14/21

BH EKONOMSKI FORUM/BH ECONOMIC FORUM

GOD. 2021 · BR.1/2021. · STR. 5-151 - · ZENICA, DECEMBAR, 2021.

YEAR, 2021 · NO. 1/2021. · PP. 5-151 - ·ZENICA, DECEMBER, 2021.

BH EKONOMSKI FORUM
ECONOMIC FORUM

Univerzitet u Zenici

Ekonomski fakultet

University of Zenica

Faculty of Economics

BH EKONOMSKI FORUM
Časopis Ekonomskog fakulteta u Zenici

Izdavač / Publisher
Univerzitet u Zenici, Ekonomski fakultet u Zenici

For the Publisher
Prof.dr.sc. Alaudin Brkić, dean

Glavni i odgovorni urednik / Editor-in-Chief
Dr.sc. Almir Alihodžić, full professor

Sekretar časopisa / Journal secretary
Ilma Grabus - Dedić, MA

Grafički dizajn / Graphic design
Nermin Ahmić, dipl.oec

Lektorica za bosanski jezik / Bosnian language editor
Jasmina Omerašević, prof

Lektorica za engleski jezik / English language editor
Jasmina Omerašević, prof

Radovi objavljeni u časopisu referiraju se u / Indexed in:

- EBSCOhost, Ipswich, USA.
- CEOL - Central and Eastern European Online.
- ROAD.
- BASE.
- PROQUEST.
- CITEFACTOR.
- ERIH PLUS.
- SCINDEKS
- ECONBIZ.

Tiraž / Edition
100 primjeraka/copies

Štampa / Printed by
Perfecta, Sarajevo

Časopis izlazi dva puta godišnje / Published biannually

Adresa uredništva / Address of the Editorial Board
Univerzitet u Zenici - Ekonomski fakultet u Zenici
Fakultetska 3, 72000, Zenica
Bosna i Hercegovina

E-mail:bh.ekonomski.forum@gmail.com

CONTENTS / SADRŽAJ

EDITOR'S LETTER

Respected reader public,
It is our great honor to present you the fourteenth edition of the Journal under the title: BH ECONOMIC FORUM, whose structure is composed of original scientific papers, preliminary communications, review articles, professional article and book reviews. In this issue of the Journal, seven papers were published focusing on the diversity of proposed topics in line with the demands of new challenges, trends and the market, and offering new ideas, models and concepts. The papers are thematically oriented in four scientific areas: economic theory and politics, marketing, management and finance and accounting.

In this issue, the papers are diversified, which certainly represents a great advantage compared to previous numbers, because there is no deepening of the paper in one scientific field on the one hand, and on the other hand, the importance of all scientific areas is almost the same. In this issue we have some papers of colleagues from abroad, more accurate paper of colleague from North Macedonia, Republic of Serbia, Montenegro, and Turkey which gives importance to the Journal on an international level.

The paper by colleagues Evica Delova-Jolevska and Milan Eliskovski, titled: *Investigating the relationship between the single-name concentration risk and capital surplus: Evidence from the Macedonian banking sector*, treats the impact of concentration risk from individual clients on capital surpluses in the Macedonian banking sector.

The aim of the paper entitled *Adjustments of board composition during COVID-19 crisis: analysis of the Macedonian companies*, written by colleagues Ljupcho Eftimov and Tihona Bozhinovska, was to make an analysis of the reported changes in the composition of the boards of Macedonian companies listed on the stock exchange during the COVID-19 crisis. The survey results showed that during the Covid -19 period, a significant number of companies in the sample made changes in the composition of the board, and only 9.38% of the companies that reported the change decided to reappoint the same members.

Vasva Klopić, Amer Klopić and Adi Alić in the paper entitled *Impact of key account management orientation on company's non-financial performance* explain the importance of focusing on key customer management in today's business and how it affects the non-financial performance of companies in Bosnia and Herzegovina.

Vladimir Grdinić, Jasmina Šmigić Miladinović, Miloš Pavlović and Miloš Ranđelović in their paper entitled *Specificities of capital valuation of young companies by yield basis method* explain the method of estimating the value of capital of young companies by the yield method, as well as the specifics of the procedures of the given method.

The paper by colleague Maja Baćović titled *Public debt and economic growth: Two public debt management scenarios in Montenegro* investigates the impact of public debt growth on the economic growth of the Western Balkans with a look at Montenegro. The results of the research using the OLS method on panel data for the countries of the Western Balkans and for the period from 1998 to 2019 indicate that the percentage growth of public debt leads to a decrease in the GDP growth rate by about 0.036 percentage points.

In the paper *The significance of R&D activities for managing intellectual capital of enterprises* authors explore the relationships and connections between investment in research and development, components of intellectual capital of enterprises and the efficiency of intangible assets as visible intellectual capital and the efficiency of total intellectual capital. Therefore, the aim of the paper is to point out the importance of research and development activities for the management of intellectual capital of companies.

Abdulkadir Kaya in his paper *The Effect of Agricultural Investments by Governments on Economic Growth and Financial Markets: An Application on Developed and Developing Countries* investigates the application of Bound Test Analysis - ARDL in order to examine the effects of agricultural orientation indices on the stock exchange index and gross domestic product in developed and developing countries. The results of the research indicated that the variable of agricultural orientation indices has a negative impact on GDP growth in the short run.

In these turbulent times caused by COVID-19 the editorial board of the BH Economic Forum managed to hold all online (regular) sessions and with their brilliant decisions influence the extraordinary selection of submitted papers and ultimately the publication of the fourteenth edition of the Journal. I would like to take this opportunity to thank all members of the Journal editorial board.

We are particularly pleased by the fact that the editorial board of the Journal: BH Economic forum selects and chooses to promote papers from different scientific fields, which certainly increases the quality of the Journal. What we especially consider important to note is that the Journal was included in new database from October to December 2021, such as: ECONBIZ, which will increase visibility in the upcoming period, and the number of authors as well.

On this occasion, I would like to thank Nermin Ahmić for the enormous and selfless technical and graceful help and support, without which we can hardly be able to perform all the activities. Also, I take the opportunity to thank Ilma Dedić-Grabus, the journal secretary for hard work and huge technical support. Also, I would like to thank all the domestic and foreign reviewers who, with their brilliant suggestions and ideas, helped this number to be published.

I am especially grateful to the English language editor, professor Jasmina Omerašević, who with her great suggestions and detailed proofreading, makes the texts stylish and grammatically correct in order to help the reader's mindset. I warmly thank all members of the editorial board for their successful cooperation and excellent synergy in making crucial decisions. Also, I would like to thank the top management of the Faculty, primarily the dean prof.dr. Alaudin Brkic and the Rector of the University of Zenica prof.dr. Jusuf Duraković who have provided moral and financial support all the time. The vision of the editorial board and publisher is to develop BH ECONOMIC FORUM as the scientific journal publishing highly relevant articles, with the major objective to be indexed on various journal lists in forthcoming period. On this occasion, we would like to thank all the authors who pointed out the high level of confidence by publishing their work, and we hope that the cooperation will continue continuously in the forthcoming period.

Zenica, autumn/winter, 2021.

Editor-in-Chief

prof.dr. Almir Alihodžić

Evica Delova-Jolevska[1]

Milan Eliskovski[2]

INVESTIGATING THE RELATIONSHIP BETWEEN THE SINGLE-NAME CONCENTRATION RISK AND CAPITAL SURPLUS: EVIDENCE FROM THE MACEDONIAN BANKING SECTOR

ABSTRACT

Banks lend large funds to big clients and are exposed to concentration risk. The concentration risk is indirect credit risk exposure for the banks and it might cause large losses in case of default of the big clients. Therefore, prudent banks would increase their capital surplus as the concentration exposure rises in order to preserve their stability against deteriorating performances of the big clients. Thus, this paper investigates the effect of the single-name concentration risk on the capital surplus in the Macedonian banking sector. The analysis was done by employing Vector Error Correction Model on quarterly data from 2006q1 to 2018q4. The results suggest that the Macedonian banking sector is prudent and increases the capital surplus from 0.65 percentage points (p.p.) to 2.20 p.p., as the single-name concentration risk rises by 1 p.p. More concretely, a future increase of the banking sectors' large exposures by 53.7 million of euros (1 p.p. of the total gross loans as of 2018q4), would require an increase of the capital surplus by the minimum amount of 3.1 million of euros (0.65 p.p. of the minimum capital requirement as of 2018q4), under the assumption of not changing both the total gross loans and the minimum capital requirement, compared to 2018q4.

Keywords: *Capital Surplus, Single-Name Concentration Risk, Macedonian Banking Sector*

JEL: *C32, G21, G32*

1 University American college, e-mail: Skopje, evicadj@uacs.edu.mk

2 National Bank of the Republic of North Macedonia, e-mail: EliskovskiM@nbrm.mk; m_eliskovski@yahoo.com

1. INTRODUCTION

Lending is the most significant profit-generating and risk-taking activity of the banks. The banks lend money to the economic agents, and undertake credit risk as a possibility for not collecting the money lent. The low level of exposure to credit risk is related to credit risk management based on the following criteria: solid analysis of the creditworthiness of the borrower, diversification of the loan portfolio and credit exposure limits set by the supervisor. Notwithstanding these criteria, the analysis of each client's creditworthiness is not perfect due to the asymmetric information between the banks and the borrowers and moreover, proper loan portfolio diversification and the credit exposure limits do not completely eliminate credit losses for the banks. In fact, the diversification of the loan portfolio and credit exposure limits, only allow for minimizing the losses from lending to the non-creditworthy clients relative to the income gained from the creditworthy clients. Over time, the creditworthiness' analysis may not imply credit risk occurrence and accordingly, the banks might lend large funds to certain clients (single-name), sectors (households or corporates) or industries, relative to the overall loan portfolio size, and still complying with the credit exposure limits. Therefore, the banks could create imperfect loan diversification, and consequently, the credit risk has an additional dimension as concentration risk. The concentration risk is banks' large lending to individual borrowers, industries and sectors, when compared to the overall loan portfolio or regulatory capital (Grippa and Gornicka, 2016). Additionally, as the source of the concentration risk is relatively high lending, then its interconnectedness with the credit risk is evident.

The concentration risk is very important for the stability of the individual banks and the total banking sector. Examples for high lending to large borrowers like Enron and WorldCom and the subsequent problems caused to the American banks at the beginning of the 2000s, only confirm the significance of this type of risk (Grippa and Gornicka, 2016). Furthermore, the concentration risk was an important factor for the recent two banking crises. Namely, the Global Financial crisis of 2007/08 was triggered by the high concentration of the American banks to the mortgage loans (Brunnermeier, 2009), and the concentrated banks' lending to poorly performing European countries contributed to the subsequent European debt crisis during 2011 and 2012 (Acharya et al., 2014). Thus, the concentration risk necessitates close monitoring from both banks and supervisors because when mismanaged, it materializes as credit default with a severe damaging impact on the overall economy.

Despite the unfavourable effects that the concentration risk might have on the banking sector and the overall economy, yet the banks could not be prevented from lending large funds to a single client, sector or industry within the exposure limits set by the supervisor.

Namely, large individual clients, sectors or industries might be very important for the overall economy and necessitate banks' support. Therefore, the concentration risk is an inevitability in the banks' credit risk management in the case of the monopolized economy and it could not be detrimental as long as it is properly managed. Furthermore, as the banks have been developing a traditional relationship with such large clients, sectors or industries, they get to know them better and reduce the information asymmetry problem as one of the main sources for the credit risk.

Nevertheless, the various unforeseen factors are always possible to affect the concentration risk to materialize into credit risk and therefore, it is very important this risk to be monitored regularly from the banks' risk management perspective because it could affect the capital adequacy as the ultimate absorber of credit risk losses. The concentration risk is not addressed in Pillar 1 of the Basel capital framework, because it relies on the assumption that the loan portfolio is well-diversified and accordingly, risk weights objectively evaluate the credit risk-weighted assets within the capital adequacy assessment process. However, the practical experience indicates that the loan portfolio might not be well-diversified. Therefore, Basel's Pillar 2 addresses the concentration risk and compensates for this drawback of Pillar 1. Pillar 2 predicts that banks should develop their own methodology for measuring the concentration risk and its' potential for credit risk losses as well as provide capital buffers for covering unexpected losses. More concretely, within the Pillar 2 framework, the banks assess the internal capital adequacy assessment process (ICAAP) and thus, they evaluate the risks not covered in Pillar 1 and set aside additional capital as loss absorber.

This study aims to investigate the relationship between the concentration risk and capital surplus for the Macedonian banks. The concentration risk is considered as the single-name credit risk exposure or more concretely, it is measured by the total value of large loans approved to individual borrowers as percentage of the total gross loan portfolio. Why is this relationship between the single-name concentration risk and capital surplus important to be considered? The single-name concentration risk has twofold nature in the sense that is a credit risk arising from large credit exposures to certain clients. Therefore, this risk is complicated from risk management's stance as, usually, the total sum of the large credit exposures exceeds the banks' capital capacity and therefore it requires many practices and knowledge to monitor this risk. If the large exposures default and risk materializes, then it could cause severe damage to the banking sector. Hence, for the banks and policymakers, knowing that banks have a solid capital surplus given the large credit exposures is especially important to maintain the stability of the financial sector as the banks are its core. This paper sets the research hypothesis as a positive relationship between the single-name concentration risk and capital surplus. Vector Error Correction Model (VECM) or known as the Johansen cointegration technique was applied for investigating the mentioned relationship throughout the period from 2006q1 to 2018q4.

The results confirm the hypothesis set above and suggest that the Macedonian banking sector is prudent and increases the capital surplus as the single-name concentration risk rises. Thus, this investigation finds a direct-proportionate relationship between the two variables and moreover, it assesses the average increase of the capital that the Macedonian banking sector sets aside as a response to the increase of the single-name concentration risk.

Additionally, to explain the aim of this paper in more detail, it has to be emphasized that from an ex-ante point of view, the regular monitoring of the creditworthiness of the large borrowers and compliance with the exposure limits is a primary defence from the concentration risk, unlike building up the large capital base that captures funds that could not be used for lending. However, as it was mentioned above, the asymmetric information that banks have compared to the borrowers could contribute to a less than perfect assessment of the creditworthiness, despite complying with the exposure limits. Furthermore, from an ex-post point of view, the banks might only cover the expected losses of the single-name concentration risk, with proper loan pricing (interest rate), provisions and collateral, but unexpected losses are always possible due to misperformance of the large borrowers that would reduce the banks' capital. The pricing and provisioning of the large loans are usually lower as the borrowers have solid creditworthiness and do not delay with servicing of the loans. Moreover, such borrowers have negotiation power and imposing high-interest rate is not always an option, while the provisioning might cover only a fraction of the large loan in a case of loss. The collateral taken is not always marketable at market prices depending on the market demand. Therefore, the capital is the ultimate buffer for covering the unexpected losses from the possible deteriorated performance of the large loans' borrowers.

With this study, the domestic policymakers get an insight into the banks' average increase of the capital surplus in order to cover the eventual unfavorable effects of the single-name concentration risk, having in mind that loan pricing, provisioning and collateral could not absorb the unexpected losses completely.

The paper is organized in the following manner: The first section is a review of the existing literature, whereas the following section provides an overview of the concentration risk within the loan portfolio of the Macedonian banks. Furthermore, the data, VECM methodology and estimations are presented and finally, conclusions are provided.

2. Literature overview

The Bank of Spain (BoS, 2008) provides guidelines to the banks for measuring the single-name and industry concentration risk. Additionally, the guidelines by the Bank of Spain indicate the Herfindahl–Hirschman Index (HHI) as measurement of both types of concentration risk and offers several interval values for the HHI and assigns corresponding multipliers for calculating capital surcharges. Namely, the multipliers are percentages by which banks are required to increase the capital requirement for credit risk in order to cover both the single-name and industry concentration risk. According to Kozak (2015), the methodology by the Bank of Spain is used by other non-Spanish banks such as RBC Bank in Georgia and Robinsons Bank of the Philippines. Moreover, the author applies this methodology for selected Polish banks for the period from 2008 to 2013 and indicates correct multipliers for covering the mentioned types of concentration risk.

Other literature, also investigates the relationship between the concentration risk and banks' capital and considers this issue from the aspect of proper measuring the concentration risk and calculating capital surcharges within Pillar 2 of Basel's capital framework. Therefore, Semper and Beltrán (2011) explain the shortcoming of not taking the single-name concentration risk within Basel's Pillar 1. According to the authors, the weakness of Pillar 1 relies on underestimating the capital requirement for the credit risk due to the assumption that a single debtor does not have a considerable effect on the portfolio value as a whole. Thus, this paper develops a mathematical procedure for calculating concentration index (CI) in which risk weights are taken into account. The CI should approximate the concentration risk (single-name and sectors) and it could help the banks for calculating capital surcharges within Pillar 2. Similarly, the study by Grippa and Gornicka (2016) assessed the capital surcharge for covering the concentration risk. Concerning the single-name concentration, the mathematical model developed by the authors, indicates a capital requirement of a maximum of 6.7% of the regulatory capital for covering the unfavourable concentration effects. However, these papers do not test the relationship between the concentration risk and banks' capital, but only provide mathematical models as guidelines for calculating capital surcharges to cover the concentration risk.

Juodis et al. (2009), is similar to the above-explained two studies concerning the mathematical derivation, but it differs from them in a sense of providing statistical relationship for a capital surcharge for the banks that do not have calculated risk parameters. Namely, the authors suggest that risk parameters such as probability of default (PD), loss given default (LGD) and exposure at default (EAD), assigned to a single client are important for calculating capital surcharge within the mathematical model developed in the paper. Furthermore, this paper finds a positive linear relationship between Herfindahl-Hirschmann Index (HHI) and required capital, which

could be used as alternative approach for a capital surcharge, by the banks not having calculated PD and LGD. Namely, HHI increase by unit yields to capital surcharge between 0.8545% and 1.3223% of the total credit portfolio.

With regard to the Macedonian banking sector, there is no such study made by using econometrical analysis that elaborates the relationship between any type of concentration risk and capital. There are studies by Eliskovski (2014) and Nenovski et al. (2018) that investigate capital buffer relative to other determinants, but the concentration risk is not taken into consideration. The first paper by Eliskovski (2014) investigates capital buffer determinants in the Macedonian banking sector for the period 2003q2 to 2013q3 and finds that non-performing loans ratio, non-performing loans coverage, profitability and exposure to currency risk positively affect capital buffer, while loan growth decreases capital buffer. The following two variables: Economic activity measured by the growth rate of the real gross domestic product (GDP) and loans to GDP gap[3], do not affect the capital buffer according to this study. The second paper by Nenovski et al. (2018), among the many relationships considered, analyses the capital buffer determinants for the period from 2005q1 to 2015q2. The study has similar findings concerning the effect of the profitability upon the capital buffer, similarly to Eliskovski (2014), but it does not find a statistically significant effect of the credit risk determinants encompassed by non-performing loans and non-performing loans coverage and loans to GDP gap. Unlike the study by Eliskovski, Nenovski et al. (2018) estimated the negative effect of the real GDP upon the capital buffer. Moreover, this paper takes into account the effect of other determinants on the capital buffer, such as loans to deposits, the central bank bills interest rate, interest rate differential for the domestic currency loans, interest rate differential for the foreign currency loans. The estimated effect of these variables is positive.

Thus, having in mind the above-mentioned researches, it can be summarized that the literature develops various approaches to study the relationship between the single-name concentration risk and banks' capital. This study will rely on the approach implemented in the studies by Eliskovski (2014) and Nenovski et al. (2018) and moreover, the relationship between single-name concentration risk and capital surplus will econometrically be tested for the banking sector of North Macedonia. By applying the econometrical approach, this paper provides a simple model that might help the individual banks for estimating the capital surcharge for covering the single-name concentration, unlike relatively complex mathematical models developed by Semper and Beltrán (2011) and Grippa and Gornicka (2016). Also, the NBRNM would familiarize with the banking sector's capital build-up concerning the concentration risk of interest in this paper.

3 Loans to GDP gap is measured as suggested by the Basel capital framework (with lambda 400,000).

3. Regulatory treatment and stylized facts on the single-name concentration in the Macedonian banking sector

The banking sector is the core element of the total financial system of North Macedonia. Banks are traditional and loans and deposits, encompass the largest part of the balance sheet whereas investment activities take a small part. Furthermore, the banking sector is well-capitalized, profitable and highly liquid, making it a sound and reliable partner for the firms and households within the Macedonian economy.

Having in mind the aim of this paper, a couple of observations can be made about the Macedonian banks' exposure to the single-name concentration risk and its' regulatory treatment. Namely, this type of concentration risk arises from large exposure to single borrowers. According to the regulation imposed by the National Bank of the Republic of North Macedonia NBRNM (NBRM, 2007 and 2008)[4], the large exposure is defined as total exposure to a single borrower or connected borrowers, equal to or higher than 10% of the bank's regulatory capital (own funds). Furthermore, the domestic regulation limits the single-name concentration risk by setting the following two limits for the exposure to nonfinancial borrowers that are not connected with the bank (subsidiary, manager or shareholder): (1) limit of maximum 25% of the regulatory capital, for the total exposure to a single borrower or group of connected borrowers and (2) the total amount of large exposures[5] should not be over 8 times (800%) of the bank's regulatory capital.

The concentration risk[6] is not fully taken into consideration by the domestic regulation on the methodology for determining capital adequacy i.e. Pillar 1. The domestic regulation requires the banks to calculate capital surcharge for the concentration risk within the ICAAP[7] (NBRM, 2011) and it is in compliance with Pillar 2 of Basel's capital framework II.

