Accounting, Finance and Digital Applications (in English)" by the Certified Financial Institute Analyst (CFA).

Dr. Bozhidar Nedev is a successful young lecturer and researcher in the field of finance, respected among his colleagues in the department and faculty.

4. Main scientific results and contributions

Central among the publications submitted for the competition is Bozhidar Nedev's **monograph** "Behavioral Research in International Capital Markets" (2021, 150 pages).

The subject of study in this book is the returns of stocks traded on each of the four capital markets. The sample period for the three foreign stock markets covers the years between 1990 and 2018, while for BSE JSC it covers the years from January 2004 to July 2017.

The first objective of the book is to answer the question of whether the momentum effect exists in the US and Chinese equity markets over the period under study. The results thus obtained will add to the existing academic literature on the issue, which does not provide a definitive answer to this question. The second objective of the study is related to the derivation of a current picture regarding the existence of the contrarian effect on the BSE JSC. The analysis should take into account the changing economic environment and in particular the period of economic upturn, the impact of the Great Recession of 2008-2009 and the period of recovery from the crisis.

This is how the thesis of this book could be formulated: the momentum effect still exists in the US and Chinese capital markets (1997-2018), while the contrarian effect was present in the BSE during the crisis period between 2008 and 2012.

The realization of the goals and objectives thus formulated also depends on the choice of research method. The presence of missing data in the US and Chinese capital markets is overcome by applying the "nearest neighbour" method, which is commonly used in financial markets with high

liquidity. For the BSE JSC, interpolation using natural cubic spline functions is used due to market specificities.

To this day, the scientific debate on market efficiency in financial markets is an open topic attracting the interest of the academic community. The same applies to the study of the many identified market anomalies in global financial markets. Recently, researchers have been seeking an answer to the question of whether these deviations still exist in financial markets or whether, as might be expected under the Efficient market hypothesis, rational investors should have seized the arbitrage opportunity upon learning of their existence, thereby exhausting the identified excess returns. For some market anomalies, there is no universal understanding of whether the phenomenon has disappeared or still exists. One such example is the momentum effect, which was first documented in 1993 and expresses the possibility of predicting the returns of traded stocks in the next up to 12 months based on their performance in the past up to 12 months. The best (poorest or worst) performing issues are considered to continue to achieve good (weak or negative) returns in the short-term future. As for East Asian stock markets such as Chinese and Japanese, for example, there are mixed conclusions, with some studies finding momentum effect and others rejecting it. At the same time, the academic literature on the United States tends to question the existence of the momentum effect in the period following the outbreak of the Great Recession, with some studies arguing that the anomaly has lost its strength or has even disappeared.

What is more, under market anomaly of contrarian effect, the most profitable (losing) publicly traded companies over the previous up to 12 months achieve negative (high) returns ahead of the next up to 12 months.

Throughout the entire study period on the BSE JSC between January 2004 and July 2017, the contrarian effect was not observed as all portfolios realized positive returns. However, there is a clear tendency for the portfolios of the worst-performing issues to achieve higher returns than the portfolios of the best-performing Bulgarian public companies, which could be defined as a type of circularity.

Examining sub-periods shows that during the economic boom period (2004 - 2007), the short-term return reversal effect on the Bulgarian equity market is again not observed, with winning companies outperforming losing ones during the holding period. However, the returns of losing stocks are also good (positive).

During the economic crisis period between 2008 and 2012, the contrarian effect can be documented for the formation and holding periods of up to 3 months. As for the post-crisis period between 2013 and 2017, a contrarian effect can be observed for formation periods up to 3 months and holding periods up to 2 weeks. However, it should be noted that the market anomaly is characterized by statistical insignificance with respect to the portfolios of winning stocks and that, in general, the portfolios of losing issues achieve higher returns than those of winning issues.