---

4 Banking Law (Official Gazette of the Republic of Macedonia No. 67/07, 90/09, 67/10, 26/13, 15/15, 153/15, 190/16 and 7/19), available at http://www.nbrm.mk/content/Banking_Law_unof_OVofRM_7_19.pdf and Decision on Exposure Limits (Official Gazette of the Republic of Macedonia No. 31/08, No. 163/08, No. 43/09, No. 91/11, No. 100/12, No. 127/12 and No. 26/17), available at http://www.nbrm.mk/ns-newsarticle-decision_exposure_limits.nspx.

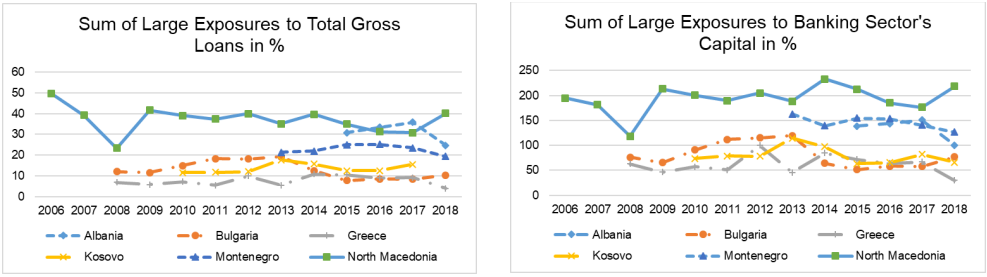
5 Sum of the large exposures to credit risk (10% and above 10% from the regulatory capital (own funds)) by individual bank for all banks in the banking sector divided with the banking sector's regulatory capital (own funds). The large exposures to credit risk are calculated before supervisory deductions.

6 It refers to all types of concentration risk: single-name, sector and industry. According to the NBRM (2012), the banks are obliged to determine the capital requirements in a case of exceeding of the large exposure limits prescribed in the Banking Law. There is no concrete capital requirments for covering the concentration risk when the exposure limits are not exceeded.

7 Decision on Risk Management (Official Gazette of the Republic of Macedonia No. 42/11 and No. 165/12), available at http://www.nbrm.mk/ns-newsarticle-decision_risk_management.nspx

The domestic regulation by the NBRNM neither imposes nor suggests a particular methodology for calculating capital surcharge for the concentration risk. More concretely, the Macedonian banks have the freedom to develop their own calculation or to adopt methodology from the mother bank for those that are subsidiaries of foreign banks. Furthermore, as the banks are obliged to report the ICAAP to the NBRNM, the methodology for each bank is under review of the NBRNM's supervision sector. The purpose of the supervisory review is to ensure that banks have adequate capital support against the concentration risk and all other risks included in ICAAP. It is important to note, that the supervisors in the NBRNM, primarily focus on the qualitative features and efficiency of the banks' risk management and its' ability to prevent losses. The capital size is also important and ultimate absorber of losses, but it does not compensate for the inefficient risk management (NBRM, 2011).

Figure 1: Single-name concentration risk per Balkan countries, measured as the sum of large exposures to gross loans and sum of large exposures to banking sector's capital in %.



Source: *International Monetary Fund (Financial Soundness Indicators Database).*

Figure 1 indicates that the Macedonian banking sector has highest single-name concentration risk compared to other Balkan countries, according to both indicators. The Macedonian banks have large exposures above 200% of the regulatory capital as of 2018, but below the ceiling of 800%, implying that eventual unforeseen and unfavourable performance of the borrowers with large loans might severely damage the banks if the provisioning is not sufficient[8]. Namely, as can be seen from the right graph of figure 1, the banking sectors of Bulgaria, Greece and Kosovo have sufficient regulatory capital to cover the large exposures[9], neglecting the provisioning. Large exposures for Albania, Bulgaria, Greece, Kosovo and Montenegro are defined in similar manner across the countries considered.

8 Beside the regulatory capital, provisioning is additional buffer to cover the expected losses of the large exposures, but the data for provisioning are not available.

9 The large exposures to regulatory capital are below 100% as of 2018 for Bulgaria, Greece and Kosovo.

Namely, large exposure is defined as exposure to a borrower or group of connected borrowers, where its value is equal to or exceeds 10% of a bank's capital[10].

Furthermore, it should be mentioned that the regulatory limit of "ratio of the sum of large exposures to banking sector's capital", is differently defined by the countries' supervisory regulative. Thus, the limit of the sum of large exposures to capital should not exceed more than the following limits: 700% of the regulatory capital for Albania (BoA, 2006), 300% of the Tier 1 capital for Kosovo (CBRK, 2013) and 800% of the regulatory capital for Montenegro (CBMNE, 2008). Bulgaria and Greece have a limit set for exposure to individual borrowers or group of connected borrowers, not to exceed more than 25% of the eligible capital or not more than 150 millions of euros, whichever the higher (EU, 2013). Bulgaria and Greece do not have a limit for the sum of the large exposures, but they consider the exposure to the individual borrower along with its connected clients. Although Bulgaria and Greece have different treatment of this indicator compared to other countries considered, yet they are put in figure 1 for comparison purposes.

4. Data

In order to assess the relationship between the Macedonian banking sector's capital surplus on one side and the single-name concentration risk on another, the following variables presented in Table 1 have been used. Single-name concentration risk is the key independent variable whose effect on the capital surplus has to be estimated. The banks' capital surplus is measured as the difference between the Tier 1 regulatory capital and the minimum capital requirement[11] and the difference expressed as percentage relative to the minimum capital requirement. The capital surplus is taken because the banks, in reality, operate with the excess capital above the minimum capital requirement (8% of the risk weighted assets[12] (RWA)), not with the total amount of capital. Namely, if a bank operating with a capital adequacy ratio below the regulatory prescribed minimum of 8%, then the NBRNM will impose corrective measures due to not complying with the regulatory requirement, notwithstanding the bank still has a positive size of the capital.

10 The term capital is differently defined for the countries considered. It refers to regulatory capital for a bank from Albania and Montenegro (BoA, 2014 and CBMNE, 2008), eligible capital for a bank from Bulgaria and Greece (EU, 2013) and Tier 1 capital for a bank from Kosovo (CBRK, 2013).

11 Minimum capital requirement is 8% of the risk weighted assets (RWA) for the Macedonian banking sector according to the Banking Law (Official Gazette of the Republic of Macedonia No. 67/07, 90/09, 67/10, 26/13, 15/15, 153/15, 190/16 and 7/19).

12 Minimum rate of Tier 1 is 6% of the risk weighted assets for the Macedonian banking sector according to the Banking Law (Official Gazette of the Republic of Macedonia No. 67/07, 90/09, 67/10, 26/13, 15/15, 153/15, 190/16 and 7/19).

Technically, a bank that has a capital adequacy ratio below the minimum as stipulated by the Banking Law, could not be considered as a functioning bank.

The banks' capital surplus is based on the Tier 1 regulatory capital due to the following reasons: Tier 1 is a measure of the banks' capital that contains capital items with the highest quality such as nominal shares and retained earnings, and it is the first loss absorber. Moreover, Tier 1 capital surplus is compared to the regulatory minimum for the total regulatory capital of 8% (not 6% of the RWA for Tier 1), in order to have a conservative measure as a dependent variable[13].

The variables used in this paper, encompass the supply side and the demand side on the Macedonian loan market. Namely, the real GDP variable is demand-side variable as representative of the income capacity of the Macedonian economy. The other variables are representatives of the supply-side on the loan market and they affect the banks' performances for building up the capital surplus and provide stable loan supply. More concretely, they represent the profit capacity of the banks for creating capital surplus (ROE), and the risk variables that are eventually covered by the regulatory capital such as the single-name concentration risk exposure and the credit risk exposure (nonperforming loans). The inflation rate has dual nature and could be considered as both demand and supply factor because both the banks and clients are affected by the higher inflation. Total gross loans are indirectly taken in the analysis, as the denominator in the key independent variable i.e. single-name concentration risk and in the secondary important variable - the NPL ratio. It should be noted that such defined measure for the single-name concentration risk (value of large exposures / total gross loans) considers only the size of the large exposures. It does not consider how risky the borrowers are to whom large exposures have been approved to, and this could be considered as a disadvantage of the measure[14]. Also, all the series are seasonally adjusted by using the additive Census X12 option in EViews 8.

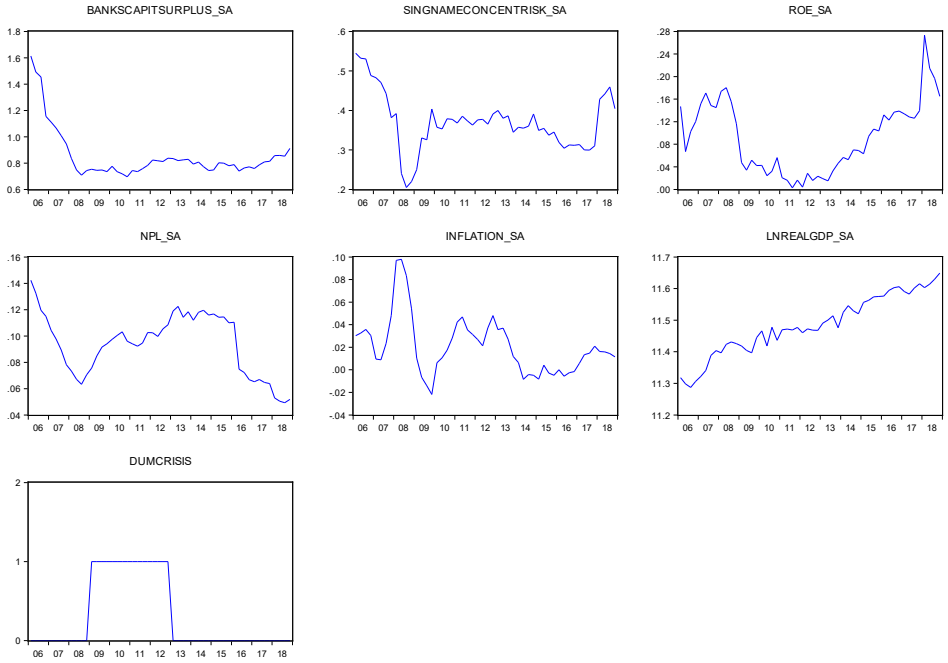
13 Capital surpluss is less when compared to 8% as higher threshold and thus it is conservative measure, unlike when comparing to 6% as lower threshold and consequently the capital surpluss would be higher.

14 There is no information about the creditworthiness of the clients to whom the large exposures are approved to, or whether they are delaying the payment obligations and have offered well collateral.

Table 1: Definition of the variables and data sources

Abbreviation	Dependent/ independent variable	Description	Expected effect	Period	Source
Banks' capital surplus	Dependent	(Regulatory Tier 1 capital - minimum capital requirment) / minimum capital requirment, expressed in %; regulatory Tier 1 capital in millions of denars; minimum capital requirment in millions of denars calculated as RWA multiplied by 8% as regulatory capital adequacy minimum		2006q1 to 2018q4	International Monetary Fund, Financial Soundness Indicators Database
Single-name concentration risk	Independent	Value of large exposures / total gross loans, expressed in %; Value of large exposures to credit risk (10% and above 10% from the regulatory capital (own funds)) by individual bank for all banks in the banking sector in millions of denars; total gross loans in millions of denars	+ or -; Positive sign indicates prudent banking sector because it increases the regulatory capital surplus as loss abbsorber relative to rise of the single-name concentration risk; Negative sign indicates imprudent banking sector because increase of the single-name concentration risk at the expense of the regulatory capital could cause severe damage in a case of unfavorable risk materialization	2006q1 to 2018q4	International Monetary Fund, Financial Soundness Indicators Database
Return on equity (ROE)	Independent	Net income / capital, expressed in %; Net income in millions of denars; capital in millions of denars	+; Higher profitability of the banking sector is positively associated with the capital surplus because by retaining the earnings, the banks increase the regulatory capital	2006q1 to 2018q4	International Monetary Fund, Financial Soundness Indicators Database
Nonperforming loans (NPL) ratio	Independent	Nonperforming loans / total gross loans, expressed in %; nonperforming loans in millions of denars; total gross loans in millions of denars	+ or -; Positive sign indicates prudent banks as they increase the capital surplus when the bad loans rise; Negative sign indicates imprudent banks having less capital surplus in order to cover unfavorable effects of the credit risk	2006q1 to 2018q4	International Monetary Fund, Financial Soundness Indicators Database
Inflation rate	Independent	(CPIt – CPIt-4) / CPIt-4, expressed in %; base 2010=100; CPI is Consumer Price Index	+ or -; The banks might increase the capital surplus as response to higher inflation in order to account for the macroeconomic instability; Positive inflation might decrease the capital surplus as long as the banks do not perceive the higher inflation as threat to the macroeconomic stability	2006q1 to 2018q4	State Statistical Office of North Macedonia
Real Gross Domestic Product (Real GDP)	Independent	Natural logarithm of the real GDP; real GDP at 2005 prices, in millions of denars	+ or -; A positive sign of the coefficient in front of this variable indicates that banks build up the capital surplus during expansion of GDP and create buffer timely; Negative coefficient indicates that banks decrease their capital surplus during good economic times, due to higher lending that increases RWA	2006q1 to 2018q4	State Statistical Office of North Macedonia
Dummy variable for the global financial crisis and subsequent European sovereign debt crisis	Independent	Variable to account for the unexpected effects of the mentioned crisis and takes values of 1 for the period from 2009q1 to 2012q4			

Figure 2: Graphical overview of the variables used



Source: *International Monetary Fund (Financial Soundness Indicators Database) and State Statistical Office*

5. Methodology and econometric specification

Johansen cointegration technique (Vector Error Correction Model-VECM) will be employed to assess the effect of the single-name concentration risk on the banking sector's capital surplus. The Johansen technique allows variables to be taken with the same order of integration and uses lags in order to mitigate the problem that might arise from the endogenous variables (Haris and Sollis, 2003). The integrative features of the variables were tested by employing two tests: The Augmented Dickey-Fuller test (ADF) and the Phillips-Perron test (PP)[15]. The results from the tests are conflicting for few variables meaning that both tests indicate different levels of integration for the same variable[16], and also the tests estimate conflicting results depending on the critical values for 1%, 5% and 10% statistical level[17]. However, despite these conflicting results, the tests show that all the variables are non-stationary in the level and that are integrated of order 1 - I(1)[18].

15 Intercept and trend parameters are not included in ADF and PP testing.

16 Banks' capital surplus is such variable.

17 Banks' capital surplus, NPL ratio and inflation rate are such variables.

18 The results are not presented in order to save space.

The endogeneity arises from the mutual interaction of the variables considered in the regression (1). Namely, higher single-name concentration risk stimulates the banks to increase or decrease the capital surplus as prudent or imprudent behavior, and moreover, higher capital surplus provides a base for undertaking higher concentration risk. Additionally, this technique provides long-run equilibrium coefficients and the error correction mechanism (ECM) which presents the speed of adjustment of short-run disequilibrium towards long-run equilibrium.

Therefore, the below given regression (1) was constructed and the long-run coefficients[19] were estimated.

Table 2: Correlation matrix between the variables

	Banks' capital surplus	**Single-name concentration risk**	**Return on equity (ROE)**	**Nonperforming loans (NPL) ratio**	**Inflation rate**	**Real Gross Domestic Product (Real GDP)**
Banks' capital surplus	1.00	0.77	0.24	0.39	0.12	-0.57
Single-name concentration risk	0.77	1.00	0.09	0.41	-0.06	-0.41
Return on equity (ROE)	0.24	0.09	1.00	-0.58	0.11	0.20
Nonperforming loans (NPL) ratio	0.39	0.41	-0.58	1.00	-0.15	-0.44
Inflation rate	0.12	-0.06	0.11	-0.15	1.00	-0.37
Real Gross Domestic Product (Real GDP)	-0.57	-0.41	0.20	-0.44	-0.37	1.00

Source: *Author's calculations.*

The correlation matrix indicates that multicollinearity is not an issue of concern between the regressors as it is low. Also, the correlation between the dependent variable (Banks' capital surplus) and the main independent variable (Single-name concentration risk) is relatively high, but below the threshold of 0.8 and could not be considered as a threat to the results.

19 The dummy variable for the global financial crisis and subsequent European sovereign debt crisis is not contained here because it is taken as an exogenous variable to account for the unexpected effects of the mentioned crisis.

6. Estimation results

The regression (1) was developed in 7 sub-regressions by combining various independent variables to consider whether the coefficient in front of the single-name concentration risk changes its effect. Table 2 below contains the estimated long-run coefficients in front of the independent variables for the 7 sub-regressions (I-VII) developed from the regression (1) and ECM term, for each sub-regression separately.

Table 3: Estimated long-run coefficients for the regression (1) by employing VECM method, banks' capital surplus is the dependent variables (normalization of banks' capital surplus = -1)

Dependent variable: Banks' capital surplus							
	I	II	III	IV	V	VI	VII
Single-name concentration risk	**0.69***	**0.80***	**0.65*****	**0.88***	**1.56***	**1.10***	**2.20***
ROE		-0.16				0.51***	0.80*
NPL ratio			-0.91				
Inflation rate				0.62		0.37	
Real GDP					0.34		-0.62**
ECM	-0.25*	-0.26*	-0.22*	-0.32*	-0.14**	-0.34*	0.06
No serial correlation in the first order (probability) ***	0.16	0.12	0.39	0.03	0.01	0.02	0.18
*, ** and *** indicate statistically significant coefficient at 1%, 5% and 10% level of significance (H0: coefficient=0); *** a figure higher than 0.01 indicates non rejection at 1% statistical level of the following null hypothesis: (1) no serial correlation in the residuals at the first order.							

Source: *Author's calculations.*

The results presented in Table 2 for the sub-regressions I-VII arising from the regression (1), are indicating prudent behaviour of the Macedonian banking sector relative to the single-name concentration risk. The sub-regressions I - VII yielded a positive coefficient ranging from 0.65 to 2.20. The meaning of this coefficient is that an increase of the single-name concentration risk by 1 percentage point (p.p.) affects positively the banks' capital surplus within the interval from 0.65 p.p. to 2.20 p.p., ceteris paribus. Thus, these sub-regressions imply that the Macedonian banking sector accounts for the eventual unfavourable effects of the single-name concentration risk and accordingly, it increases the capital surplus to cover eventual unexpected losses. The effect is positive across all estimated sub-regressions.

In order to have a monetary insight of the estimated coefficient, a calculation was made with an aim of obtaining the minimum amount of additional capital surplus in millions of euros.

Namely, by taking the minimum value of the coefficient of 0.65 p.p. and applying to the last number of the banks' capital surplus of 87.56%[20], as of 2018q4, it indicates that the banks would be prudent if they increase the regulatory capital by the minimum amount of 3.1 million of euros[21], in order to obtain the capital surplus of 88.21% (87.56%+0.65 p.p.=88.21%), under the assumption of rise of the single-name concentration risk by 1 p.p. which is by 53.7 millions of euros[22]. Hence, a future increase of the banking sector's single-name concentration risk by 53.7 million of euros compared to the number obtained as of 2018q4, would require an increase of the banking sector's capital surplus by minimum amount of 3.1 million of euros, under the assumption of not changing both the total gross loans and the minimum capital requirement, compared to 2018q4. This minimum amount (3.1 million of euros) could serve as a benchmark for assessing the capital surcharge for the single-name concentration risk provided by each bank. Also, the minimum amount is more appropriate for using a benchmark as there are large, medium and small banks each with different capital sizes, profitability and opportunity for increasing the regulatory capital.

Finally, the ECM term is mostly negative suggesting the correction of the disequilibrium towards equilibrium, with the exception to the sub-regression VII, but it is statistically insignificant. The diagnostic tests for the serial correlation do not indicate large problems in the residuals.

The results regarding the other variables are in line with the expectations except for the statistically insignificant effect of the NPL ratio and inflation rate. The ROE variable has a positive effect of 0.51 p.p. and 0.80 p.p., ceteris paribus, and it is logical having in mind that profitability is very important source for increasing the regulatory capital. Furthermore, the real GDP has a negative effect of 0.62 p.p., ceteris paribus, implying that banks lend in good times at the expense of the capital surplus.

---

20 Minimum capital requirement for the Macedonian banking sector is 478.2 millions of euros (RWA of 5,978 millions of euros times 8%=478.2) and Tier 1 regulatory capital (896.9 millions of euros). Thus, ((896.9-478.2)/478.2)*100=87.56%.

21 Tier 1 regulatory capital of 896.9 millions of euros increased by 3.1 million of euros yields to Tier 1 regulatory capital of 900 millions of euros. Moreover, ((900-478.2)/478.2)*100=88.21% i.e. banks' capital surplus of 88.21% which is by 0.65 p.p. higher compared to the 87.56% as of 2018q4.

22 Value of large exposures (10% and above 10% from the regulatory capital (own funds)) is 2,154.6 millions of euros and total gross loans are 5,368.9 millions of euros, yielding to single-name concentration risk of (2,154.6/5,368.9)*100=40.13%, as of 2018q4. The single-name concentration risk ratio of 41.13% (40.13%+1p.p.), is obtained by an increase of the value of the large exposures by 53.7 millions of euros ((2,154.6+53.7)/5,368.9)*100=41.13%.

7. CONCLUSION

This study aims to investigate the relationship between the concentration risk and capital surplus for the Macedonian banks. The concentration risk is considered as the single-name credit risk exposure or more concretely, it measures the total value of large loans approved to individual borrowers as a percentage of the total gross loan portfolio. Vector Error Correction Model (VECM) or known as the Johansen cointegration technique was applied for investigating the mentioned relationship throughout the period from 2006q1 to 2018q4.

Therefore, the single-name concentration risk has to be taken seriously for the case of North Macedonia due to the very high potential for causing loss to the banks and the fact that the banking sector's regulatory capital is not sufficient to fully cover the eventual realization of this risk. Therefore, assessing the relationship between the banks' capital surplus and this type of concentration risk is of particular importance for the Macedonian banks as it would provide insight into the capital practice to cover this risk and whether the banks prudentially address this issue.

The results suggest that the Macedonian banking sector is prudent and increases the capital surplus from 0.65 p.p. to 2.20 p.p. as the single-name concentration risk rises. Thus, this investigation finds a direct-proportionate relationship between the two variables and moreover, it assesses the average increase of the capital that the Macedonian banking sector sets aside as a response to the increase of the single-name concentration risk. The minimum amount by which the Macedonian banking sector should increase the capital surplus is 3.1 million of euros (0.65 p.p. of the minimum capital requirement as of 2018q4) as a response to the increase of the large exposures by 53.7 millions of euros (1 p.p. of the total gross loans as of 2018q4), as indicated by this study and under the assumption of not changing both the total gross loans and the minimum capital requirement (compared to 2018q4).

Therefore, with this study, the domestic policymakers get an insight into the banks' average capital increase in order to cover the eventual unfavourable effects of the concentration risk. The best defence from all risks, including the concentration risk, is solid banking risk management unlike building up a large capital base that captures funds that could not be used for lending. However, the banking risk management could not always be perfect for minimizing the losses and thus the banks will be rational if they continue with such prudent practice and increase the capital surplus by the minimum amount of 3.1 million of euros, in order to cover the single-name concentration risk accordingly. Having in mind the mentioned estimated effect, the domestic policymakers now have a clear benchmark for assessing the proper size of the capital surcharge for the single-name concentration risk, when making on-site and off-site supervision to each bank in North Macedonia.

REFERENCES

1. Acharya, V., Drechsel, I., and Schnabl, P., (2014). "A Pyrrhic Victory? Bank Bailouts and Sovereign Credit Risk", *The Journal of Finance*, 69(6), pp. 2689-2739.

2. Bank of Albania (BoA), (2006). "Law on Banks in the Republic of Albania (Official Journal of Albania No. 9662/2006, abrogated with 1/2011, ammended with 10481/2011, abrogated with 133/2013 and ammended with 131/2016)", available at https://www.bankofalbania.org/About_the_Bank/Legislation/Laws/Document_Title_17855_1.html

3. Bank of Albania (BoA), (2014). "Regulation on the Risk Management from Large exposures of Banks (Official Journal of Albania No. 10/2014", available at https://www.bankofalbania.org/Supervision/Regulatory_Framework/Supervision_regulations/Regulation_On_the_Risk_Management_from_Large_Exposures_of_Banks.html

4. 4. Bank of Spain (BoS), (2008). "Guidelines on the Internal Capital Adequacy Assessment Process (ICAAP) at Credit Institutions". The version updated by decisions of the Executive Commission of the Bank of Spain of 18.03.2009, 26.01.2011 and 26.10.2012, available at https://www.esrb.europa.eu/mppa/cbmd/shared/pdf/Spain/2013-12-09_Guidelines_ICAAP.pdf?d4d658c6b10e47f9ed87bf47a4be2b29

5. Brunnermeier, M., K., (2009). "Deciphering the Liquidity and Credit Crunch 2007-2008", *Journal of Economic Perspectives*, 23(1), pp. 77-100.

6. Central Bank of the Republic of Kosovo (CBRK), (2013). "Regulation on Large Exposures", available at https://bqk-kos.org/repository/docs/korniza_ligjore/english/Credit%20Risk%20Management%20for%20Banks.pdf

7. Central Bank of Montenegro (CBMNE), (2008). "Banking Law (Official Gazette of Montenegro 17/2008, 44/2010, 40/2011 and 73/2017"), available at https://www.cbcg.me/en/about-us/legislation/laws

8. Eliskovski, M., (2014). "The Determinants of Capital Buffer in the Macedonian Banking Sector", *Journal of Contemporary Economic and Business Issues*, 1(2), pp. 19-33.

9. European Union (EU), (2013). "Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on Prudential Requirments for Credit Institutions and Investment Firms and Amending Regulation (EU) No 648/2012 (Official Journal of the European Union L 176/1)" available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R0575

10. Grippa, P., and Gornicka, L., (2016). "Measuring Concentration Risk - a Partial Portfolio Approach", International Monetary Fund, Working Paper, WP16/158.

11. Harris, H., and Sollis, R., (2003). "Applied Time Series Modelling and Forecasting", Wiley, West Sussex.

12. Juodis, M., Valvonis, V., Berniûnas, R., and Beivydas, M., (2009). "Measuring Concentration Risk in Bank Credit Portfolios Using Granularity Adjustment: Practical Aspects", *Monetary Studies (Bank Of Lithuania),* 13(1), pp. 43-63.

13. Kozak, S., (2015). "Concentration of credit exposure as a significant source of risk in banking activities: The idea and methods of estimation", *e-Finanse: Financial Internet Quarterly ISSN 1734-039X*, 11(3), pp. 103-115.

14. National Bank of the Republic of Macedonia (NBRM), (2007). "Banking Law (Official Gazette of the Republic of Macedonia No. 67/07, 90/09, 67/10, 26/13, 15/15, 153/15, 190/16 and 7/19)", available at http://www.nbrm.mk/content/Banking_Law_unof_OVofRM_7_19.pdf

15. National Bank of the Republic of Macedonia (NBRM), (2008). "Decision on Exposure Limits (Official Gazette of the Republic of Macedonia No. 31/08, No. 163/08, No. 43/09, No. 91/11, No. 100/12, No. 127/12 and No. 26/17)", available at http://www.nbrm.mk/ns-newsarticle-decision_exposure_limits.nspx

16. National Bank of the Republic of Macedonia (NBRM), (2012). "Decision on on the methodology for determining capital adequacy (Official Gazette of the Republic of Macedonia No. 47/12, No. 50/13, No. 71/14, No. 223/15, No. 218/16, No. 218/18, No. 221/18, No. 181/19 and No. 181/19)" available at http://www.nbrm.mk/content/Regulativa/Decision_on_capital_adequacy_unofficial_text(2020).pdf.

17. National Bank of the Republic of Macedonia (NBRM), (2011). "Decision on Risk Management (Official Gazette of the Republic of Macedonia No. 42/11 and No. 165/12)", available at http://www.nbrm.mk/ns-newsarticle-decision_risk_management.nspx

18. 17. Nenovski, T., Bishev, G., and Eliskovski, M., (2018). "Is There a Role for Monetary Policy in Stabilizing Banking Sector Soundness and Lending?", *Journal of Sustainable Development*, 7(18), pp. 34-61.

19. Semper, J., D., C., and Beltrán, J., M., T., (2011). "Sector Concentration Risk: a Model for Estimating Capital Requirements", *Mathematical and Computer Modelling*, 54, pp. 1765-1772.

Evica Delova-Jolevska

Milan Eliskovski

ISTRAŽIVANJE ODNOSA IZMEĐU RIZIKA KONCENTRACIJE I VIŠKA KAPITALA: EVIDENCIJA BANKARSKOG SEKTORA U MAKEDONIJI

SAŽETAK

Banke pozajmljuju velika sredstva velikim klijentima i izložene su riziku koncentracije. Rizik koncentracije je neizravna izloženost banaka kreditnom riziku i može uzrokovati velike gubitke u slučaju neizvršenja obaveza velikih klijenata. Stoga bi prudentne banke povećale kapitalni višak s rastom izloženosti koncentracije kako bi očuvale svoju stabilnost protiv pogoršanja performansi velikih klijenata. Tako se u ovom radu istražuje utjecaj rizika koncentracije od individualnih klijenata na višak kapitala u makedonskom bankarskom sektoru. Analiza je urađena primjenom Vector Error Correction Model na kvartalnim podacima 2006q1 do 2018q4. Rezultati sugeriraju da je makedonski bankarski sektor prudentan i povećava kapitalni višak sa 0,65 postotnih bodova (pp) na 2,20 pp, budući da se rizik koncentracije individualnih klijenata povećava za 1 pp. Konkretnije, budući porast velikih izloženosti u bankarskom sektoru za 53,7 miliona eura (1 pp od ukupnih bruto kredita u 2018q4), zahtijevalo bi povećanje kapitalnog viška za minimalni iznos od 3,1 milion eura (0,65 pp minimalne kapitalne potrebe od 2018q4), pod pretpostavkom da se ne mijenjaju ni ukupni bruto kredite ni minimalni kapitalni zahtjev, u odnosu na 2018q4.

Ključne riječi: *višak kapitala, rizik koncentracije, bankarski sektor Makedonije*

JEL: *C32, G21, G32*

Ljupcho Eftimov[1]

Tihona Bozhinovska[2]

ADJUSTMENTS OF BOARD COMPOSITION DURING COVID-19 CRISIS: ANALYSIS OF THE MACEDONIAN COMPANIES

ABSTRACT

The aim of this paper is to make an analysis of the reported changes in the boards' composition of the Macedonian stock exchange -listed companies during the Covid-19 crisis. In order to achieve this objective, secondary data of the companies reports published on the Macedonian stock exchange website were used. The sample consists of 80 companies, and firstly we performed qualitative analysis on the companies' reports regarding boards' composition changes (over 30 companies reported changes). Afterwards, in order to increase the understanding of the factors that determine boards' composition in Macedonian joint-stock companies, we designed a model to examine the relation of company characteristics, industry characteristics and market perception of company value with board size, board independence and board diversity. The results from our analyses show that during the Covid-19 period a substantial number of companies from the sample have made changes in board composition and only 9.38% of the companies that reported change (over 30) decided to reappoint the same members. However, this does not mean that the Covid-19 crisis has been the only factor influencing the changes. Furthermore, one of our conclusions from the presented results in the study is that most of the variations in board/boards size can be explained by the differences in firm characteristics (in particular operating revenues and chosen boards structure), while the variations in board independence can be explained by firm characteristics (in particular operating revenues and chosen board structure) and industry characteristics.

Keywords: *board composition, board size, board diversity, Covid-19 crisis, listed companies*

JEL: *M10, M12, M14, G34*

---

1 Associate Professor at Faculty of Economics-Skopje, Ss. Cyril and Methodius University in Skopje e-mail:ljupco.eftimov@eccf.ukim.edu.mk

2 Ph.D Student at Faculty of Economics-Skopje, Ss. Cyril and Methodius University in Skopje e-mail:tihonabozhinovska@gmail.com

1. INTRODUCTION

COVID-19 pandemic created unprecedented turmoil in every industry and it nevertheless represents a "true crisis for nearly every board of directors today" (Deloitte, 2020). During the COVID-19 era, the dimensions of the inward-facing governance of any single company are crucial for the company's ability to cope with the challenges and to implement the required changes as soon as possible. It can be noted that in this kind of situation the procedural and behavioural governance is highly important. This crisis one more time affirmed that corporate governance is a central aspect of business (Dibra, 2016) since the proper strategic direction and management was critical for the company's survival and boards had no other choice than to step in. Consequently, boards' effectiveness in the turbulent times during COVID-19 pandemic significantly depended on boards' members' readiness and willingness for implementing changes in their operating models. Hence, it is expected that many companies' board/boards composition during this crisis is going to change.

As the analysis of corporate governance literature of the past few decades shows, the number of studies focused on the corporate governance structures is dramatically increasing after every crisis. During this period the corporate world faced two major crises: the first one shook the US corporations at the beginning of this century (in which one of the most popular episodes was the Enrons' failure) and the second one was the 2007-2008 financial crisis. In fact, through these two crises, the failure in different dimensions of corporate governance was noted. Namely, the first crisis showed the consequences of the constant neglecting of procedural and behavioural governance of any single company, while the second one manifested the weaknesses in the systematic dimension of governance which "refers to the interlinking relationships between separate companies that form an economic or sectoral structure" (Bloomfield, 2013, p. 153). Therefore, it is expected that this crisis created by the COVID-19 pandemic is going to also increase the research regarding corporate governance structures, their role in the period of crises and how did their composition (size, independence, diversity) relate to organizational survival.

Most of the studies published recently on topics regarding boards during the COVID-19 pandemic analyzed the boards' roles during the crisis (Deloitte, 2020; Benson-Rea et al, 2021) and the boards functioning during this period (SpencerStuart, 2020; McKinsey&Company,2021; Kaur et al. 2021). Others give recommendations regarding the most important research areas in the following period and they distinct board composition as one of them (Eklund, 2021, Kaur et al. 2021). Thus, having in mind the existent gap of the research in this segment in the Macedonian context, the aim of this paper is to make an analysis of the reported changes in boards' composition of the Macedonian stock exchange-listed companies during COVID-19 crisis and the determinants of the board composition characteristics in the period 2020-2021.

2. Literature review

in order to better elaborate the importance of board's composition, in this section, we are going to make a brief overview of the corporate governance theories and their perspective on board's composition issues. Afterwards, we are going to examine the empirical studies investigating the determinants of board/boards size, independence and diversity, in order to define the most appropriate methodological approach for analyzing the Macedonian context.

According to Jansen and Fama (1983), the separation of ownership and control leads to the agency problems. Jensen and Fama (1983) main hypothesis is that "the contract structures of all of these organizations separate the ratification and monitoring of decisions from initiation and implementation of the decisions" (p.302). In these terms, decision management includes decision initiation and implementation and these two steps of the decision process are typically allocated to the same agents, while decision control includes ratification and monitoring. Concerning the board composition, Jensen (1993) argues that boards with more than seven or eight members (oversized boards) are less likely to function effectively and are easier for the CEO to control (p. 865). Additionally, Kiel и Nicholson (2003) explain that agency theory leads to two normative suggestions: 1. the majority of board members should be outside or independent directors, and 2. it is necessary to avoid CEO duality (p.190). Agency theorists suggest that boards should be more independent from top management teams, smaller and accountable and with an independent board chair (Dubbin и Jung, 2007, p. 30/31).

The main assumption of the stewardship theory is that "the model of man is based on a steward whose behaviour is ordered such that pro-organizational, collectivistic behaviours have a higher utility than individualistic, self-serving behaviours" (Davis et al, 1997, p.24). This theory is based on the assumptions in organizational psychology and organizational sociology and argues that executives as stewards are motivated to act in the best interests of their principals (Davis et al, 1997). When CEOs act like stewards "their pro-organizational actions are best facilitated when the corporate governance structures give them high authority and discretion" (Davis et al, 1997, p.26). According to stewardship theory CEO duality and the preponderance of executive directors among the board can increase boards' effectiveness and consequently lead to higher corporate financial performance (Donaldson, 1990, p.377). The authors of stewardship theory do not support the concept of board independence, which has gained a significant popularity in the last few decades in the USA.

The resource dependence theory points out that "the key to organizational survival is the ability to acquire and maintain resources" (Pfeffer and Salancik, 2003, p.2) and therefore organizations continually seek to manage their dependence on the environment (Pfeffer, 1972).

According to the resource dependence theory, the board is considered as an instrument for dealing with the organization's environment through which they coopt, or partially absorb, important external organizations with which they are interdependent (Pfeffer, 1972, p.222). In addition, these theorists reason that the requirement for a large board undoubtedly increases as the size of the organization itself increases and that the organizations with greater requirements for external financing are expected to have a smaller percentage of inside directors on their boards (Pfeffer, 1972, p. 221-222). Furthermore, according to this theory postulates "…more diverse board will provide more valuable resources, which should produce better firm performance." (Carter et al 2010, p.398).

"The contingency approach may be seen as covering two areas of analysis: first, leadership theory and the 'micro' problems of motivation and productivity in the workgroup; and secondly, organization theory with its more 'macro' problems of designing organization structures and systems" (Redding, 1976, p. 199). In the past decade, this approach was used in studies focused on researching which contingencies have an impact on the effectiveness of corporate governance practices. According to Aguilera et al (2008) "contingencies thus imply that the role of corporate governance is likely to differ in ways contingent on both external and internal resources, which are critical within the context of the firms' organizational, market, sectoral, regulatory, or institutional environment" (p. 481).

In addition to this review of board roles from a theoretical perspective and their implication for board's composition issues, it can be also noted that some authors have given comprehensive systematization of boards crucial activities during the COVID-19 crisis. According to Benson-Rea et al. (2021), the board had three most important roles in the COVID-19 pandemic period:

1. ***Boards as a communication hub*** – responsible for the communication with the internal and external stakeholders;
2. ***Board as a strategic change agent and the crisis as a strategic opportunity*** – which means that boards had to get involved in the discussion together with the management about the future of the business and to make decisions for implementing radical strategic change to the operational model.
3. ***Board as an organizational guardian*** – which means that the boards were responsible for the survival of the organization.

Over the last few decades, numerous empirical studies, using the assumption from various theoretical approaches, are trying to examine the determinants of board size, independence and diversity. These studies differ significantly in the following areas: scope, methodology and results.

It is important to notice that most of them cover data from the companies from the USA. In the following section, we are going to analyse some of their results.

The study of Hermalin and Weisbach (1988), on a sample of 142 companies, indicates that weak organizational performance, firm participation in various product markets and CEO succession processes have an impact on board composition. Pearce III and Zahra (1992), on a sample of 119 companies, have found that board composition is determined by the influences from the organizational environment, the corporate strategy and the past organizational performance. Bathala and Rao (1995), are suggesting that "…the proportion of outside directors on the board is inversely related to the managerial ownership of equity, the use of debt leverage in the firm, and the dividend payout policy"(p. 62). In addition, this study shows a positive relation between the proportion of outside directors and the percent of equity ownership by the institutional investors which is consistent with the assumption of the agency theory.

Bhagat and Black (2002) have noted that there is a strong negative correlation between past organizational performance and board independence. Kiel and Nicholson (2003) have found that "…large companies have larger boards and greater proportion of outside directors, more interlocked boards and are more likely to separate the roles of chairman and CEO" (p.201). Davidson III and Rowe (2004) report that the relationship between organizational performance and board composition differs as a result of the differences in methodology. Boone et al. (2007) in their research on the determinants of board size and independence drew the following three conclusions: Larger more seasoned, and more diverse firms tend to have larger and more independent boards; firms in which managers' opportunities to consume private benefits are large, or in which the cost of monitoring managers is small, have larger boards; and firms in which managers have substantial influence and in which the constraints to managerial influence are weak, have less independent boards" (p.90).

Guest (2008) on a research sample of UK firms, have found that "board size and outsider proportion are positively impacted by greater advising needs and negatively impacted by CEO influence, and that outsider proportion is not related to monitoring costs or benefits" (p.22). The results of the Coles et al. (2008) indicate that complex firms have larger boards with more outside directors (p.329).

Lehn et al. (2009) on a sample of 82 US companies that survived in the period 1935-2000 have found that the companies' size, the opportunities for growth, merger activity, and geographical expansion are determinants of board size and composition, but they did not find a robust relationship between and that firm performance and these board characteristics. Similarly, on a sample of Australian companies, Wang (2009) has shown that organizational performances in the recent past do not have a significant impact on board independence.

The results of Chouchene (2010), on a sample of French companies, imply that the presence of independent directors is positively related firm size and that board independence is strongly negatively related to the coalition between top management and dominant shareholders. Furthermore, their research shows that institutional investors are positively related to board independence.

Ferreira and Kirchmaier (2013) investigated the determinants of recent changes in board size, board independence and board gender diversity in the joint-stock companies from different countries and their research implies that firm size, organizational performances (profitability) and the accepted board system (one-tier or two-tier) has a statistically significant influence on board size. Furthermore, they note that company size, profitability and market valuation of the company are politely related to board independence, and that profitability is a determinant of the board gender diversity in European boards.

Min (2017) on a sample of Korean-listed companies has found that board size is related to the firm complexity and the power of the controlling shareholders.

As for the empirical evidence related to the determinants of board gender diversity, it can be outlined that several studies have reported a positive association between company size and board diversity (Hyland and Marcellino (2002), Saaed et al (2016), Arnegger et al (2014). Additionally, Esteban-Salvador (2011), suggest that in the Spanish context "four variables contribute significantly to predicting the presence of women on the corporate board or a single woman if she is the CEO or chair: firms not listed on the continuous market but obliged to present an ACGR to the CNMV; firms from the consumer service sector; firms from the real estate sector; and firms that have a board with a high participation in the capital" (p.324). De Jonge (2014) also found a relation between women directors and industry sector in the research on a sample of corporations from China and India. Oyotode-Adebile and Ujah (2020), have argued that firms headquartered in high social capital counties have higher diversity in their corporate board. The overall conclusion of the analyzed empirical studies include:

- A significant number of studies have implied that board size is related to the company size (Pearce III and Zahra, 1992; Denis and Sarin, 1999; Kiel and Nicholson, 2003; Boone et al., 2007; Lehn et al. 2009; Ferreira and Kirchmaier, 2013; Alnaif, 2014). Furthermore, board size is also related to organizational performances (Pearce III and Zahra (1992); Ferreira and Kirchmaier (2013).
- Positive and significant relation between board independence and company size is found in several research papers (Pearce III и Zahra, 1992; Denis и Sarin, 1999; Kiel и Nicholson, 2003; Boone et al., 2007; Guest,

2008; Chouchene, 2010; Ferreira и Kirchmaier, 2013). However, in regard to the impact on organizational performances to the board independence the findings are different: Hermalin and Weisbach (1988), Pearce III and Zahra (1992) and Bhagat and Black (2002) found negative and significant relation, while Denis and Sarin (1999) and Ferreira and Kirchmaier (2013) report a positive and significant relation between board independence and organizational performances. Wang (2009) has noted that organizational performances in the recent past do not have a significant relation to the board independence. The studies from the end of the previous and the beginning of the ongoing century, usually measure board independence as a percentage of outside directors (Hermalin and Weisbach, 1988; Pearce III and Zahra, 1992; Bathala and Rao 1995; Denis and Sarin, 1999; Guest, 2008). This is a result of the fact that board independence is more actualized after the scandals of the beginning of this century. This remark is important since Davidson III и Rowe (2004) have found that the measurement of board independence can significantly influence the research results;

- As for the empirical evidence related to the determinants of board gender diversity, it can be outlined that several studies have reported a positive relationship between company size and board gender diversity (Hyland and Marcellino (2002), Saaed et al (2016)). Additionally, Esteban-Salvador (2011) suggests that women membership in corporate boards in Spain is related to several variables and that the sector in which the company competes is one of them.