In conclusion, it could be said that behavioural finance provides a deeper insight into how financial markets function and the actual behaviour of investors. However, without traditional financial theory, the behavioural strand cannot exist. The equity markets of the New York Stock Exchange, the American Stock Exchange, the Shanghai Stock Exchange, and the Bulgarian Stock Exchange (BSE) JSC are the object of study in this paper. Considering the empirical results obtained, the following generalized conclusions could be drawn. The winners-only cross-sectional momentum effect strategy provides positive returns to the New York Stock Exchange between July 1997 and December 2018, thus the possibility of short-term predictability of the returns of the best performing issues in the recent past is available. A comparative analysis in terms of the structure of the winers-only momentum strategy between the present study and that of Jagadeesh & Titman (1993) shows that the characteristics of the strategy holding only a long position in the best performing public companies are largely the same over time. In terms of the results for the Shanghai Stock Exchange, it can be said that the cross-sectional momentum effect also exists despite the presence of statistically insignificant returns. All results show positive returns, with higher and significant winners-only momentum returns occurring for formation and holding periods between 6 and 12 months. In conducting a comparative analysis with respect to changes in the performance structure of profitable public companies in Shanghai in this book and in the work of Naughton, et al. (2008), it can be said that there are significant differences and transformations over time. Overall, it can be concluded that the winners-only cross-sectional momentum effect is more pronounced in the US equity market than in the Chinese equity market, and the anomaly structures are different in the two exchanges. The indicated serious differences in the behavior of the two nations from a cultural perspective could underlie this observation, given the scholarly literature on the subject.

2nd monograph: "Momentum effect on the Bulgarian Stock Exchange AD: analysis from the viewpoint of behavioral finance" (2021, 161 pages) – based on previously defended PhD thesis

The behavioral science literature considers many market anomalies that cannot be explained by the Efficient market hypothesis and the Capital asset pricing model. The lack of normative explanations for the existence of persistence of these phenomena is still a scientific fact. At the same time, behavioral economics provides psychological explanations, in terms of different cognitive and emotional biases in the mentation process. One of the many market anomalies is the momentum effect, which is the opportunity to predict changes in the returns of traded equity securities in the short term (3 to 12 months) on the basis of the realized gains made over the previous 3 to 12 months. Issues that have performed best in the past tend to continue to achieve high returns in the short-term future. The reverse is true for the poorest performing public companies, which continue to record similar results going forward. The investment strategy of holding a long position in the portfolio of the best-performing issues over the relevant prior period and short-selling the portfolio of the worst-performing assets is defined in academic circles as profitable.

The object of this monograph is the equity securities market of the Bulgarian Stock Exchange (BSE) JSC - Sofia. In terms of behavioral finance, the Bulgarian market is extremely understudied in the academic literature. Thus, the subject of the study in this book is the returns of equity instruments traded on the BSE JSC as of 31 July 2017, with the sample covering the period from January 2000 to the end of July 2017.

The main objective of the book is to present the current picture regarding the momentum effect of the analyzed Bulgarian Stock Exchange JSC - Sofia. In order to fulfill this objective, it is necessary to define three intermediate objectives. First, the question whether the momentum effect is present on the Bulgarian market or not has to be answered. The second intermediate objective is related to the study of the impact of the Great Recession of 2008 on the momentum effect on the Bulgarian equity market. Thus, the results obtained will be related to the relevant economic environment and its impact on trading on the BSE both during the most acute periods of the crisis and during the recovery period. The third intermediate objective relates to the examination of and assessing the

suitability of the so-called winners-only momentum strategy, namely holding only long positions in the best-performing public companies. For individual retail investors, short selling is not practical as this position requires in-depth knowledge and experience.

Thus, the main thesis of the book could be formulated: During the pre-crisis period (2004-2007), the BSE JSC as a frontier market provided an opportunity to forecast the short-term returns of equity instruments depending on their performance in the recent past.

To achieve the main objective and the task of overcoming the problem of missing historical prices of the considered equity instruments, interpolation by natural cubic spline functions is applied, to which a large part of the contributions in this book are due.