3. Methodology

3.1. Sample and Data

The data were collected during July 2021 from the Macedonian Stock exchange website. Namely, we used secondary data available at the Macedonian Stock exchange web site. Companies listed on the Macedonian Stock Exchange are obligated by Macedonian laws to report any change in board composition, as well as to publish their Annual report and summary of financial statements quarterly. To collect the data, we used all the reports available. The data for the profitability measures, the operating revenues, the market-to-book ratio from the last year available (2020), while the data regarding board size, independence and diversity are including the changes made until the last day of data collection.

The sample consists of 80 companies that are listed on the Macedonian Stock exchange on three different segments: super listing, exchange listing and mandatory listing. The super listing includes 1 enterprise, the exchange listing includes 25 enterprises, and the mandatory listing includes 71 enterprises. From them we exclude the banks (7 entities) and insurance companies (2 entities) since they are regulated with the Banking Law[3] and Law on Insurance Supervision[4]. Furthermore, one (1) company organized as a limited partnership with stocks was excluded. Additionally, the companies that were under suspension from the mandatory listing in the analysed period (4 entities) were not also excluded, as well as several companies with ongoing corporate governance issues (some of them on the Observation List by on the Macedonian Stock Exchange).

To give a more holistic review of the companies included in the sample, we would emphasize that most of these companies were founded in the socialist system that was based on public ownership (also known as collective or common ownership) of the means of production. These companies underwent the process of privatization which started in 1990/91 and for most of the companies ended in 1995. Meanwhile, these companies had to reorganise and adapt to the values of the new system, in an extraordinary turbulent economic and political environment. Some of them successfully maintained their operation and continued to be leaders in the industries where they compete, while others had to implement turnaround strategies and focus on selective products and make market pruning in order to maintain profitability. Consequently, the companies from the second group significantly decreased in terms of assets, revenues and/or the number of employees. However, most of them managed to reorganise. The third group of these companies decided to continue its growth by implementing a strategy of conglomerating diversification. And finally, some of them transformed into holding companies.

Additionally, to increase the understanding of the context in which the companies are operating, we would mention that join-stock companies in our country have the legal possibility to choose between one-tier and two-tier board structures (Article 342 of the Macedonian Company Law). This practice is not unusual and according to Ferreira and Kirchmaier (2013), 9 of the 28 European countries they analyzed have this kind of legal framework. Furthermore, according to Article 367 of the Macedonian Company Law, the number of members on the board of directors should be in the range between 3 and 15.

---

3 Official Gazette of the Republic of Macedonia No. 67/07, 90/09, 67/10, 26/13, 15/15, 153/15, 190/16 and 7/19 and Official Gazette of the Republic of North Macedonia No. 101/19, 122/21.

4 Official Gazette of the Republic of Macedonia nos. 27/2002, 98/2002, 79/2007, 88/2008, 67/2010, 44/2011, 112/2011, 188/2013, 30/2014, 43/2014, 112/2014, 153/2015, 192/2015, 23/2016 and 83/2018.

Furthermore, the number of independent directors must be at least ¼ of the number of appointed non-executive directors. As for the two-tier board system, according to Article 374 and Article 378 from Macedonian Company Law, the number of members of the management board and the supervisory board can vary from 3 to 11. As well as in the one-tier board system, the minimum number of independent directors is defined as ¼ of the members of the number of appointed directors in the supervisory board.

3.2. Methodology for examining the determinants of board composition (model and hypothesis)

To investigate the determinants of the characteristics of board composition during the COVID-19 crisis in Macedonian joint-stock companies, we use the approach implemented by Ferreira and Kirchmaier (2013) that used the method of linear regression. The reason for such a decision is in the fact that their study on the characteristics of board composition in the European countries should provide the most suitable measures for the analyzed parameters that are applicable in the Macedonian context. To analyze the determinants of the board size, independence and diversity in Macedonian joint-stock companies we run a hierarchical regression on each of the four independent variables: number of board members, the proportion of independent directors, the proportion of female directors and female CEOs. The research model is presented in the Figure below.

The hypotheses in this model are as follows:

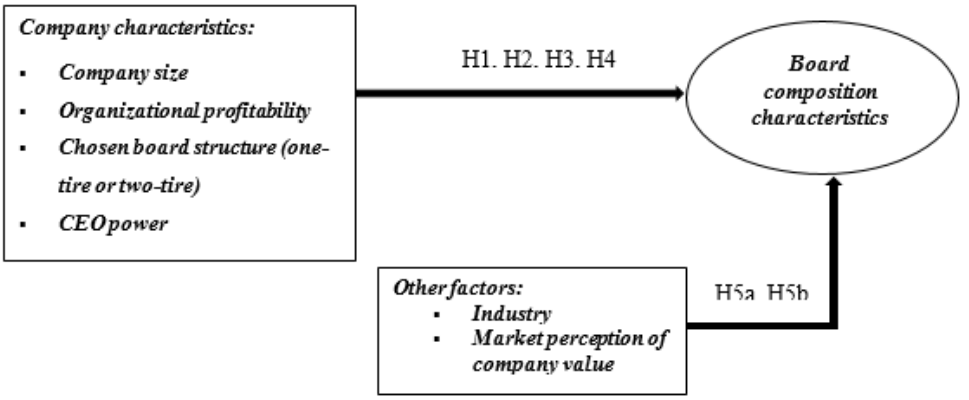
H1: Company size is related to board size, board independence and board gender diversity.

H2: Organizational profitability is related to board size, board independence and board gender diversity.

H3: Chosen board structure (according to the Macedonian Company Law companies can choose between one-tier and two-tier board systems) is related to board size, board independence and board gender diversity.

H4: CEO power is related to board size, board independence and board gender diversity.

Figure 1:



Source: *authors' construction*

H5: Other factors are related to board size, board independence and board gender diversity.

H5.a.: The industry in which the company competes is related to the board size, board independence and board gender diversity.

H5.b.: Market perception of company value is related to the board size, board independence and board gender diversity.

In the table below we are going to explain each of the variables used in the model.

Table 1: Description of the variables

Variable	Explanation
Board size	Measured by the number of directors on the board or boards.
Board independence	Measured by the proportion (percentage) of independent directors in the total number of board members.
Board gender diversity	Measured by proportion (percentage) of female directors in the total number of board members. Additionally, we designed separate measure for female CEO (model).
Company size	Measured by total operating revues (log of), as used in other research papers.
Organizational profitability	Measured by return of assets (ROA) and return of equity (ROE).
Board structure	One variable with two values: 0 is for two-tier board system and 1 is for one-tier board system.
CEO power	One variable that indicates whether the CEO is on this position more than 4 years (one tenure is usually 4 years).
Industry	For the analysis of industry, we used 3 so called industry dummies: one of manufacturing firms, one for trade and one for services.
Market perception of company value	Measured by the ratio Market-to-Book.

Source: *authors' construction*

4. Results

Firstly, we are going to overview the changes in board/boards in the COVID-19 period, basically from April 2020 to July 2021. In this section, we have a qualitative analysis of the changes in board characteristics in the analysed period, and afterwards in the following part, we examine the results from the hierarchical regression implemented to detect the determinants of board composition characteristics in the Macedonian context.

4.1. Qualitative analysis of the adjustments of board/boards composition during the COVID-19 period

During the COVID-19 period, or in the period between April 2020 and July 2021 over 30 companies have reported changes in their board/boards. The data shows regarding the type of changes in the governing structures made by the companies are presented in Table 2 below. From the table, it can be noted that only 9.38% of these companies decided to reappoint the same board/boards without making any change. The biggest proportion of these companies (37.50%) decided to make changes only in the appointment of non-executive members or in the members of the Supervisory Boards.

Table 2: Changes in board/boards composition during Covid 19 (between April 2020 and July 2021)

Type of change	% of companies	Is there is at least one change in favour of women between new appointments?	Is there at least one change in favour of minority between new appointments?
Reappointing the same members with no changes	9.38%	/	/
Inceasing board/board size (appointing new members)	3.13%	No	Yes (in 1 company)
Decreasing board/boards size (cutting the number of members)	3.13%	/	/
Change in the non-executive members (or SB) only	37.50%	Yes (in 5 companies)	Yes (in 1 company)
Change in the executive members (or MB) only	12.50%	Yes (in 1 company)	No
Changes in the executives and non-executive members (or SB and MB, some of the old members remain)	/	/	/
Changes in the non-executives/executive members (SB/MB) and change of CEO (some of the old members remain)	21.88%	Yes (in 4 companies, although this means at least one in any of the members, executive or non-executive)	No
The tenure of some of the non-executive/executive boards members finished or they have given resignation, but the appointment of new members was not yet executed	12.50%	/	

Source: *Authors' analysis of the reports for changes in governing structures and decision from the general assembles of the companies in the sample.*

4.2. Results of the analysis of the board's composition determinants Board size

In our study, we used hierarchical regression in order to understand the determinants of board's size in our country. The results from the model are presented in Table 4.

As can be seen in the table above, the two variables that have a statistically significant impact on board size are companies' size measured by operating revenues (log) ($p<0.05$) and the chosen board structure ($p<0.01$). The analysis of the coefficients of all models, Model 1, Model 2 and Model 3, shows that companies with greater operating revenues have a larger number of members on the board/boards. Also, companies that have chosen two tier-board structures have larger board/boards size (B in all of the models is negative, and we code one-tier board structure with 1 and two-tier board structures with 0). Also, it can be noted that Model 1 explains a sizable part of the variation in the board size among analysed companies, with an adjusted R^2 of 43.3 per cent. However, by adding the additional two variables the adjusted R^2 of the models does not increase. Therefore, it can be concluded that few firm characteristics explain much of the variations in board size in our country.

Table 3: Results of hierarchical regression analysis with board/boards size as dependent variable

Independent variables	Dependent Variable: Board size					
	Model 1		Model 2		Model 3	
	B	Sig	B	Sig	B	Sig
STEP 1						
Operating Revenues (log)	0.842	0.004	1.002	0.002	0.974	0.003
ROA	0.010	0.547	0.007	0.679	0.007	0.697
ROE	-0.005	0.482	-0.004	0.595	-0.004	0.589
One-tier board structure	-3.274	0.000	-3.368	0.000	-3.391	0.000
CEO power	-0.346	0.453	-0.184	0.713	-0.132	0.796
STEP 2						
Industry manufactory			0.393	0.587	0.363	0.619
Industry trade			1.020	0.290	1.001	0.302
Industry services			1.254	0.171	1.149	0.221
STEP 3						
Market-to-book						
R2		0.469		0.487		0.489
Change in R2		0.469		0.018		0.002
Adjusted R2		0.433		0.429		0.424
Durbin-Watson						2.121

Source: *authors' analysis*

Board independence

To analyse the determinants of the board independence we used the proportion (percentage) of appointed independent directors from the total number board/boards members. It is also important to mention that due to missing data in the companies' report, the sample for these three models consists of 49 observations. The results are presented in Table 5.

Model 1 shows that on the level of board independence statistically significant influence in our sample has the chosen board structure by the company ($p<0.01$) and CEO power ($p<0.1$). In Model 2 the variable ROE and Industry manufactory also have a statistically significant association with board independence ($p<0.1$). Finally, Model 3 shows that chosen board structure by the company ($p<0.01$), CEO power ($p<0.05$) and manufactory industry ($p<0.05$) and ROE ($p<0.1$) have statistically significant association with the level of board independence in the analysed companies. Furthermore, the results imply that board independence is positively related to the one-tier board system and negatively related to the CEO power, as expected. Besides, according to the coefficient in Table 5, manufactory industry is positively related to percentage of independent directors.

Table 4: Results of hierarchical regression analysis with board/boards independence as dependent variable

Independent variables	Dependent Variable: Board independence					
	Model 1		Model 2		Model 3	
	B	Sig	B	Sig	B	Sig
STEP 1						
Operating Revenues (log)	0.003	0.831	0.003	0.803	0.005	0.688
ROA	0.000	0.428	0.000	0.555	0.000	0.593
ROE	-0.001	0.216	-0.001	0.072	-0.002	0.061
One-tier board structure	0.100	0.000	0.096	0.000	0.098	0.000
CEO power	-0.037	0.074	-0.047	0.032	-0.050	0.022
STEP 2						
Industry manufactory			0.055	0.055	0.060	0.038
Industry trade			0.022	0.598	0.025	0.555
Industry service			0.004	0.928	0.016	0.695
STEP 3						
Market-to-book					-0.007	0.175
R2		0.452		0.524		0.546
Change in R2		0.452		0.072		0.022
Adjusted R2		0.388		0.428		0.441
Durbin-Watson						1.959

Source: *authors' analysis*

The Adjusted R^2 is increasing from 38.8 per cent in Model 1, to 42.8 per cent in Model 2 and 44.1 per cent in Model 3. Consequently, it can be noted that several variables explain significant per cent of the variations in the percentage of independent directors appointed on the board/boards.

Board diversity

Gender diversity significantly improved in the past years and as discussed above in the analyses of the new appointments, significant numbers of them are in favour of females. Also, it is important to be mentioned that in our country there is no mandatory requirement regarding the appointment of women on board/boards.

In table 6, we present the results of the hierarchical regression where the dependent variable is the proportion (percentage) of female directors in the total number of members of the board/boards. The number of observations in this regression is 80, as it was in the analysis of board size.

Table 5: Results of hierarchical regression analysis with percentage of female directors as dependent variable

Independent variables	Dependent Variable: Percentage of female directors					
	Model 1		Model 2		Model 3	
	B	Sig	B	Sig	B	Sig
STEP 1						
Operating Revenues (log)	-0.097	0.001	-0.105	0.001	-0.097	0.002
ROA	0.002	0.199	0.002	0.175	0.002	0.151
ROE	0.000	0.717	0.000	0.705	0.000	0.728
One-tier board structure	0.034	0.509	0.070	0.174	0.077	0.132
CEO power	-0.032	0.507	-0.050	0.296	-0.006	0.177
STEP 2						
Industry manufactory			-0.204	0.004	-0.195	0.006
Industry trade			-0.162	0.083	-0.156	0.090
Industry service			-0.247	0.006	-0.216	0.016
STEP 3						
Market-to-book					0.025	0.094
R2		0.163		0.268		0.296
Change in R2		0.163		0.105		0.029
Adjusted R2		0.106		0.185		0.206
Durbin-Watson						1.666

Source: *authors' analysis*

Model 1 shows that only operating revenues (log) have a statistically significant relationship with the percentage of female directors ($p<0.05$). In Model 2, where we added industry dummies it can be noted that all of them are statistically significant relation with the percentage of female directors ($p<0.05$ and $p<0.1$), together with the already defined relation with the operating revenues (log) ($p<0.05$). Also, the adjusted R^2 in Model 1 is only 10.6 per cent and increase to 18.5 per cent in Model 2.

Model 3 shows that operating revenues (log) have a statistically significant relationship with the percentage of female directors ($p<0.05$), as well as industry manufactory ($p<0.05$), industry trade ($p<0.1$), industry service ($p<0.05$) and market-to-book ($p<0.1$). The explanatory power of this model is only 20.6 per cent (adjusted R^2 0.206). This means that the model explains a small part of the variations in the percentage of female directors. However, it can be concluded that the percentage of female directors is negatively related to operating revenues (log) (B= -0.097), which means that there are more female directors in companies with smaller revenues and positively related to the market-to-book ratio (which means that companies with higher market-to-book ratio have a larger number of female directors). The impact of the industry on the percentage of female directors is statistically significant, but it should be examined further and maybe with different methods.

For better understanding of the factors affecting gender diversity of the boards, we ran additional regression with female CEO as dependent variable. This decision was made during the process of guttering the data, especially for the variable CEO power. Namely, we noted that a significant number of female CEO is not serving the board for more than one tenure or more than 4 years (or 31.25 per cent are serving more than 4 years). Therefore, we ran the hierarchical regression with female CEO as a dependent variable and the same set of independent variables, excluding only the independent variable for CEO power. The results are presented in Table 7.

Table 6: Results of hierarchical regression analysis with percentage of female directors as dependent variable

Independent variables	Dependent Variable: Female CEO					
	Model 1		Model 2		Model 3	
	B	Sig	B	Sig	B	Sig
STEP 1						
Operating Revenues (log)	-0.149	0.003	-0.157	0.004	-0.148	0.008
ROA	-0.002	0.551	-0.002	0.564	-0.002	0.567
ROE	0.004	0.004	0.004	0.005	0.004	0.004
One-tier board structure	0.170	0.056	0.188	0.044	0.194	0.038
STEP 2						
Industry manufactory			-0.102	0.414	-0.091	0.469
Industry trade			-0.095	0.563	-0.083	0.614
Industry service			-0.150	0.335	-0.112	0.485
STEP 3						
Market-to-book					-0.026	0.316
R2		0.249		0.260		0.270
Change in R2		0.249		0.010		0.010
Adjusted R2		0.209		0.188		0.188
Durbin-Watson						2.059

Source: *authors' analysis*

Model 1 presented in the table below indicates the existence of a statistically significant relation between operating revenues (log) ($p<0.05$), ROE ($p<0.05$), and one-tier board structure ($p<0.1$), with appointed female CEO.

In Model 2 and Model 3 these results are becoming even stronger ($p<0.05$ for all of three mentioned variables in Model 2 and Model 3), and the newly added variables related to industry and market value of the company do not show statistically significant association with the appointment of female CEO. From the presented coefficients it can be noted that companies with smaller operating revenues (B= -0.148) and better profitability measured by ROE (B=0.004), as well as companies that have chosen the one-tier board structure (B= 0.194), are more likely to appoint female CEO. However, the explanatory power of the models is low and according to the adjusted R2, Model 1 explains only 20.9 per cent of the variations in the dependent variable, and Model 2 and 3 only 18.8 per cent. Additionally, it can be noted that the adjusted R2 in Model 2 drops for 2 percentage points which may suggest that the industry characteristics are not that important for the research of this dependent variable, while when we add market-to-book ratio the adjusted R2 remain the same (adjusted R2 is the same for Model 2 and Model 3).

5. Limitations and further research

This paper brings some insights regarding the number of changes in board composition during the analyzed period April 2020 - July 2021. In addition, the analysis also allows deepening of the understanding of the determinants of board size, independence and gender diversity in the Macedonian context. However, this study has several limitations:

1. The number of papers researching board roles and board composition during the COVID-19 pandemic has been limited and most of them provide qualitative analysis and remarks/recommendations for future research.
2. This study uses secondary data from the reports that listed joint-stock companies submit for publishing to the Macedonian stock exchange. However, these reports do not have a standardized form and in some situations the information lacks significant elements. This leads to the need for making additional research on the previous reports in order to obtain a full understanding of the changes made in the governing structures of the companies. The problem with the data gathering has been partially facilitated by the activity of the team of the Macedonian stock exchange, which updates the information about the governing structures of ever y single company on regular basis on the brief summary prepared for every listed company.

Thus, all these circumstances additionally overwhelm the process of data gathering and having in mind that the human factor is crucial, the level of possible random errors increases.

3. As a result of the problem of missing data the total number of observations in the model that investigates the determinants of board/boards independence is lower (49 observations).
4. Regarding the qualitative analysis, it is important to note that this paper does not investigate the reasons for changes in board composition that have occurred during the analysed period.
5. In the quantitative analysis, this paper investigates the relation of several factors (companies characteristics, industry and market perception of company value) to board/boards size, independence and gender diversity in the Macedonian context. However, many other factors (such as ownership structure, organizational complexity etc.) has not been included in the model and can be a subject for further research. Furthermore, in order to investigate the relation between industry type and board/boards composition characteristics (size, independence and diversity) other methods may be used.
6. The explanatory power of the models designed to examine the determinants of board/boards gender diversity is relatively small compared to the models designed to examine the determinants of board/boards size and independence. These results are an indicator that in further research the topic of board gender diversity should be addressed separately and the impact of other factors should be analysed.

6. CONCLUSION

COVID-19 crisis, which came suddenly and had an unprecedented impact on every business operation, increased the attention to the board's roles and the board's ability to cope with the new reality. Although the published research papers on this topic are more explanatory, with qualitative analysis and remarks/recommendations (and in preparation), they all agree that the strategic and stewardship role of the boards is crucial for organizational survival in these changing times.

The results from our analyses show that during the COVID-19 period a substantial number of companies from the sample (over 30) have made changes in board composition and only 9.38% of the companies in which changes in governing structures occurred (over 30) decided to reappoint the same members. Although this does not mean that COVID-19 has been the only factor influencing the changes.

Some of the changes are made due to the ending of the tenure, others as a result of generational changes in the management/governing structures or as a part of the ongoing management succession process.

This impact of other factors is not excluded, too.

In regard to the analysis of the factors affecting board composition characteristics on a sample of listed companies in our country, we conclude that most of the variations on board/boards size can be explained by the differences in firm characteristics (in particular operating revenues and chosen board structure). This is similar to the findings of Ferreira and Kirchmaier (2013) about the association between revenues and board structure with boards size on a sample of European companies, although we did not found a relation between board size and profitability (measured by ROA and ROE), as they did.

Additionally, the variations in board independence can be explained by firm characteristics (in particular operating revenues and board structure) and industry characteristics. Ferreira and Kirchmaier (2013) also find an association of revenues and one-tier board structure with board independence. However, they also report that firm performance is positively related to board independence. On the other hand, the presented results in this paper indicate the existence of a negative association between CEO power and board independence as was expected.

As for gender diversity, the conclusions are not that clear, but it can be noted that firm characteristics, in particular operating revenues, had a significant association with the proportion of female directors. Furthermore, our results suggest the existence of a statistically significant relation between operating revenues (log) ($p<0.05$), ROE ($p<0.05$), and one-tier board structure ($p<0.05$), with appointed female CEO. However, these models with two different dependent variables as measures of gender diversity (proportion of female director and female CEO) have low explanatory power. Nevertheless, the need for greater gender diversity in Macedonian society has been actualized in the past few years. We strongly believe that in the forthcoming period the board's gender diversity is going to increase due to the following circumstances: the ongoing changes regarding the perception of women's roles and capabilities in our society; generational changes in the governing structures are inevitable and in a significant number of cases the successors of the leading individuals are female; the COVID-19 crisis imposed new strategic challenges and in order to adjust boards need to expand their skills and competencies. Therefore, this topic should be the subject of further research that could give broader understanding of the determinants of board/boards gender diversity in the Macedonian context.

Overall, the potential contribution of this paper is to shed light on the situation with the corporate boards in North Macedonian during the COVID-19 period and to provide a better understanding of the variables that determine the board composition characteristics in the Macedonian joint-stock companies.

REFFERENCES

1. Aguilera, R. V., Filatotchev, I., Jackson, H. G. (2008) *"An organizational approach to comparative governance: Costs, contingencies, and complementaries", Organization Science*, Vol. 19, No.3, pp. 475–492.
2. Alnaif, K.L.K. (2014), Determinants of The Size Of Board Of Directors: Evidence from Jordanian Corporation, Research Journal of Finance and Accounting, Vol.5, No.8, pp.54-63.
3. Arnegger, M., Hofmann, C., Pull ,K., Vetter, K. (2014), *"Firm size and board diversity"*, Journal of Management and Governance, Vol.18, pp.1109–1135.
4. Bathala, C.T., Rao, R. P. (1995) *"The Determinants of Board Composition: An Agency Theory Perspective"*, Managerial and Decision Economics, Vol. 16, No. 1, pp.59-69.
5. Benson-Rea, M., Eraković, L., Watson, S. M. (2021) "Covid-19 governance challenges: The board's role in Covid-19 crisis management", available at: https://ssrn.com/abstract=3765053 (accessed 8th August 2021).
6. Bhagat, S., Black, B. (2002) "The non-correlation between board independence and long term firm performance", Journal of Corporation Law, Vol. 27, No. 2, pp. 231-274.
7. Bloomfield, S. (2013) *Theory and practice of corporate governance: an integrated approach*, Cambridge University Press, Cambridge.
8. Boone, A. L., Casares F., Laura, K., Jonathan M., Raheja, C. G. (2007) "The determinants of corporate board size and composition: An empirical analysis", Journal of Financial Economics, Vol. 85, No. 1, pp. 66–101.
9. Carter, D. A., D'Souza, F., Simkins, B. J., Simpson, W. G. (2010) "The gender and ethnic diversity of US boards and board committees and firm financial performance", Corporate Governance: An International Review, Vol. 18, No.5, pp. 396–414.
10. Chouchene, I. (2010) "The determinants of the presence of independent directors in French board companies", International Journal of Business and Management, Vol. 5, No. 5, pp. 144-153.
11. Coles, J. L., Naveen D., Naveen, L. (2008) "Boards: Does one size fit all*?",* *Journal of Financial Economics*, Vol. 87, No. 2, pp. 329–356.
12. Davidson III, Wallace N., Rowe, W. (2004) "Intertemporal endogeneity in board composition and financial performance", Corporate Ownership and Control, Vol. 1, No. 4, pp. 49-60.

13. Davis, J. H., Schoorman, D. F., Donaldson, L. (1997) "Toward a stewardship theory of management", Academy of Management Review, Vol. 22, No. 1, pp. 20-47.

14. De Jonge, A. (2014), "The glass ceiling that refuses to break: Women directors on the boards of listed firms in China and India", Women's Studies International Forum, Vol. 47, Part B, pp.326-338.

15. Deloitte (2020), Stepping in: The board's role in the COVID-19 crisis, available at: https://www2.deloitte.com/global/en/pages/about-deloitte/articles/covid-19/stepping-in--the-board-s-role-in-the-covid-19-crisis---deloitte-.html (accessed 8th August 2021)

16. Denis, D. J., Sarin, A. (1999) "Ownership and board structures in publicly traded corporations", Journal of Financial Economics, Vol. 52, No. 2, pp.187-223.

17. Dibra, R. (2016) "Corporate Governance Failure: The Case Of Enron And Parmalat", European Scientific Journal, ESJ, Vol. 12, No.16, pp. 283-290.

18. Dobbin, F., Jung, J. (2010) "The misapplication of Mr. Michael Jensen: how agency theory brought down the economy and why it might again", in Lounsbury, M., Hirsch, P. M. (ed.) *Markets on trial: the economic sociology of the U.S. financial crisis: part B*, Emerald Group Publishing Limited. Bingley. pp. 29-64.

19. Donaldson, L. (1990) "The ethereal hand: organizational economics and management theory", Academy of Management Review, Vol. 15, No.3, pp. 369-381.

20. Donaldson, L., Davis, J. H. (1991) "Stewardship theory or agency theory: CEO governance and shareholder returns", Australian Journal of Management, Vol. 16, No. 1, pp. 49-65.

21. Eklund M.A. (2021) The COVID-19 lessons learned for business and governance. *SN Business & Economics*, 1(1):25. doi:10.1007/s43546-020-00029-2

22. Esteban-Salvador, M. L. (2011), "Variables Influencing the Gender Composition of Boards: The Spanish Evidence", Journal of Women, Politics & Policy, Vol. 32, No.4, pp. 305-332.

23. Fama, E. F., Jensen, M. C. (1983) "Separation of Ownership and Control", Journal of Law and Economics, Vol. 26, No. 2, pp. 301-325.

24. Ferreira, D., Kirchmaier, T. (2013) "Corporate boards in Europe: size, independence and gender diversity", in Belcredi, M., Ferrarini, G. (ed.), *Boards and shareholders in European listed companies: facts, context and post-crisis reforms*, Cambridge University Press. Cambridge. pp.191-223.

25. Gavin, D. J. (2012) "Power in the corporate boardroom: a new dimension in measuring board power", Journal of Business and Economic Studies, Vol.18, No.2, pp.1-25.

26. Guest, P. M. (2008) "The determinants of board size and composition: Evidence from the UK", Journal of Corporate Finance, Vol.14, No.1, pp.51-72.

27. Hermalin, B. E., Weisbach, M. S. (1988) "The determinants of board composition", *Journal of Economics*, Vol. 19, No. 4, pp. 589-606.

28. Hyland, M. M., Marcellino, P. A. (2002),"Examining gender on corporate boards: a regional study", Corporate Governance: The international journal of business in society, Vol. 2, No. 4 pp. 24 – 31.

29. Jensen, M. C. (1993) "The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems", Journal of Finance, Vol. 48, No. 3, pp. 831-880.

30. Kaur, M., Malik, K., Sharma, S. (2021), "A Note on Boardroom Challenge, Board Effectiveness and Corporate Stewardship During COVID-19", Vision The Journal of Business Perspective, Vol. 25, No. 2, pp. 131-135, available at: https://journals.sagepub.com/doi/pdf/10.1177/0972262920987326 (accessed 8th August 2021).

31. Kiel, G. C., Nicholson, G. J. (2003) "Board composition and corporate performance: how the Australian experience informs contrasting theories of corporate governance", Corporate Governance: An International Review, Vol. 15, No. 4, pp. 585-608.

32. Lehn, K. M., Patro, S., Zhao, M. (2009) "Determinants of the size and composition of US corporate boards: 1935-2000", Financial Management, Vol. 38, No. 4, pp. 747-780.

33. McKinsey&Company (2021), How boards have risen to the COVID-19 challenge, and what's next, available at: https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-boards-have-risen-to-the-covid-19-challenge-and-whats-next (accessed 8th August 2021).

34. Min, B.S. (2017), "Determinants of board size in an emerging market", Journal of International financial management and accounting, pp.1-25.

35. Oyotode-Adebile, R., Ujah, N. U. (2020), "Is social capital a determinants of board gender diversity?", The Journal of Financial Research, Vol. 44, No.1, pp. 25-52.

36. Pearce III, J. A., Zahra, S. A. (1992) "Board composition from a strategic contingency perspective", Joumal of Management Studies, Vol. 29, No. 4, pp. 411-438.

37. Pfeffer, J. (1972) "Size and composition of corporate boards of directors: the organization and its environment", Administrative Science Quarterly, Vol. 17, No. 2, pp. 218-228.

38. Pfeffer, J., Salancik, G. R. (2003), *The external control of organizations: a resource dependence perspective*, Stanford University Press, Stanford.

39. Redding, G. (1976) "Contingency theory in management", Education and Training, Vol.18, No.7, pp. 199 – 202.

40. Roberts, J., McNulty, T., Stiles, P. (2005) "Beyond agency conceptions of the work of the non-executive director: creating accountability in the boardroom", British Journal of Management, Vol. 16, Supp. 1, pp. 5-26.

41. Saeed, A., Belghitar, Y., Yousaf, A. (2016), "Firm-level determinants of gender diversity in the boardrooms: Evidence from some emerging markets", International Business Review, Vol. 25, No. 5, pp. 1076-1088.

42. Spencer Stuart (2020), The effects of Covid-19 on boards and governance, available at: The effects of Covid-19 on boards and governance (spencerstuart.com) (accessed 8th August 2021).

43. Wang, Y. (2009) *Boards independence and firm performance: reforms, theories and empirical evidence*, Lambert Academic Publishing, Köln.

Ljupcho Eftimov

Tihona Bozhinovska

PRILAGOĐAVANJE SASTAVA ODBORA TOKOM KRIZE COVID-19: ANALIZA PREDUZEĆA U MAKEDONIJI

SAŽETAK

Cilj ovog rada je napraviti analizu prijavljenih promjena u sastavu odbora makedonskih kompanija koje kotiraju na berzi tokom krize COVID-19. Za postizanje ovog cilja korišteni su sekundarni podaci izvještaja kompanija objavljeni na web stranici makedonske berze. Uzorak se sastoji od 80 kompanija, a prvo smo izvršili kvalitativnu analizu izvještaja kompanija o promjenama sastava odbora (više od 30 kompanija prijavilo je promjene). Nakon toga, kako bismo poboljšali razumijevanje faktora koji određuju sastav odbora u makedonskim dioničkim društvima, dizajnirali smo model za ispitivanje povezanosti karakteristika kompanije, karakteristika industrije i percepcije tržišta o vrijednosti kompanije s veličinom odbora, neovisnošću odbora i raznolikost odbora. Rezultati naših analiza pokazuju da je tokom perioda Covid -19 značajan broj kompanija iz uzorka napravio promjene u sastavu odbora, a samo 9,38% kompanija koje su prijavile promjenu (više od 30) odlučilo je ponovo imenovati iste članove. Međutim, to ne znači da je kriza COVID-19 bio jedini faktor koji je utjecao na promjene. Nadalje, jedan od naših zaključaka iz prikazanih rezultata u studiji je da se većina varijacija u veličini odbora može objasniti razlikama u karakteristikama firme (posebno operativnim prihodima i izbrani sistem upravljanja - ednostepeni ili dvostepeni), dok varijacije u nezavisnosti odbora mogu se objasniti karakteristikama preduzeća (posebno operativnim prihodima i izbrani sistem upravljanja - ednostepeni ili dvostepeni) i karakteristikama industrije.

Ključne riječi: *sastav odbora, veličina odbora, raznolikost odbora, kriza COVID-19, kompanije koje kotiraju na berzi.*

JEL: *M10, M12, M14, G34*

Vasva Klopić[1]

Amer Klopić[2]

Adi Alić [3]

IMPACT OF KEY ACCOUNT MANAGEMENT ORIENTATION ON COMPANY'S NON-FINANCIAL PERFORMANCE

ABSTRACT:

Key account management (KAM) in theory is described as a strategic approach distinguishable from account management or key account selling that should be used to endure long-term development and retention of strategic customers. This article presents the importance of key account management orientation in today's business and how it affects the non-financial performance of companies in Bosnia and Herzegovina. Also, we will present the results of ongoing research that aims to identify the influence of key account management orientation on company non-financial performance in different industry sectors. Data were collected from several companies in different industries considering a company as a unit of analysis. Research instrument – questionnaire compromised scales that had been validated and found reliable in previous research. Item total reliability and confirmatory factor analysis will be used to test the reliability and validity of the constructs. Furthermore, the structural equation modelling (SEM) technique will be employed to analyze the effects of key account management orientation on a company's non-financial performance. It is to be expected that the results of the conducted research show a statistically significant impact of key account management orientation on a company's non-financial performance in Bosnia and Herzegovina.

Keywords: *key account management, non-financial performance, relationship marketing, Bosnia and Herzegovina*

JEL: *M30, M31*

1 Ph.D. candidate, MA, School of Economics and Business, University of Sarajevo, Trg Oslobođenja - Alija Izetbegović 1, 71000 Sarajevo, Email: vasvaklopic@hotmail.com

2 Ph.D., Director of Talent Acquisition, Ministry of Programming, Zmaja od Bosne 7A, 71000 Sarajevo, Email: amerklopic@yahoo.com

3 Associate Professor, School of Economics and Business, University of Sarajevo, Trg Oslobođenja - Alija Izetbegović 1, 71000 Sarajevo, Email: adi.alic@efsa.unsa.ba

1. INTRODUCTION

The history of key account management (KAM) began with the industrial industry. KAM as a practice or a discipline within B2B marketing is not new; it has been around for more than 20 years (Pardo, 1997; Sharma, 1997; McDonald, Millman & Rogers, 1997). It is known that KAM became very important for companies in order to remain competitive. It allows companies to improve both value creation and value capturing with strategically important customers. Therefore, KAM has received interest in both academic research and management practice. These days, KAM programs are developed and implemented in many different industries (Ivens & Pardo, 2007; Ojasalo, 2001; Ryals & Humphries, 2007).

Key account management orientation (KAMO) is defined as an element that serves key customers with appropriate key account management (Davies & Ryals, 2014). KAMO is also defined as the ability of the organization structure to work towards sustaining and improvement of the selected clients who are believed to increase the financial performance of the company (Speakman & Ryals, 2012). However, KAMO is considered as identification of the most important client and developing strategies to fit those clients' needs hence ensuring that the client seeks services from your hence performance (Gounaris & Tzempelikos, 2013).

KAM is one of the relationship marketing approaches to manage strategic accounts (Wengler, Ehret & Saab, 2006). KAM refers to the management of those customer relationships which are strategically important, to the firms' long-term performance (Ivens & Pardo, 2007; Pardo, Ivens & Wilson, 2014).

Although many KAM studies have been done so far, there are very few that have researched the direct implications of KAMO on company performance. Performance drivers that have been identified are: financial, relational and technological (Kumar, Sharma & Salo, 2019). However, the purpose of this paper is to check the impact of KAMO on the non-financial performances of the companies in Bosnia and Herzegovina. We proposed a conceptual model which will show the relationship between KAMO and non-financial performances. We surveyed key account managers in medium and large companies in different industries. Therefore, we created multiple groups for companies where we have made analyses for manufacturing companies and service oriented companies.

The paper is laid out as follows. This section introduces the research. The next section will provide the literature review of key account management. The third section will describe the methodology used in this research. The fourth section presents the results of the research. The paper ends with concluding considerations.

2. Review of relevant literature

The term of key account management has previously several other names e.g. national account, key account, global account and strategic account. The national account term was first time used by Roger M. Pegram back in 1972 to address important customers to firms. The first definition of the above-mentioned terms was provided by Stevenson & Page (1979) with the following summation: "Special marketing procedures are followed in selling, servicing, and monitoring certain key customers considered important to the goal attainment selling company". The main focus of KAM is to establish and manage long-term business relationships with important customers who offers a competitive advantage to companies (Tzempelikos & Gounaris, 2015). Having this in mind, companies have decided to choose key accounts for their business from the existing database following their potential to develop collaborative, long-surviving and mutually beneficial relationships (Ivens & Pardo, 2007; Workman, Homburg & Jensen, 2003).

McDonald (2000) has provided a framework for antecedents of KAM and KAM stages. The other influence to KAM has been provided by Homburg, Workman & Jensen (2002) when they have written an article about classifying KAM literature as research on key account managers, research on key account relationships, and research on KAM approaches. Jones, Dixon, Chonko & Cannon (2005) have provided a review, framework and research agenda for key accounts and teams selling with a focus on team selling dynamics. A review of KAM literature at that time has been done by Guesalaga & Johnston (2010) where they have reviewed all KAM related research topics (KAM adoption, KAM elements, KAM teamwork, and KAM relationships) from 1979 to 2009 in marketing and management journals.

Key account management orientation (KAMO) and its dimensions have been defined by Gounaris and Tzempelikos (2013) where they have created a multidimensional construct which has integrated attitude related and behavioral related sets of values toward KAM. In the same article, they have found that the implementation of KAMO has a direct influence on companies' financial and non-financial performances. KAMO is defined as a system of values that reflect the supplier's willingness and ability to adapt and meet the unique needs of key accounts.

Key account management (KAM) is increasingly important for companies. All changes that have been requested by customers, enhanced competitive conditions, as well as emerging disruptions, have made an impact on company strategies where KAM became more critical and KAM performances essential to any firms' success (Guesalaga, Gabrielsson, Rogers, Ryals and Cuevas, 2018). KAM performances can be explained in two ways: performance drivers (financial, relational, behavioral, activities-related, resources-related, technology, environmental) and performance measures (firm-level, market-level, account level; dyad-level).

Based on current researches, we have noticed that performance drivers are: financial (costs), relational (Sharma, 2006; Sengupta, Krapfel & Pusateri, 1997; Barrett, 1986; Abratt & Kelly, 2002) and technological (Davies & Ryals, 2014; Salojärvi, Sainio & Tarkiainen, 2010). Also, there have been some papers that have mentioned organizational drivers (e.g., customer orientation, top management involvement, and selling orientation) (Davies & Ryals, 2014; Workman, Homburg & Jensen, 2003; Salojärvi, Sainio & Tarkiainen, 2010; Guenzi, Georges & Pardo, 2009) and behavioral drivers (e.g. intrapreneurial ability, selling skills and account managers' strategic ability) (Sengupta, Krapfel & Pusateri, 2000; Tzempelikos & Gounaris, 2015; Abratt & Kelly, 2002).

Although previous researches emphasize the impact of KAM on financial performances, there are also outcomes that KAM relationships can provide (Ivens & Pardo, 2007). Some of the KAM outcomes that are noneconomic are access to know-how or new markets (Millman & Wilson, 1999; Pels, 1992), the reference value (Ojasalo, 2001; McDonald et al., 1997), better business planning (Caspedes, 1993), better organization of processes (Ojasalo, 2001), joint product development (Boles, Johnston & Gardner, 1999), opportunity to internationalize (Millman, 1996) and facilitation of internal communication (Boles et al., 1999; Stevenson, 1981).

Even though some of these outcomes have been previously researched, it became standard that the most cited benefit is reference value. It is referred to the supplier's opportunity to increase its image and status in the market through a relationship with the key account. This means that suppliers can use customer's status as a reference in the companies' efforts to reach other customers (McDonald et al., 1999; Ojasalo, 2001). Know-how development seems to be another outcome for the supplier. When key accounts' request improved products and/or services, suppliers are forced to be updated with operations or product developments. This requires suppliers to proactively develop competencies and know-how (Pels 1992; Ojasalo 2001). Another important outcome is processes efficiency. If we can manage several customers it will help the company to manage internal processes such as business planning and evaluation of results (Cespedes, 1993). The last outcome would be an improvement in internal communication (Boles et al., 1999). It will involve the facilitation to direct, open and flexible communication of the various units that are basically results of coordination to respond effectively to the needs of all key accounts.

Taking into account the given literature review, the following hypotheses are set in the paper:

H1: KAMO has a positive impact on the non-financial performance of the company.

*H2: KAMO's influence on non-financial performance is determined by the industry the company operates i*n.

3. Research methodology

3.1. Sample characteristics

Data were collected using a structured questionnaire, over five months. A total of 86 usable questionnaires (response rate 46%) were collected from companies covering different sectors of production and service character. Given the nature of the research, we decided to contact the Key Account Management (KAM) managers within the company, as they are considered to have the best insight into the practices and benefits of KAM within the company (Homburg et al., 2002). The research was conducted online, and the application for participation in the research and the corresponding link to the questionnaire were submitted to the companies by e-mail.