Based on the empirical results presented, the following conclusions can be drawn. The momentum effect is not present in the Bulgarian equity market during the entire period studied between January 2004 and July 2017, as most momentum investment strategies exhibit negative returns. This is due to the strong negative impact of the Great Recession of 2008 on the processes of BSE JSC. Using sub-periods to account for times with different economic situations, it appears that during the precrisis period (2004-2007) the momentum effect provides positive and statistically significant returns to BSE JSC investors. The most successful strategy is due to the WML-portfolio (K = 1; K = 1), realizing 1.46% (t-stat. = 2.6522) on a weekly basis. At the same time, due to lower transaction costs, the WML-portfolio (K = 26; K = 8 weeks) provides an optimal return for investors of 1.34% (t-stat. = 4.2987) per week.

With respect to the winners-only momentum strategy that has been studied for the Bulgarian equity market in the pre-crisis period, it can be said that it provides higher average weekly returns for investors than that of pursuing the overall momentum strategy. The highest gain in avoiding short selling is reported for the portfolio of winning issues (K = 1; J = 1) at 3.23% per week. In comparison, the winners-only strategy (K = 13; J = 13) with weekly 2.38% provides a more optimal return due to the need to rebalance the portfolio less frequently.

The empirical evidence for the crisis period (2008-2012) suggests that the momentum effect of BSE JSC ceases to exist, with returns either highly negative or statistically indistinguishable from zero.

At the same time, the momentum effect does not reappear on the BSE JSC in the post-crisis period (2013-2017), as would be expected from international research. Gains from the momentum effect are still either negative or statistically insignificant.

In conclusion, the results provide a deeper insight into the processes that have determined the functioning of BSE JSC. To the best of the author's knowledge, no other academic work has examined the momentum effect of the Bulgarian equity market.

Special appreciation among the candidate's publications deserve also the following articles:

Article: Nedev, B., 2021. Cultural Specifics and the Momentum Effect on the Bulgarian Stock Exchange. *Journal of Business Accounting and Financial Perspectives*, 3(1)

This article analyses the relationship between the documented momentum effect on the Bulgarian Stock Exchange and the cultural characteristics of Bulgarian society on the basis of the 6-Dimensions Culture Model by Hofstede. Derived are possible behavioural biases, that could cause investors to underreact to firm-specific information, resulting in short-term return predictability. Outlined are implications for the relation between the rising of momentum effect and low individualism index, as identified on the Bulgarian Stock Exchange (BSE).

Article: Nedev, B. (2019). Historical roots of behavioural financial thought

The rise of the first implicit ideas in the field of behavioural finance is examined from a historical point of view, taking into consideration the evolution of economic theories. The first documented manifestation of irrational behaviour on a market level, which took place during the 17th century, is presented. The foundations of Daniel Bernoulli's Decision theory from the 18th century are systemized in regard to the implementation of behavioural aspects and the reference to the contemporary Prospect theory. The classical and early neoclassical schools of economic thought, where the idea that economic decisions are also being influenced by emotional stimulus can be found in the works of economists like Hermann Heinrich Gossen, Adam Smith, Jeremy Bentham, William Stanley Jevons, Léon Walras and Edgeworth, are examined. The neoclassical school of economics, where the representatives of marginalism limit the idea of the complexity of human nature, is also analysed. In conclusion, a short description of some of the contemporary aspects of the science of behavioural finance is made.

In the collective publications with Assoc. Prof. Boryana Bogdanova, dedicated to the topic of the mental health of the aging population in Europe and public policies (2021), the two authors assert that aging population across developed countries is a problem that no nation has faced before. It puts severe financial burden on every public budget. Non-financial burdens are also common. Depression turns out to be the most common mental disease. Studying the features, that could boost the exhibition of depressive symptoms, and those, that could protect individuals from them, would have significant effect on the precision of public health policies. That is the aim of the paper. The co-authors base their research on wave 7 data of the Survey of Health, Aging, and Retirement in Europe that for the first time summarizes information about 27 European countries and Israel. As a preliminary step in the analysis, they construct two latent variables used to quantify the level of depression. On the basis of extensive literature review, they identify a long list of potential features and apply lasso regression so as to select those of them that contribute most in explaining the variance of each of the latent variables. Delivered results indicate that among the most common features, leading to poor mental health, are working conditions, self-perceived health and the presence of functional limitations. On the other hand, educational attendance, lack of chronic diseases and sport activities are among the factors that protect from exhibiting depression symptoms.