3.2. Research instrument

The questionnaire consists of a total of 48 questions, mostly based on multidimensional scales, adapted from the existing literature and includes two basic parts (not including questions of a general nature). The questionnaire was previously tested by experts from the academic and business community, with the aim to increase the validity of the content and the clarity of the scales used. All questions in the questionnaire were measured using a seven-point Likert scale, ranging from 1 “strongly disagree” to 7 “strongly agree”.

The first part of the questionnaire refers to the degree of adoption of the orientation to key customers in the company (KAMO). KAMO is treated as a construct that defines six dimensions, including consumer orientation, top management commitment, inter-functional coordination, adaptability, involvement of top management, and inter-functional support. The scales used were taken and adapted from research conducted by Gounaris and Tzempelikos (2013).

The second part of the questionnaire refers to the non-financial performance of the company, which is also a multidimensional construct that includes four dimensions: reference value, knowledge development, process efficiency and communication within the company. Measurement scales were taken and adapted according to research conducted by Gounaris and Tzempelikos (2014).

4. Research results

4.1. Evaluation of measurement scales

Before testing hypotheses, it is necessary to assess the reliability and validity of the applied measurement scales (Gerbing and Anderson, 1988). Within Table 1, the results of the reliability and validity assessment are presented.

Convergent validity was first performed, based on an assessment of standardized factor loadings. Table 1 shows that the values of standardized factor loadings (λ) for each observed variable are above the minimum required value of 0.5 and that they are all statistically significant ($p < 0.01$), which provides evidence of satisfactory convergent validity.

Table 1: Measures properties

Construct	Indicator (number of items)	Mean	Standard deviation	Cronbach alpha (N=86)	Item-total correlation	Standardised factor loading (λ)	CR	AVE	Squared correlation	Cronbach alpha	CR	AVE
Key account management orientation (KAMO)	Customer orientation (5)	5.753	.89	.869	.672-.788	.733-.832	.888	.614	.784	.862	.871	.538
	Top-management commitment (5)	4.307	1.28	.862	.553-.780	.888-.948	.874	.587	.766			
	Inter-functional coordination (4)	5.712	.98	.951	.873-.916	.898-.947	.954	.838	.915			
	Ability to customization (5)	4.881	1.16	.896	.602-.887	.656-.933	.905	.660	.812			
	Top-management involvement (5)	5.440	1.03	.863	.548-.805	.620-.850	.868	.572	.756			
	Inter-functional support (3)	5.101	1.16	.921	.778-.906	.823-.964	.927	.809	.900			
Non-financial outcomes	Reference value (4)	4.393	1.16	0.854	.611-.854	.698-.914	.869	.626	.791	.975	.871	.630
	Know-how development (4)	5.712	.98	.951	.873-.916	.904-.943	.954	.839	.916			
	Processes efficiency (3)	5.698	.94	.757	.492-.654	.618-.796	.775	.538	.733			
	Internal communication (4)	5.215	1.08	.861	.663-.817	.740-.882	.871	.629	.793			

Source: *Analysis of data obtained by primary research*

The next step analyzes the validity of the constructs, following the procedure proposed by Fornell and Larcker (1981). As shown in Table 1, the average extracted variance (AVE) of all constructs exceeds the minimum limit value (0.50). Additionally, the AVE for each construct is greater than the square correlation between that construct and any other construct in the model. This shows satisfactory discriminant validity.

The final step in the evaluation of measuring scales refers to testing the reliability of measuring scales and their internal consistency. For this purpose, reliability assessment was first performed by calculating the Composite Reliability (CR). It measures the internal consistency of the variables describing the latent construct and should be 0.7 or greater (Hair et al., 2009). Composite reliability values for the observed constructs range from 0.897 to 0.947. Reliability testing was also performed using Cronbach's alpha coefficient. As shown in Table 1, Cronbach's alpha coefficients are above the 0.7 thresholds (Nunnally, 1978), and it is evident that the measurement scales are also internally consistent.

Having in mind the sample size on the one hand and the number of questions in the questionnaire on the other, composite variables were formed to continue the analysis, certainly taking into account the psychometric characteristics of the measurement scales. For each of the six dimensions of the KAMO model, we calculated a simple arithmetic mean (average) of the observed variables, resulting in a latent variable KAMO, with six indicators (Homburg and Pflesser, 2000). The same procedure was performed in the case of the variable related to the non-financial performance of the company, given that both the theory (eg Walter and Ritter, 2003; Gounaris and Tzempelikos, 2014) and the previous evaluation of psychometric characteristics of measurement scales provide evidence that each indicator loads appropriately on the predicted latent variable.

4.2. Hypothesis testing

The analysis of the collected data is based on modelling through structural equations (SEM), using IBM's Amos 20.0 software package. Regarding the fit of the model, we rely on $\chi 2$ / df ratio, the comparative fit index (CFI), the root mean square error of approximation (RMSEA), the non-normed fit index (NNFI), and standardized root mean residual value (SRMR).

The ratio of $\chi 2$ over the degrees of freedom (df) is a descriptive measure of overall fit. Values of this ratio less than 2 indicate acceptable model fit (Medsker, Williams, & Holahan, 1994). However, $\chi 2$ was significantly determined by sample size as well as the number of observed variables (Hair et al., 2010).

In this sense, more modern alternative measures (CFI, RMSEA, NNFI, SRMS, etc.) are used to assess the fit of the model, more robust in terms of sample size or complexity of the model.

CFI is an incremental model fit index, suggested by Bentler (1990). The value of this index can range from 0 to 1, with values closer to 1 indicating a better fit. A value of 0.9 is taken as the usual lower limit for a good model fit (Hair et al., 2010). RMSEA (Root Mean Square Error of Approximation) as one of the absolute indices is a measure of the deviation between the observed covariance matrix and the covariance matrix obtained based on model estimation, according to the degree of freedom (Browne and Cudeck, 1993). Lower values of this index indicate better model fit. Although there is no single view on the upper limit to which this index should go, it can generally be accepted that values below 0.08 indicate a good model fit (MacCallum, Browne, & Sugawara, 1996). However, although the RMSEA is considered "one of the most informative fit indices" (Diamantopoulos and Siguaw, 2000), the sample size can significantly affect the size of this index (Tanaka, 1987). To avoid this problem, researchers can rely on NNFI (Bentler, 1990; Sharma, Mukherjee, Kumar, & Dillon, 2005). Values of this index greater than 0.95 are taken as indicators of adequate model fit (Hu and Bentler, 1999).

SRMR, as a standardized RMR index, represents the average of the standardized residues derived based on the difference between the observed covariance matrix and the covariance matrix obtained based on the model estimate. Lower values of these indices indicate a better fit. It is generally accepted that SRMR index values below 0.08 indicate good model fit (Hair et al., 2010).

The assessment of our model shows satisfactory fit: χ2gof is significant ($\chi 2 = 58.983$, N = 86, df = 34, p <0.01), $\chi 2 / df = 1.73$, CFI = 0.944, RMSEA = 0.081, NNFI = 0.96; SRMR = 0.0801. A detailed inspection of the modification indices did not identify potential changes that would have a significant impact on improving the fit of the measurement model.

Table 2: Standardized and unstandardized coefficients for the structural model

Exogenous variable	Endogenous variable	b	B	SE	p
KAMO ®	NFP (R2 =0.281)	0.530	.446	.111	0.000

Source: *Analysis of data obtained by primary research*

Notes: b-standardized coefficients, B–unstandardized coefficients, SE – standard error, Two-tailed p- value.

The basic results of hypothesis testing are shown in the previous table (Table 2). As for the effect of the company orientation on key customers (KAMO) on the non-financial performance of the company (NFP), it is evident that this impact is statisti-

cally significant and positive, which confirmed the first hypothesis of the research (H1). The second objective of this study was to analyze the impact of the type of industry (manufacturing and service) on the relationship between company orientation to key customers (KAMO) on the non-financial performance of the company (NFP). Therefore, group comparisons were made between manufacturing companies and service companies, using the modelling of structural equations. The difference test $\chi 2$ showed that there is no statistically significant difference between the companies of the two observed industries ($\chi 2 = 14.365$, df = 9, $p < 0.110$). Therefore, hypothesis H2 is not supported. This further confirms that the heterogeneous sample does not pose a problem regarding the validity of the research results.

4.3. Discussion

The results of the research first point to the conclusion that the degree of adoption of the orientation to key customers has a statistically significant and positive impact on non-financial performance in the analyzed companies in Bosnia and Herzegovina. In this way, the obtained results confirm the fact that the advantages of adopting KAM outweigh the financial benefits and synergistically enrich the relationship with consumers, creating an environment more suitable for increasing the overall performance of the company. This conclusion supports the first research hypothesis (H1), and is consistent with the results of previous research (Gounaris and Tzempelikos, 2013; Davies and Ryials, 2014). Also, in a recent study, Gounaris and Tzempelikos (2014) confirm the indirect orientation of key customers to the non-financial performance of companies.

In summary, a total of 28.1% of the variability of the non-financial performance construct can be explained with the key customer orientation construct. In other words, a higher perceived degree of adoption of key customer orientation by companies, including consumer orientation, top management commitment, inter-functional coordination, adaptability, top management involvement, and inter-functional support, leads to better non-financial performance related to the reference value, knowledge development, process efficiency and communication within the company.

In the context of industry impact, research results show that industry type does not have a statistically significant impact on non-financial efficiency measures. This is in accordance with the findings of a study conducted by Gounaris and Tzempelikos (2014). On the other hand, Davies and Ryials (2014) conclude that the type of industry has a statistically significant impact on certain performance measures. This is an important area for further research in terms of the need to diagnose the relative importance of KAM and the nature and form of KAM practice in different industries.

5. CONCLUSION AND RECOMMENDATIONS

The main goal of this study is to investigate the direct impact of key customer orientation on the non-financial performance of companies in Bosnia and Herzegovina. In addition, it is investigated whether the stated impact varies depending on the type of industry to which the companies belong. The research was conducted on the market of Bosnia and Herzegovina.

Previous research suggests that the degree of a company's focus on key customers is a significant determinant of a company's overall performance. The results of this research also confirm that the orientation to key customers has a significant and positive impact on the non-financial performance of the company (H1). On the other hand, the moderating influence of the industry type on the stated influence (H2) has not been confirmed. These research findings represent a significant contribution to KAM theory, as they demonstrate that the company's benefits from KAMO are not only related to financial performance, in terms of sales, market share, or profitability and ROI, but also to non-financial performance, in terms of the reference value, knowledge development or process efficiency.

This study is, in fact, a continuation and contribution to some previous studies approaching KAM from a relationship marketing perspective (e.g. McDonald et al., 1997; Pardo 1997; Sengupta, Krapfel, & Pusateri 1997; Gosselin and Bauwen 2006; Gounaris and Tzempelikos, 2013; Gounaris and Tzempelikos, 2014; Davies and Ryials, 2014), establishing and empirically examining KAMO, as a construct that reflects a set of values that a company needs to develop to effectively manage relationships with key customers.

In theoretical terms, the contributions are primarily reflected in the fact that this study proposes and empirically examines KAMO, as a multidimensional construct that combines behavioral and attitudinal factors, which reflect the ability of companies to develop effective KAM practices. Second, the study develops reliable and valid measures of KAMO, as well as the non-financial performance of the company, providing comprehensive, psychometrically correct and operationally valid construct measures. Third, viewed from the perspective of marketing relationship theory, the research findings show that the management of key customers as a whole represents a potential basis for the development of strategic competitive advantages of companies. Consistent with this, in the context of Resource-based theory, companies that have a higher degree of adoption of KAM, create opportunities to limit themselves to those customers who are of strategic importance to the company.

In addition to the theoretical contribution, this study has significant practical implications. The first important implication relates to the organizational consequences that the adoption of KAMO encourages.

For example, decentralizing decision-making is not always easy. Middle or even lower-level managers must be willing to take responsibility for decision-making and must have the necessary knowledge to be able to do so (Hurley and Hult, 1998). In this regard, a serious investment of both time and money is needed to train managers and promote KAM orientation. Another important practical implication is the nature of the benefits that top management can expect from the implementation of KAM. This research confirms that the adoption of KAMO enables companies to improve the quality of relationships with key customers. Along with improved relationship quality, there also come stronger reference values, knowledge development, better process efficiency and communication within the company. All these advantages together can be seen as a key strategic asset that enables a long-term relationship with the existing portfolio of key customers, and at the same time creates conditions for improving the company's attractiveness to other potential customers with whom the company currently has little or very limited relationship.

Of particular importance is the fact that this is a pioneering research of this type in Bosnia and Herzegovina. This is particularly important for two reasons: (1) the fact that key customer-oriented practices are insufficiently researched, taking into account the characteristics and specifics of the market of Bosnia and Herzegovina; (2) the fact that the modern strategy of marketing relations is mainly based on the successful implementation of KAM orientation.

5.1. Limitations and recommendations for future research

Although this research makes a significant contribution to understanding the relationship between the degree of adoption of key customer orientation and the non-financial performance of companies, there are certainly some limitations that are important to emphasize. The main limitation of the work is primarily the possibility of generalizing the results, given that the survey is based on 86 companies, and that only one respondent from each company participated in the survey, which creates the possibility of bias and may jeopardize the validity of the survey.

One of the limitations of the research is the focus solely on the internal environment of the company. However, in order to gain a more comprehensive understanding of how KAM affects a company's performance, other variables, such as specific market characteristics, competition intensity, or customer characteristics, need to be considered at the same time, in terms of purchasing strategy. This is certainly an interesting entry point for future research.

The limitation of this research also relates to the use of research design that focuses only on companies, which is an obstacle in assessing the actual quality of customer relationships. Relationship quality represents the value created from the KAM relationship, but from the user's perspective. Future research should therefore include the perspectives of both the customer and the company, thus providing a more comprehensive overview of the outcomes of the KAM program.

Also, future research could be based on the use of different research techniques, in order to examine the model in different contexts. Of course, there is a need to involve potential moderators, who can significantly change the intensity of the surveyed relationships. Finally, conducting similar research in other countries, especially close countries from the group of transition or developing countries, opens the possibility of comparing the results, and bringing more general results in terms of development and future orientations for KAM practices.

REFERENCES

1. Abratt, R. and Kelly, P.M., 2002. Customer–supplier partnerships: Perceptions of a successful key account management program. *Industrial Marketing Management*, 31(5), pp.467-476.
2. Barrett, J., 1986. Why major account selling works. *Industrial Marketing Management*, 15(1), pp.63-73.
3. Bentler, P.M., 1990. Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), pp.238–246.
4. Boles, J., Johnston, W. and Gardner, A., 1999. The selection and organization of national accounts: a North American perspective. *Journal of Business & Industrial Marketing*.
5. Browne, M.W. and Cudeck, R., 1993. *Alternative ways of assessing model fit*. In K.A. Bollen and J.S. Long (Eds.), *Testing Structural Equation Models*. Newbury Park: Sage.
6. Cespedes, F.V., 1993. Coordinating sales and marketing in consumer goods firms. *Journal of Consumer Marketing*.
7. Davies, I.A. and Ryals, L.J., 2014. The effectiveness of key account management practices. *Industrial Marketing Management*, 43(7), pp.1182-1194.
8. Davies, I.A. and Ryals, L.J., 2014. The effectiveness of Key Account Management practices. *Industrial Marketing Management*, 43(7), pp.1182-1194.
9. Diamantopoulos, A. and Siguaw, J.A., 2000. *Introducing LISREL*. London: Sage Publications.

10. Fornell, C. and Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), pp. 39–50.

11. Gerbing, D. and Anderson, J., 1988. An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 25, pp.186–192.

12. Gosselin, D.P. and Bauwen, G.A., 2006. Strategic account management: customer value creation through customer alignment. *Journal of Business & Industrial Marketing*, 21(6), pp.376-385.

13. Gounaris, S. and Tzempelikos, N., 2013. Key account management orientation and its implications: A conceptual and empirical examination. *Journal of Business-to-Business Marketing*, 20(1), pp.33-50.

14. Gounaris, S. and Tzempelikos, N., 2014. Relational key account management: Building key account managmentt effectiveness through structural reformations and relationship management skills. *Industrial Marketing Management*, 43(7): pp. 1110-1123.

15. Guenzi, P., Georges, L. and Pardo, C., 2009. The impact of strategic account managers' behaviors on relational outcomes: An empirical study. *Industrial marketing management*, 38(3), pp.300-311.

16. Guesalaga, R. and Johnston, W., 2010. What's next in key account management research? Building the bridge between the academic literature and the practitioners' priorities. *Industrial Marketing Management*, 39(7), pp.1063-1068.

17. Guesalaga, R., Gabrielsson, M., Rogers, B., Ryals, L. and Cuevas, J.M., 2018. Which resources and capabilities underpin strategic key account management?. *Industrial marketing management*, 75, pp.160-172.,

18. Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E., 2010. *Multivariate data analysis*. 7th ed. Upper Saddle River: Pearson Prentice Hall.

19. Homburg, C. and Pflesser, C., 2000. A multiple-layer model of market-oriented organisational culture: Measurement issues and performance outcomes. *Journal of Marketing Research*, 37(4), pp.449–462.

20. Homburg, C., Workman Jr, J.P. and Jensen, O., 2002. A configurational perspective on key account management. *Journal of marketing*, 66(2), pp.38-60.

21. Hu, L.T. and Bentler, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), pp.1–55.

22. Hurley, R.F. and Hult, T.G., 1998. Innovation, market orientation, and organisational learning: An integration and empirical examination. *Journal of Marketing*, 62(3), pp.42–54.

23. Ivens, B.S. and Pardo, C., 2007. Are key account relationships different? Empirical results on supplier strategies and customer reactions. *Industrial Marketing Management*, 36(4), pp.470-482.

24. Ivens, B.S. and Pardo, C., 2007. Are key account relationships different? Empirical results on supplier strategies and customer reactions. *Industrial Marketing Management*, 36(4), pp.470-482.

25. Jones, E., Dixon, A.L., Chonko, L.B. and Cannon, J.P., 2005. Key accounts and team selling: a review, framework, and research agenda. *Journal of Personal Selling & Sales Management*, 25(2), pp.181-198.

26. Kumar, P., Sharma, A. and Salo, J., 2019. A bibliometric analysis of extended key account management literature. *Industrial Marketing Management*, 82, pp.276-292.

27. MacCallum, R.C., Browne, M.W. i Sugawara, H.M., 1996. Power Analysis and Determination of Sample Size for Covariance Structure Modeling. *Psychological Methods*, 1(2), pp.130-149.

28. McDonald, M., 2000. Key account management–a domain review. *The Marketing Review*, 1(1), pp.15-34.

29. McDonald, M., Millman, T. and Rogers, B., 1997. Key account management: Theory, practice and challenges. *Journal of Marketing Management*, 13(8), pp.737-757.

30. Medsker, G.J., Williams, L.J. and Holahan, P.J., 1994. A review of current practices for evaluating causal models in organisational behavior and human resources management research. *Journal of Management*, 20(2), pp.439–464.

31. Millman, T. and Wilson, K., 1999. Processual issues in key account management: underpinning the customer-facing organisation. *Journal of Business & Industrial Marketing*.

32. Millman, T.F., 1996. Global key account management and systems selling. *International Business Review*, 5(6), pp.631-645.

33. Nunnally, J.C., 1978. *Psychometric theory.* 2nd ed. New York: McGraw-Hill.

34. Ojasalo, J., 2001. Key account management at company and individual levels in business to business relationships. *Journal of Business & Industrial Marketing*.

35. Pardo, C., 1997. Key account management in the business to business field: the key account's point of view. *Journal of Personal Selling & Sales Management*, 17(4), pp.17-26.

36. Pardo, C., Ivens, B.S. and Wilson, K., 2014. Differentiation and alignment in KAM implementation. *Industrial Marketing Management*, 43(7), pp.1136-1145.

37. Pegram, R.M., 1972. Selling and servicing the national account.

38. Pels, J., 1992. Identification and management of key clients. *European Journal of Marketing*, 26(5), pp.5-21.

39. Ryals, L.J. and Humphries, A.S., 2007. Managing key business-to-business relationships: what marketing can learn from supply chain management. *Journal of Service research*, 9(4), pp.312-326.

40. Salojärvi, H., Sainio, L.M. and Tarkiainen, A., 2010. Organizational factors enhancing customer knowledge utilization in the management of key account relationships. *Industrial Marketing Management*, 39(8), pp.1395-1402.

41. Sengupta, S., Krapfel, R.E. and Pusateri, M.A., 1997. Switching costs in key account relationships. *Journal of Personal Selling & Sales Management*, 17(4), pp.9-16.

42. Sengupta, S., Krapfel, R.E. and Pusateri, M.A., 2000. An empirical investigation of key account salesperson effectiveness. *Journal of Personal Selling & Sales Management*, 20(4), pp.253-261.

43. Sharma, A., 1997. Who prefers key account management programs? An Investigation of Business. Characteristics, *Journal of Personal Selling and Sales Management*, 17(4), pp. 27-39.

44. Sharma, A., 2006. Success factors in key accounts. *Journal of Business & Industrial Marketing*.

45. Sharma, S., Mukherjee, S., Kumar, A. and Dillon, W.R., 2005. A simulation study to investigate the use of cutoff values for assessing model fit in covariance structure models. *Journal of Business Research*, 58(7), pp.935–943.

46. Speakman, J.I. and Ryals, L., 2012. Key account management: the inside selling job. *Journal of Business & Industrial Marketing*.

47. Stevenson, T.H. and Page, A.L., 1979. The adoption of national account marketing by industrial firms. *Industrial Marketing Management*, 8(1), pp.94-100.

48. Stevenson, T.H., 1981. Payoffs from national account management. *Industrial Marketing Management*, 10(2), pp.119-124.

49. Tanaka, J.S., 1987. "How big is big enough?": Sample size and goodness of fit in structural equation models with latent variables. *Child Development*, 58, pp.134–146.

50. Tzempelikos, N. and Gounaris, S., 2015. Key account management orientation and its impact on company's performance–an empirical study. *In The Sustainable Global Marketplace* (pp. 44-47). Springer, Cham.

51. Tzempelikos, N. and Gounaris, S., 2015. Linking key account management practices to performance outcomes. *Industrial Marketing Management*, 45, pp.22-34.

52. Walter, A. and Ritter, T., 2003. The influence of adaptations, trust, and commitment on value-creating functions of customer relationships. *Journal of Business & Industrial Marketing*, 18(4/5), pp.353–365.

53. Wengler, S., Ehret, M. and Saab, S., 2006. Implementation of Key Account Management: Who, why, and how?: An exploratory study on the current implementation of Key Account Management programs. *Industrial Marketing Management*, 35(1), pp.103-112.

54. Workman Jr, J.P., Homburg, C. and Jensen, O., 2003. Intra-organizational determinants of key account management effectiveness. *Journal of the Academy of Marketing Science*, 31(1), pp.3-21.

Vasva Klopić

Amer Klopić

Adi Alić

UTICAJ KEY ACCOUNT MANAGEMENT ORIJENTACIJE NA NEFINANSIJSKE PEFORMANSE KOMPANIJA

SAŽETAK

Key account management u teoriji se opisuje kao strateški pristup koji se razlikuje od upravljanja korisnicima ili prodaje ključnim kupcima koji bi se trebao koristiti da omogući dugotrajni razvoj i zadržavanje strateških kupaca. Ovaj članak govori o važnosti orijentacije na upravljenje ključnim kupcima u današnjem poslovanju te na koji način utiče na nefinansijske performanse kompanija u Bosni i Hercegovini. Također ćemo prezentirati rezultate istraživanja koje ima za cilj da identifikuje uticaj orijentacije na upravljanje ključnim kupcima na nefinanijske performanse u različitim industrijskim sektorima. Podaci su prikupljeni iz različitih kompanija u različitim industrijama, a gdje se svaka kompanija posmatrala kao jedinka u analizi. Instrument istraživanja – upitnik koristi skale koje su validirane i korištene kao pouzdane u prethodnim istraživanjima. Ukupna pouzdanost i konfirmatorna faktorska analiza će biti korištene kako bi se testirala pouzdanost i validnost konstrukata. Nadalje, tehnika modeliranja strukturalnih jednačina (SEM) će se koristiti za analizu efekata orijentacije na upravljanja ključnim kupcima na nefinanijske rezultate kompanija. Za očekivati je da će rezultati provedenog istraživanja pokazati da orijentacija na upravljanje ključnim kupcima značajno utiče na nefinansijske performanse kompanija u Bosni i Hercegovini.

Ključne riječi: *key account management, nefinansijske performanse, marketing odnosa, Bosna i Hercegovina*

JEL: *M30, M31*

Vladimir Grdinić[1]
Jasmina Šmigić Miladinović[2]
Miloš Pavlović[3]
Miloš Ranđelović[4]

SPECIFICITIES OF CAPITAL VALUATION OF YOUNG COMPANIES BY YIELD BASIS METHOD

ABSTRACT

The capital valuation of young companies differs from the assessment of mature and developed companies. Namely, some of these companies achieve business results that are negative or at a low level. Even when they can generate a higher level of profit, the history of their existence is short, it depends on the possibility of borrowing capital, which makes the assessment through the yield method significantly more difficult than usual. Regardless of the industry in which they operate, the sector, the production, and sales arrangement, and the degree of innovation, these companies face not only the usual risk but also the risk of survival and uncertainty that the future brings.

In estimating the value of the capital of young companies, standardized and traditional valuation methods can be used, and thus the yield basis method. Regardless of the chosen method of assessment, the assessor faces a lack of information about the history of "existence". For this reason, for the assessment, all parameters involved in the capital evaluation process must be adjusted.

The subject of this paper is capital valuation. The aim of this paper is to show how it is possible to estimate the value of capital using the yield method and to point out the specifics of this procedure. The object of this research are young companies. In this paper, we will first present the characteristics of young companies, and then the possibilities of estimating their capital by discounting cash flows as a type of yield basis method of capital valuation.

Key words: *capital valuation, young companies, yield basis method.*
JEL: *M40, G30.*

---

1 Professor of applied studies, e-mail: vladimir.grdinic@bpa.edu.rs, Belgrade Business and Arts Academy of Applied Studies, Belgrade, Serbia

2 Professor of applied studies, e-mail: jasnacs0411@yahoo.com, Kosovo and Metohija Academy of Applied studies, Leposavić, Serbia

3 Professor of applied studies, e-mail: milospavlovic84@hotmail.com, Belgrade Business and Arts Academy of Applied Studies, Belgrade, Serbia; Faculty of Economics, University of Pristina, Kosovska Mitrovica, Serbia

4 Professor of applied studies, e-mail: milosrandja1@gmail.com, Academy of Vocational Studies South Serbia, Leskovac, Serbia

1. INTRODUCTION

The yield method in capital valuation, also called the net cash flow discounting method, is the most widespread valuation method in the world, but the valuation results are usually combined with the valuation results using a market approach (Pratt, 2003). However, the application of the market valuation method requires, among other things, the development of the capital market and its long history of existence, due to the valuation parameters that are necessary for the application of this method. The use of the yield method requires extensive experience of the appraiser, on the one hand, and a good knowledge of the elements for calculating the discount rate, on the other hand, regardless of whether it is obtained by "masonry method" or calculated using CAPM method which, in essence, represents a correction of the "masonry" method. Since the application of the latter model for calculating the discount rate is based on market parameters, the return value obtained based on the CAPM method certainly represents a more accurate approximation of the value of capital concerning the return value obtained using the "masonry" method during the capital market history.

Different ways of calculating the discount rate can lead to different estimated values of capital, but it is necessary to emphasize that, regardless of that, it does not deviate from the most common method of assessment - the return method. In other words, changes in the parameters of determining the price of capital when applying the return method affect the estimated value of capital, but do not change the essence of the assessment and the fact that the return method, which is based on discounting estimated net cash flows, allows the best approximation, estimated value of capital. The discount rate is a basic parameter in estimating the value of capital using the yield valuation method.

Capital value estimation is specific for young companies, for several reasons. The one and main are that such companies don't have the history that can be used for future projections. Because of that, the process of capital estimation of young companies is different from of mature and well-known companies.

In this paper we will first point out the main characteristics of the young companies and, after that, we will discuss some problems and specifics of cash flow estimation, discount rate and adjusting for the purpose of capital valuation of the young companies.

2. Literature review

According to Goldman (2008), every start-up company must consider its chances and possibilities. These are economically feasible ideas that are attractive, long-lasting and recognized in time. Chances require sufficient resources (financial, human, etc.) for a young company to survive the competition and environmental risks. The chances defined in this way enable the creation of positive net cash flows and high rates of return on invested capital. The chances for such a scenario increase, if, after the company enters a certain market, there are strong barriers to the entry of competition in the same. Having this in mind, the capital valuation of young companies has its specificities.

According to Kumar (2015), there are three basic approaches for capital valuation of young companies:

1. Yield method
2. Method of analysis of comparable transactions and
3. The method of net assets of the enterprise.

However, regardless of the chosen valuation method, the evaluator faces a lack of information about the history of "existence". This may be due to a lack of accounting data (no data on revenues and results), lack of market information (no comparable companies or direct competitors), or a large part of the company's assets are intangible assets (Miloud, Apelud, Cabrol, 2012).

According to Dusatkova, Zinecker (2016) the problem lies in the fact that existing valuation models require additional information, and that none of the mentioned methods takes into account the environment in which the investor invests capital, ie the model does not consider external factors to the business success of young (start-up) companies.

Therefore, standardized and traditional valuation methods can be used when estimating the value of capital of young companies, and thus the yield method, but for the purposes of valuation, all parameters that participate in the capital evaluation process must be adjusted.

When estimating the value of capital by the yield method of mature companies, several sources of information are used. The first and basic source is the current financial statements of the company on the basis of which it is possible to determine the profitability of the company, how that profitability affects the generation of future growth and the number of potential investments. Business history can be viewed through historical data on business results, company income and market share prices.

The third source of information is related to comparable companies on the basis of which it can be determined whether the company is better or worse than the competition, which provides potential determinants for projecting net cash flows, potential growth rates and risk premiums.

Young companies have a great lack of all this information, which means that it is necessary to replace this information with some other, to a greater or lesser extent, depending on the possibility of finding new data sources. For example, the lack of business history of young companies can be replaced by data on industry averages. Also, certain companies may operate in completely new economic sectors, which can lead to additional problems in gathering information. Such companies have a very short business history, especially bearing in mind that this is a new sector of the economy. The financial statements of these companies offer very little data on the financial structure of assets, and the expected growth is an important component of the value of capital. The companies in question are leaders and not imitators, so there is a lack of information for comparison with the competition, because there is no competition.

As a result, the task of the evaluator is to find new, additional sources of information, use all the possibilities of limited existing sources, and adjust the obtained evaluation results. Regardless of the numerous offered methods and ways of valuing young companies, the return valuation method gives the most realistic estimated value of capital, provided that the necessary modification of the basic parameters of the model were made: projected net cash flows, discount rates, stable growth rates and residual values.

Goldman (2008) believes that when assessing the value of capital of young companies using the return method, the effect of the following factors should be considered:

- Availability of potential customers and possible degree of their loyalty;
- What is the added value created by the new products of the young company, for customers and how attractive are their products;
- Size, growth rate, and level of market competitiveness;
- Investment needs and barriers to entry into the target market; Efficiency and other advantages of young companies in relation to competitive companies;
- Availability of resources of a young company - human and financial capital;
- Expected time until the first sale and entry into the profit zone;
- Seasonal character and cyclicality;
- Technology, legislation, unions, economic conditions in the country;
- The concentration of buyers and suppliers of goods and services.

3. Methodology

The subject of this paper is capital valuation. The aim of this paper is to show how it is possible to estimate the value of capital using the yield method and to point out the specifics of this procedure. Young companies are the object of this research. In this paper, we will first present the characteristics of young companies, and then the possibilities of estimating their capital by discounting cash flows as a type of yield basis method of the capital valuation from the theoretic point of view. The hypothesis that we will try to prove is that the capital valuation of young companies has its specifics in relation to the same process of mature companies. This will be proven through analyzing the available literature and the views of different authors.

4. Results of the research and discussion

4.1. Characteristics and life cycle of young companies

Young companies derive most of their value from the business perspective, ie from the possibility of generating net cash flows in the future. These companies, in the initial stages of growth, can generate high cash losses, and, regardless of that, the estimated value of capital is at a high level. Young companies do not have large investments in land, office buildings and construction facilities, and other fixed assets, but owe a large part of their value to intangible investments. Given that, business losses, lack of business history, and small amounts of material investments characterize these companies in the initial stages of development and business, and in relation to other, already existing, mature companies, which are in higher stages of the life cycle. A capital valuation of such companies may be required by a potential investor even when young firms do not yet have a market for their products.

Start-ups are usually small and represented only a small part of a country's national economy. However, Damodaran (2009) believes that these companies have a disproportionately large impact on the economy for several reasons, namely:

- There is evidence that young companies increase employment rates, creating new jobs;
- Young companies bring innovations. Namely, it is not realistic to expect significant innovations from mature companies, since they can lose more than they gain, but from young companies that bring innovations, since they "have nothing to lose";

- The formation of new companies stimulates economic growth. The economies of some countries have experienced rapid growth based on the establishment of start-up companies. For example, the US economy experienced significantly higher growth than the economies of Western European countries in the 1990s, as it was based on the establishment of smaller companies that introduced new technological innovations;

According to Damodaran (2002), all the already mentioned characteristics of young companies can be sublimated as follows:

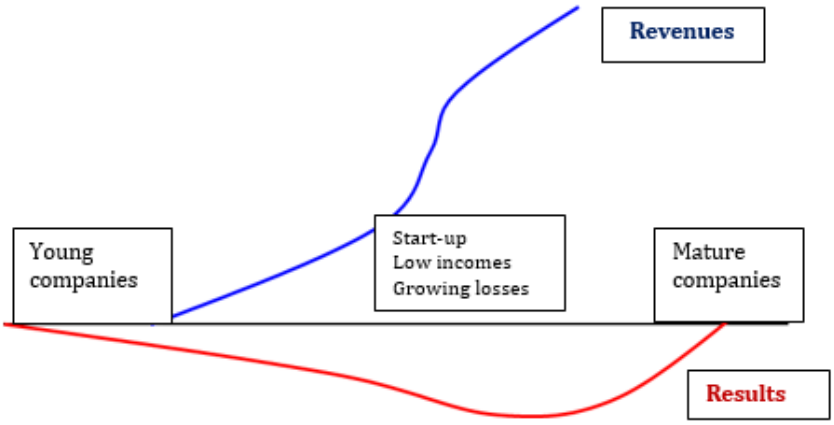
1. They do not have a business history – the business data of these companies are very limited. Many companies have only data from one, possibly two years, regarding business and finances, and financial statements are often incomplete;
2. Small or non-existent revenues, significant losses - The revenues of these companies are very low or non-existent, and the costs are usually related to the costs of establishment, rather than to the costs that generate revenues. As a result, they face high losses;
3. Young companies depend on private capital - At the beginning of the business, the sources of the capital comes from the founders, often family and friends. As the business of the company becomes promising over time, investors who want to invest capital to participate in the ownership of the company appear;
4. Many young companies do not "survive" - Many young companies cannot survive the market test of competition. Wattson and Everett (1996) conducted research in Australia and found that 64% of businesses cease to exist within the first ten years of establishment. Knaup (2005) determined, on the basis of data on the business of young companies in the United States in 1998-2005 period, that only 44% of established companies in 1998 managed to survive for four years, and only 31% "celebrated their 7th birthday";
5. Investments in young companies are illiquid - Investments of private capital in young companies are illiquid comparing to the investments in larger companies listed on the stock exchange.

Every company goes through several phases of the life cycle: the initial phase, the phase of accelerated growth, the phase of high growth, the phase of stagnation and the phase of decline. The following diagram shows the life cycle of young companies.

At the very beginning of the business, start-ups suffer high losses because their revenues are not enough to cover high amounts of fixed costs.

Even when they start generating revenue, their losses grow because they have to invest more in order to be able to meet the increased demand for their own products. Given the above, it is clear that the performance of the past of young companies cannot be used to assess future performance.

Graphic 1: Life cycle of young company



Source: *Damodaran, A. (2001). The dark side of valuation. Englewood Cliffs, Prentice Hall, New York.*

The place of young companies in the life cycle of the company indicates the limited information needed for evaluation. Namely, in the first phase of the life cycle (established companies), the products of young companies have not yet been "tested", and companies do not have a developed sales market. Current operations are of low intensity, there is no business history and comparable companies, so the overall value of the capital of young companies can only be reported from potential growth in the future. This indicates that the initial inputs for the estimation must be subject to estimation, which can lead to estimation errors. The potential growth rate is, to a large extent, related to the expertise and quality of management and the ability to commercialize ideas.

Young companies, their life cycle, continue through a phase of expansion and accelerated growth. When they attract potential customers and create a sales market, so that the company's revenue growth begins, it can easily happen that the financial statements continue to show losses. Current business operations may indicate expected growth, but realized operating margins cannot be the basis for projecting future results. The business history of these companies is still very limited and very variable from period to period. Still, a large part of the projected capital value of these companies is due to the expected potential growth in the future.

Assessing the capital of such companies is somewhat easier compared to newly established companies, but sources of information are still very limited and unreliable.

As companies enter higher stages of the life cycle, the availability and quality of information for assessment is at a significantly higher level. This information can be a solid basis for estimating the value of capital. In further phases, young companies have found their place in the market competition, gained their competitors, have a business past, relatively stable financial results, so the application of the yield method implies significantly less correction of its parameters.

If the young company is in the initial stages of the life cycle, due to possible errors, the appraiser determines a significantly larger range between the upper and lower limits of the projected value of capital. Appraisers who agree to appraise young businesses usually receive significantly higher compensation, as they are usually reluctant to participate in the evaluation due to potential errors that could lead to a decline in their reputation. A higher fee, in that case, is compensation for taking on a higher risk of misjudging the value of capital.

4.2. Specifics of net cash flow projections of young companies

Designing the net cash flows of companies with a long business history is based on historical financial statements, financial analysis results, defining the growth rate of the elements of the periodic result, based on the appraiser's assessment and, in that sense, does not create significant problems or lead to the large standard error of assessment. However, the design of net cash flows of young enterprises is based on limited information and involves finding alternative ways of estimating. Namely, international valuation standards (IVSC, 2017) recommend the application of the yield method as a simulation method in cases where there is significant uncertainty regarding future net cash flows or the moment when the flows will be generated.

The issue of projecting the net cash flows of young companies was mostly dealt with by Damodaran. According to Damodaran (2002), there are two approaches to projecting net cash flows:

1. Estimation of the potential market for products and services of a young company - In this phase, it is necessary to define: products and services that will be offered by the company, assess the size of the market and predict market movements in the future. If the offered range of products of a young company is narrow, then the potential market will be small, and vice versa. When defining a potential market, it is necessary to measure its size. For these purposes, the information offered by professional assessment services is used. Namely, there are many companies that specialize in collecting information about the business, for consulting purposes. Finally, it is necessary to analyze how the potential market will move, over time;

2. Assessment of market share - Based on the information from the previous phase, the potential market share of a young company is estimated, in the long run. This assessment depends on the quality of services that provide information and how they measure market share. It is best to analyze the companies that have the largest market share, and then evaluate the place of the young company in that market, as opposed to the competition. Potential market share depends on the ability of the management of the young company to commercialize the offered product and the available sources of financing of young companies that should enable the creation of the desired market share. Namely, the products are not sold alone, but it requires significant investments in capacities, both material and marketing investments;
3. Estimation of operating costs and operating margin - Estimation of income may be the most important item for investors, but a young company has value only if it generates results. At this stage, it is necessary to estimate the operating costs that generate the estimated operating income. During the assessment, the assessor faces a lack of information but also data on high business losses that are immanent to young companies, at the time of the assessment. The first focus should be on estimating operating margins at a time when a young company is stabilizing its business, usually based on data from mature competing companies. This operating margin is the target to be reached, and then the assessment emphasizes the expectations about the movement of the operating margin of the young company over time. The appraiser can use two approaches in the appraisal: a general approach when assessing the operating margin and potential profit of a young company or an individual approach, when assessing in detail the cost of earnings, material costs, advertising costs and the like. The second approach generates more accurate estimates, only if the assessor has sufficient information for the assessment, otherwise the first approach is applied;
4. Young Business Growth Assessment - Young business owners are usually optimistic about revenue growth at an exponential growth rate and rapid entry into the profit zone. This creates an optimistic value of the company's capital. However, such defined growth has its price. The basic question is to estimate how much the company needs to reinvest in order to provide optimistically projected growth. This includes the assessment of additional investments not only in research and development and new patents, but also investments in quality human capital. When assessing the growth of a young company, one should pay attention to two things: first, additional investments are associated with significant cash outflows and, second, reinvestment in young companies can result in negative net cash flows, which then require additional capital raising.

5. Designing the effects of taxes - In mature companies, designing these effects is a simple job and comes down to multiplying the expected operating profit before tax by the tax rate; for young companies, the assessment problem stems from the fact that these companies, in general, have not paid taxes in the past, as they have not generated profits. This trend can be predicted soon, so the question arises when the young company will enter the profit zone. Appraisers, as a result, project tax effects based on data on the tax effects of mature companies that are comparable;
6. Internal Consistency Check - Since business profit and reinvestment are assessed, in this assessment approach, it is necessary to check the consistency of these estimates (Goldman, 2008). For example, it may be estimated that the amount of reinvestment is low and that the estimate of expected results and growth rates is disproportionately high. Damodaran (2009) proposes the following consistency test, by calculating the "imputed" rate of return:

$$\text{Imputed rate of return} = \frac{(\text{Expected operating profit (t)})}{(\textit{Capital invested in the company } (t-1))}$$

The denominator of this term represents the cumulative amount of reinvestment up to the period (t-1) to which the initial capital of the young company is added. The rate of return calculated in this way is compared with the industry average. If the "imputed" growth rate is far above the industry average, it means that the amount of reinvestment is underestimated in the estimate and insufficient to generate the estimated operating profit. If the rate is below the industry average, the projected value of the investment is overestimated relative to the targeted operating profit.