Article Bogdanova, B. & Nedev, B., 2019. Stock market crashes through the lens of behavioural finance. Scientific researches of the Union of Scientists in Bulgaria – Plovdiv. Series A. Public sciences, art and culture, V, pp. 125-128

The goal of this paper is to study stock market crashes through the lens of behavioral finance. As argued in the literature, investors tend to follow positive feedback trading strategies, i.e. strategies that buy past winners and sell past losers. This might cause stock prices to deviate from their fundamental values in the short run thus generating momentum effect. On the other hand, recent research papers discuss stock market crashes from the perspective of endogenous market instabilities. Among others, positive feedbacks are considered as one of the driving forces behind endogenous instability. Therefore, the co-authors analyze changes in momentum raw returns in times of turmoil in an attempt to shed additional light on the formation of stock market bubbles.

Among the scientific contributions of the candidate in the publications submitted for the competition are the following:

I. Contributions of a theoretical nature

On the basis of comparative analysis Bozhidar Nedev derives the main theoretical differences between traditional financial science and relatively new science of behavioral finance from the standpoint of economic theories, the principle of rational behavior, probability accounting, the theory of expected utility, models for estimating the value of financial assets and the efficient market hypothesis (Publication 1 in the list under item 10b). The candidate offers a theoretical analysis of the main tendencies in the behavior of investors, which could lead to irrational decisions, taking higher risks and achieving suboptimal returns. He traces the relationship between the cognitive qualities of the mind and the impact of emotions on the decision-making process and the possible deviation from the assumptions of rational behavior (Publication 1 in the list under item 10b). Justification is proposed for the application of natural cubic spline functions as a method for interpolation of missing historical data on stock exchange prices of traded securities on the Bulgarian Stock Exchange AD (BSE AD) in view of its applicability to address the problem of low market liquidity in the study the effect of inertia and the effect of contrarian effect on border capital markets such as Bulgaria. The application of this methodology with regard to the effects of inertia and the opposite is innovative for the scientific literature (Publications 1 and 2 in the list under item 10b). In a team of two co-authors, the possibilities offered by the transformation with "wavelets" as a relatively new method for performing time-frequency analysis of a given time series before the other alternatives are highlighted (Publication 8 in the list of item 10b);

II. Contributions of an empirical/applied nature

The candidate offers an analysis of the Bulgarian experience regarding the conduct of behavioral financial research on the Bulgarian capital market on BSE AD (Publication 6 in the list under item 10b). The possibility to predict the return on equity instruments of BSE AD as a border market within the next 12 months based on their performance in the previous up to 12 months (the effect of inertia). The testing of the effect of inertia of BSE AD was performed on the basis of the entire studied period (January 2004 - July 2017), as well as within separate sub-periods, taking into account the changes in the economic situation in the country and their impact on the Bulgarian capital market. The profitability of the so-called simplified strategy of inertia compared to the traditional strategy (Publication 1 of the list under item 10b). The possibility of short-term predictability of the return (the effect of inertia) on the US and Chinese capital markets was tested by studying the simplified strategy of inertia in the period from July 1997 to December 2018. The characteristics of the functioning of the anomaly over time are compared (Publication 2 of the list under item 10b). The existence of the opposite effect of BSE AD (between January 2004 and July 2017) was tested, including through the study of sub-periods that take into account the development of the processes of the Bulgarian capital market (Publication 2 of the list under item 10b). The possible behavioral reasons for the occurrence of the inertia effect of BSE AD in the period between January 2004 and December 2007 through the application of the six-dimensional model of Geert Hofstede for Bulgaria are analyzed (Publication 3 of the list under item 10b). The candidate coauthored an analysis of mental health in terms of geographical location of the population over 50 in 12 European countries, including Bulgaria, based on data from the seventh wave of the SHARE project (Survey of Health, Aging, and Retirement). Based on factor analysis, two latent variables were derived, which are indicative of the absence or presence of depression (Publication 4 of the list under item 10b).

In a co-authored study Bozhidar Nedev reveals the factors that are most important for the deterioration of mental health, as well as for the prevention of depression in the population over 50

years of age in 12 European countries, including and Bulgaria according to data from the seventh wave of the SHARE project (Publication 5 of the list under item 10b). Dr. Nedev analyzes the possibility for electronic trading on BSE AD, examining the necessary conditions for the use of applications for algorithmic and high-frequency trading on the Bulgarian capital market (Publication 7 of the list under item 10b). In a team of two co-authors Bozhidar Nedev tracked the time-frequency characteristics of the change in the monthly values of the S&P 500 stock market index during the closing of the market for a period of 65 years (between January 1950 and March 2015) by performing a one-dimensional analysis. 10b). A co-authored behavioral analysis studied the possibility of endogenous instability in the capital markets, using data from the New York and US stock exchanges in the period from January 1995 to April 2018 (publication 10 of the list under item 10b); A team of two co-authors analyzed the volatility of the timing of gains from the simplified strategy of inertia in the US capital market for more than 20 years (January 1995 - April 2018) through the application of continuous transformation with "waves". The applicability of this new approach to the possibility of short-term predictability of the return on traded capital assets in terms of investor behavior and their decisions to choose investment horizons over time is revealed (Publication 11 of the list under item 10b). In a team of two co-authors the candidate has revealed and systematized the possible macroeconomic effects in terms of investment activity and employment due to the transition to a low-carbon economy of the energy sector in Bulgaria. Using the production function, the relationship between real GDP, on the one hand, and capital and employees in the energy sector, on the other, in the period 1997-2017 is modeled and assessed, taking into account its capital-intensive nature (publication 12 of the list under Vol. 10b). The traditional transverse strategy of inertia of the New York Stock Exchange in the period between January 1995 and April 2018 was co-authored. publication 13 of the list under item 10b).

In his scientific works the author presents a reasoned defence of his positions on debatable issues. Numerous references to literature sources allow researchers working in the field of modern behavioral economic and financial theory to expand their knowledge of the issues under consideration. At the same time, efforts have been made to make the work more accessible to a wider audience than that of professional economists: a number of clarifications have been included to make the presented concepts more accessible. Students of economics and finance and interested readers get the opportunity to get acquainted with the main results in one of the main modern areas of modern financial research - behavioral finance.

5. Critical remarks and recommendations

The two monographs of the candidate can be used as a means of establishing a modern way of teaching important economic and financial disciplines. They could be expanded with case studies with application in the relevant topics of individual courses, which would significantly contribute to the understanding of the most current theoretical approaches of students in economics and finance in the country.

As a recommendation, it can also be noted that the monograph based on a previously defended dissertation thesis would benefit from a more comprehensive discussion of the empirical results obtained in the context of the latest discoveries in the field of behavioral finance by including in the explanation a larger number of current research results on the peculiarities of investor behavior. The unification of the used terminology in Bulgarian with that in the existing scientific publications on the topic in the country would contribute to the establishment of conceptual unity in the new research field for the Bulgarian scientific literature.

6. Conclusion

The scientific contributions of the candidate in the publications submitted for review in the procedure, as well as the quality and volume of his pedagogical activity give grounds for the conclusion that all requirements of the respective national law, the guidelines for its application and the internal rules for obtaining scientific degrees at Sofia University "St. Kliment Ohridski" are met. Bozhidar Nedev exceeds the quantitative requirements for holding the academic position of "Associate Professor" at the Faculty of Economics and Business Administration. I propose to the Scientific Jury to select Dr. Bozhidar Lyudmilov Nedev to hold the academic position of "Associate Professor" as result of the procedure announced in the State Gazette, issue 103 of 10.12.2021 in the professional field 3.8. Economics (Corporate Finance and Behavioral Finance - in Bulgarian, German and English).

Sofia, March 28, 2022,

Jury member:

Prof. Dr. Teodor Sedlarski