The bottom-up approach to projecting net cash flows begins with an analysis of the investment capacity of a young company, and, based on that, a projection of income and net cash flows is performed. According to Damodaran (2009), this approach can be divided into several phases:

1. Assessment of the size of capacity and investment of a young company - The assessment begins with the estimation of investments' necessary for the operation of a young company, which generates production potential. Larger investments in the present allow the company to sell more products and the future, but more capital (both financial and human) is needed to ensure this. Depending on the limitations of financial and human capital, the projected production capacity will also depend on;

2. Estimate of the number of products sold and revenue - When the appraiser estimates the production capacity, it is necessary to estimate the number of products sold in the future, for each year of appraisal, as well as sales prices. At this stage, not only the potential market of the young company is taken into account, but also the competition in that market. It is clear that if a lower selling price is projected, it is estimated that the young company will sell larger quantities of products, which, as a rule, does not necessarily lead to an estimate of higher profits in the future;
3. Design of operating costs - Based on the revenue plan, the appraiser projects the production costs of sold products, for all projection years. In addition to these costs, the appraiser must estimate the costs of sales, administration and other costs so that these costs are consistent with the estimate of the number of products sold;
4. Tax assessment - Revenues and expenditures projected in the previous phases are used for projections of the taxable result, by years of projection;
5. Assessment of the need for additional investment - After the necessary investments have been projected, in phase 1, it is necessary for the appraiser to anticipate the additional investments necessary to generate the targeted production capacity and the number of expected results. The task of the appraiser is to predict in which areas of business it is necessary to reinvest capital, which will ensure the generation of projected results.

The application of the bottom up approach in the design of net cash flows leads to lower values of the projected net cash flows and results, since the projections are based on the existing capacity of the young company. This approach is recommended for assessing the value of the capital of young companies if there are significant restrictions in the market in obtaining additional capital and if the success of the company depends on the concept of the "key" person of the company.

4.3. Adjusting the discount rate for the needs of capital value estimating of a young company

The calculation of the discount rate by the CAPM method is based on the assessment of the beta coefficient, and the risk of expected rates of return refers to the assessment of market risk that cannot be diversified, while there is no specific risk that can be fully diversified by a marginal investor. For young companies, this assumption is not valid, for several reasons. First, young companies are usually not listed on the stock exchange. Consequently, it is not possible to determine the beta coefficient based on regression analysis, based on previous rates of return.

Second, the assumption that the only significant risk to assess is risk assessing, which cannot be diversified, cannot be accepted, but investors demand compensation for a specific risk. This leads us to the conclusion that the discount rate of young companies will be significantly higher in relation to mature companies, regardless of the way it is calculated.

Metrick (2007) found that discount rates ranging from 30% to as much as 70% are commonly used to assess the value of young companies 'capital. These discount rates are significantly higher than the discount rates used to estimate smaller and mature firms, which range between 12.1% and 17.8% (Ibbotson, Sinquefiled, 1988). According to Amihud and Mendelssohn (1986), the main reason for high discount rates lies in the illiquidity of young companies' assets.

Given the fact that young companies are not listed on the stock exchange, Damodaran (2009) proposes an alternative procedure for assessing the risk of young companies. The substitute for the beta coefficient of young companies can be the beta coefficients of listed companies, which are in the early phase of their lives cycle. Based on the regression analysis, the beta coefficient of young companies can be calculated, as follows:

$$\beta u \text{ for sector} = \frac{(\text{Average beta of enterprises in the early phase of the life cycle})}{(1+(1-tax\,rate * average\,D/E\,of\,the\,sector))}$$

A beta determined in this way can be a good approximation of the market risk of young companies.

Since the owners of young companies are not diversified, the absence of diversification has a significant effect on the beta coefficient, ie adjustments must be made for insufficient diversification. In this way, the adjusted beta coefficient will, in addition to market risk, also include compensation for a specific risk. The value of the beta coefficient, in this case, can be reached as follows:

$$\beta u \text{ of young company} = \frac{(\text{Market beta group of selected companies})}{(Degree\,of\,correlation\,with\,the\,market\,group\,of\,selected\,companies)}$$

The beta coefficient calculated in this way is significantly higher in relation to the market beta, which leads to the calculation of a higher discount rate and a lower estimated value of the capital of young companies.

Young business owners, in some cases, are reluctant, at least in the early stages of a business life cycle, to use borrowed capital (Goldman, 2008). However, if a company has to borrow capital, the estimated debt ratio, based on the assessment of the company's management, can be used to calculate the company's beta ratio, in order to calculate the discount rate.

Since the expected changes in the life cycle of the company are included in the projected net cash flows, it is expected that the expected rate of return on equity will also change. Namely, the growth of young companies opens opportunities for additional capital lending, so positive effects of using financial leverage on the projected discount rate are expected.

As already mentioned, one of the basic problems of young companies is the illiquidity of funds. Given this, it is to be expected that the discount rate of young companies must be higher by the amount of compensation for taking on the risk of illiquidity. At this point, it is important to emphasize that if the illiquidity risk is covered through an increased discount rate, then this risk is not covered through the calculation of the terminal value, in order to avoid double counting (Damodaran, 2002).

According to Goldman (2008), the existence of two types of risks should be taken into account when estimating the discount rate of young companies:

1. The risk that is already an integral part of the discount rate (market and specific risk - in the case of young companies) and
2. The risk that reflects the probability of survival of the company (bankruptcy risk).

Based on the conducted research, Goldman (2008) observed that the value of many young companies is not derived from high discount rates, but their value is significantly lower than that of mature companies, due to the high risk of possible bankruptcy.

According to Festel, Wuermseherb, Cattaneoc (2013) the measure of the

market risk of young enterprises - the beta coefficient should be further adjusted depending on the risk profiling each young enterprise, separately. This risk is determined based on the business plan of the company, conversations with owners and managers, and on applied technology, products, implementation of plans, organizational structure, financial aspects of a particular company and the like.

According to Dusatkova, Zinecker (2016), the discount rate intended for assessing the value of young companies should be modified so that, among other things, it reflects the external determinants of the environment. The essence of their proposal is reflected in the fact that the beta coefficient without leverage calculated for mature companies in the industrial sector in which the young company operates should be increased by the estimated risk of young companies, which arises from five factors: technology, production, implementation, organization and finance. This assessment should be performed by experts in these fields.

Then, the effect of the environment is added to the projected discount rate, in the sense that if the ambient conditions for additional investments of companies that want to invest in young companies are good, then the discount rate decreases and vice versa.

This means that the beta coefficient, which is a measure of market risk and determines the amount of the discount rate, is obtained as follows:

$$\beta\text{mod.} = \beta\ (sector) + additional\ risk\ (5\ factors) \pm risk\ of\ external\ environment$$

Such a modified measure of market risk participates in the calculation of the discount rate, and the equation clearly shows the amount of the discount rate depends on the risk of the listed five factors and the risk of the external environment. Based on this method for calculating the beta coefficient as an element of the discount rate, the following conclusions can be drawn:

Young companies that have a lower additional risk based on factors: technology, production, implementation, organization, and finance, with other unchanged conditions of the model, have a lower beta coefficient and a lower discount rate;

Young companies operating in a favourable business environment, with other unchanged model conditions, have a lower beta coefficient and a lower discount rate, and vice versa.

5. CONCLUSION

Based on all the presented research results, the following conclusions can be drawn:

1. The discount rate, regardless of the calculation method, has a decisive influence on the estimated value of equity. With other unchanged conditions of the return valuation model, any increase in the discount rate leads to a decrease in the estimated value of capital, and each decrease leads to an increase in the estimated value of the company's equity;
2. The discount rate, as a crucial factor in the assessment, is conditioned by market developments, varies over time, depends on the subject of the assessment and must be adjusted for all types of risks and adjusted for the effect of inflation; The discount rate of young companies is significantly higher compared to mature companies, since investors demand compensation for specific risks: bankruptcy risk and illiquidity risk of young company's assets;
3. Young companies derive a significant part of their value from residual (terminal) value;
4. Insufficient amount of information on the business of young companies, short business history and subjectivity of appraisers when applying the return method in assessing the value of capital of young companies, makes the results of the assessment insufficiently reliable.

LITERATURE

1. Damodaran, A., 2001. The dark side of valuation. Englewood Cliffs, Prentice Hall, New York.
2. Damodaran, A., 2002. Investment Valuation, Tools and Techniques for Determining the Value of Any Asset, Second Edition, John Wiley&Sons, Inc, New York
3. Damodaran, A. (2003). Country Risk and Company Exposure: Theory and Practice. Journal of Applied Finance, Vol. 13 Issue 2, 63-76.
4. Damodaran, A. (2005). Value and Risk: Beyond Betas. Financial Analysts Journal, Vol. 61 Issue 2, 38-43.
5. Damodaran, A. (2009). Valuing Young, Start-Up and Growth Companies: Estimation Issues and Valuation Challenges, available at: http://dx.doi.org/10.2139/ssrn.1418687 (date of access: 23.07.2021).
6. Dusatkova, M. S., Zinecker, M. (2016). Valuing start-us - selected approaches and their modification based on external factors. Business: Theory & Practice, Vol. 17 Issue 4, 335-344.
7. Festel, G. Wuermseherb, M., Cattaneoc, G. (2013). Valuation of early stage high-tech start-up companies. International Journal of Business, 18(3), 216-231.
8. Fishman, J., Pratt, P.S., 2006. PPC's Guide to Business Valuations; Vol 1, 2, & 3. PPC., Texas.
9. Frykman, D., Tolleryd, J., 2003. Corporate valuation, Prentice Hall, London.
10. Gautrieaud, S. (2002). Le risque pays: approche conceptuelle et approche pratique. ATER – Centre d'Economie du Developpement – Universite Montesquieu Bordeaux IV; available at: http://ideas.repec.org/p/mon/ceddtr/72.html (date of access: 28.07.2021.).
11. Goldman, M. 2008. Valuation of Startup and Early-Stage Companies. The Value Examiner. avaliable at: http://www.michaelgoldman.com/Publications/Goldman%20Valuation%20of%20Start-ups.pdf (date of access: 01.08.2021).
12. Grabowski, R.J. (2008), Problems with Cost of Capital Estimation in the Current Environment—Update. Business Valuation Review, Vol. 27, No. 4, 209-220.
13. Ibbotson, R.G., Sinquefield, R.A., 1988. Stocks, bonds, bill, and inflation. SBBI 1988 Quarterly Market Reports, Ibbotson Associates, Chicago, IL.
14. International Valuing Standard Council 2017, International Valuation Standards 2017, IVSC, United Kingdom.
15. Knaup, A.E. (2005). Survival and longevity in the Business Employment Dynamics data. Monthly Labor Review, 50–56.
16. Kumar R., 2015. Valuation: Theories and Concepts. Academic Press Elsevier, USA.
17. Metrick, A., 2007. Venture Capital and the Finance of Innovation, Wiley, New York, NY.
18. Pratt, P.S., 2003. Business Valution Body of Knowledge, John Wiley & Sons INC, Danvery USA.

Vladimir Grdinić

Jasmina Šmigić Miladinović

Miloš Pavlović

Miloš Ranđelović

SPECIFIČNOSTI PROCENE VREDNOSTI KAPITALA MLADIH PREDUZEĆA PRINOSNOM METODOM

SAŽETAK

Procena vrednosti kapitala mladih preduzeća koja imaju kratku istoriju postojanja razlikuje se u odnosu na procenu zrelih i razvijenih preduzeća. Naime, neka od ovih preduzeća ostvaruju rezultate poslovanja koji su negativni ili su na niskom nivou. Čak i kada su sposobna da generišu viši nivo profita, istorija njihovog postojanja je kratka, ona zavise od mogućnosti pozajmljivanja kapitala što čini procenu putem prinosne metode značajno težom u odnosu na uobičajene slučajeve. Nezavisno od industrije u kojoj posluju, sektora, proizvodno-prodajnog arannžmana i stepena inovativnosti, ova preduzeća susreću se, ne samo sa uobičajenim rizikom već i rizikom opstanka i neizvesnosti koju donosi budućnost. Pri proceni vrednosti kapitala mladih preduzeća mogu se koristiti standardizovane i tradicionalne metode procene, samim tim i prinosni metod. Bez obzira na izabrani metod procene, procenitelj se suočava sa nedostatkom informacija o istoriji "postojanja". Iz tog razloga se za potrebe procene, mora izvršiti prilagođavanje svih parametara koji učestvuju u postupku evaluacije kapitala.

Predmet ovog rada jeste procena vrednosti kapitala. Cilj rada jeste da se pokaže na koji način je moguće izvršiti procenu vrednosti kapitala prinosnom metodom i da se ukaže na specifičnosti u ovom postupku. Objekat istraživanja su mlada preduzeća. U radu ćemo prvo prikazati karakteristike mladih preduzeća, a zatim mogućnosti procene njihovog kapitala uz pomoć diskontovanja novčanih tokova kao vrste prinosnog metoda procene vrednosti kapitala.

Ključne reči: *procena vrednosti kapitala, mlada preduzeća, prinosni metod.*

JEL: *M40, G30.*

Maja Baćović[1]

PUBLIC DEBT AND ECONOMIC GROWTH: TWO PUBLIC DEBT MANAGEMENT SCENARIOS IN MONTENEGRO

ABSTRACT

Growing public debt is one of the biggest challenges faced by both developing and developed economies. Available research indicates the negative impact of public debt growth on economic growth. Applying the OLS method to the panel data for the countries of the Western Balkans and the period from 1998 to 2019, we found that one percentage growth in public debt leads to a decrease in the GDP growth rate by 0.036 percentage points. In addition, an increase in public debt by one percentage point leads to a decrease in the productivity growth rate by 0.079 percentage points. The results of the research for Montenegro as a case (two scenarios of fiscal policy and the period 2021-2040), showed that, if expenditures remain intact, due to the small difference between the forecasted average GDP growth rate in the period 2021-2040 and interest rates (assumed constant), such a scenario will lead to a slower change in the public debt-to-GDP ratio (23% decrease in two decades). In addition, the cost of interest in public debt in this scenario over the entire period is higher than 2% of GDP. If the fiscal policy is changed toward a reduction in government spending, the short-term GDP growth rate would be slightly reduced, but both the expenditures for interest (less than 2% of GDP) and public debt (decrease of 63% in two decades) would be reduced significantly. Although reduced government spending will have a negative impact on GDP growth in the short run, the country will benefit in the long run as reduced public debt will have a positive impact on GDP and productivity growth.

Keywords: *Public debt, Government expenditures, Economic growth*

JEL: *H6*

1 PhD, University of Montenegro, Faculty of Economics, Podgorica. E-mail: majab@ucg.ac.me,
ORCID: https://orcid.org/0000-0002-8865-3924,
Web of Science ResearcherID: https://publons.com/researcher/R-1533-2019/
https://www.ucg.ac.me/objava/blog/16989/objava/1

1. INTRODUCTION

Public debt is often a country's large liability, as high debt servicing deprives the resources needed to support long-term economic development and build social and physical infrastructure. "Proper debt management should ensure that a government's financing needs and payment obligations are met at the lowest possible cost over the medium to long term, and that debt is assumed with a prudent degree of risk."[2]

The key idea in borrowing (deficit financing) is to finance the consumption (current and capital) which will stimulate economic growth, later providing growth of budget revenues by increasing the tax base, and therefore enable repayment of the incurred debt. Up to a certain level of public debt, economic benefits may occur. However, a problem arises when this is not the case. As in Casares (2015), "External public debt can have a nonlinear impact on economic growth. Thus, at low levels of indebtedness, an increase in the proportion of external public debt to GDP could promote economic growth; however, at high levels of indebtedness, an increase in this proportion could hurt economic growth." Although there are opinions that budget deficit and growth of public debt in certain conditions can have a positive effect on economic growth, the dominant view is that in the long run, the growth of public debt does not have a positive effect on economic growth. American economist James Madison considered "public debt as a public curse."[3] Romer (2001) emphasises "there is a widespread belief that a high and long-lasting budget deficit slows down economic growth, leading to a crisis."

The problem of public debt is not related only to developing countries. Developed countries are also facing the problem of growing public debt and efforts to reduce it. Reinhart et.al (2012), point out that, after the financial crisis at the end of the last decade, developed countries faced growing public debt, which made the issue of stabilising public debt central to Europe, Japan and the United States.

Public debt in Montenegro, after a reduction in 2007–2008 when the budget surplus was used to repay part of the debt, has been growing steadily since 2009, from 38.1% of GDP to 84.4% in 2020 (gross value of public debt was at the level of 105% of GDP in 2020)[4]. The consequences of growing public debt are high interest costs (2.64% of GDP in 2020), but also a reduction in the credit rating of Montenegro (credit rating was downgraded in March 2021 from B + / B to B, with a stable outlook[5]), which negatively affects interest rates, investments and long-term perspectives of economic growth. This indicates the importance of defining an appropriate public debt management strategy.

---

2 UNCTAD, 2016

3 Mankiw, 2009, p. 467

4 Source: Central bank of Montenegro (CBMN)

5 Standard & Poor's Credit rating agency

The following variables determine the ratio of public debt to GDP: real interest rate, GDP growth rate, the initial amount of debt and the ratio of the primary budget deficit and debt. The growth of public debt in relation to GDP is a consequence of the reduction in the GDP growth rate, the growth of real interest rates, and the growth of the primary deficit and the higher initial value of public debt, which entails higher interest costs.

In the case of Montenegro, given the monetary system, the impact on real interest rates and inflation rates is limited. Therefore, the public debt management approach can go in one of two directions (or a combination of both approaches): stimulating GDP growth and/or creating a primary budget surplus to repay public debt. This study analyses both approaches by applying two fiscal policy scenarios: the first, in which the same course of fiscal policy as during the last decade is implemented, while the public debt management strategy focuses on the GDP growth rate, and the second, in which the restrictive fiscal policy is pursued, leading to an increase in the primary fiscal surplus, which in combination with GDP growth, leads to a higher reduction in public debt.

The elaboration of the second scenario implies an analysis of the specific components of government spending in which reduction is possible. A significant part of public spending in Montenegro goes to social benefits (pensions, health care costs, social assistance), which on average (period 2006-2020) account for 27% of consolidated budget spending or 13% of GDP. Is it possible to reduce these expenditures if we know that Montenegro is in a phase of demographic ageing and that the costs of pension and health insurance will only increase and will definitely not decrease? Another option is to reduce the number of employees in the government administration and the health and education sectors, and/or reduce the salaries financed from the budget (which makes an average of 24% of consolidated budget spending in Montenegro, and 10% of GDP). In this way, if there is no transition of employment from the state to the private sector, domestic demand will decrease, which will consequently affect the volume of production in Montenegro, and thus GDP growth. The negative effect on economic growth will be partially mitigated by the fact that Montenegro is a highly imported economy, as a significant part of household consumption is realised through imports, so reducing household consumption will partly affect the decline in domestic production and partly reduce imports. The effect on GDP growth is determined by the strengths of the first and second determinants. Additional items in which expenditures can be reduced are transfers to institutions, and this approach is elaborated in this paper.

Applying the arithmetic method, we estimated changes in public debt in Montenegro under the scenario of unchanged fiscal policy and the scenario of restrictive fiscal policy (reduction of consumption).

To examine the impact of the reduction in government spending on GDP growth, we created a macroeconomic model of equilibrium in the commodity market (Keynesian model), in which government spending is an exogenous variable. The model allows us to examine the impact of government spending on GDP growth.

This study comprises four sections. The first section presents the basic postulates and the overview of the available results of previous research is presented in the second part. The third section analyses the impact of public debt on economic growth and productivity in Western Balkans, presents the model of equilibrium in the commodity market of Montenegro, budget revenues and expenditures in Montenegro in the period 2006-2020 and two scenarios of fiscal policy in the period 2021-2040. In this section we analyse the implications of different fiscal policy scenarios, after which conclusions and proposals for further research are presented.

2. Theoretical basis and literature review

The literature and research on public debt are vastly available. We present only the selection. A study conducted by Calderon and Fuentes (2013) shows that growth prospects are reduced with high or growing government debt. Their analysis of a sample of a large number of countries in the period 1970-2010 shows a negative and strong effect of public debt on growth. Strong institutions and good domestic and internationally oriented policies partially mitigate this negative effect. The improved political environment and its interaction with public debt helped to explain the improved growth performance of industrialised and developing countries for the period 2001-2005 compared to 1991-1995. A study conducted on a sample of the Caribbean and South American countries showed that a sharp decline in public debt and an improvement in the political environment simultaneously boosted the per capita growth rate of 1.7% in the Caribbean and 2% in South America. A more conservative scenario that considers improved policy quality and reduced public debt leads to lower but still significant benefits for the Caribbean and South American growth, by 0.85% and 1.5%, respectively.

Dombi and Dedak (2019) show that public debt reduces long-run output but also that the burden of public debt is country-specific depending on the saving rate and population growth rate. Ramos-Herrera and Sosvilla-Rivero (2017) investigated the relationship between public debt and economic growth on a data set of 115 economies. They initially find that those countries with the lowest public debt achieve the highest economic growth, while the smallest growth rates are associated with the highest public debt. This conclusion was tempered when they analysed the countries by income level and found that low-income countries have different behaviour with respect to lower-middle, upper-middle and high-income countries.

Nur Hayati Abd, et al. (2019) conclude in their research that there is no mutual consensus on the relationship between public debt and economic growth. The relationship can be positive, negative or even non-linear. Mencinger, Aristovnik and Verbic (2014) examined the limit of public debt measured by the share in GDP in a sample of 25 EU member states and shown that in older member states, after public debt exceeds the threshold of 80-94% of GDP, it begins to show negative effects on economic growth. In the new EU members, the border is significantly lower, 53-54% of GDP. Petrakos, Artelaris and Kallioras (2020) show that the components of public debt that are related to infrastructure development, public goods provision and catching-up with more advanced countries have a positive impact on growth and convergence. A survey conducted by Gomez-Puig and Sosvilla-Rivero (2017), on a sample of Central and Peripheral Eurozone (EA) countries and the period 1961-2013 shows that public debt always has a long-term negative impact on the economic performance of EA countries, although its short–term effect may be positive depending on the country analysed. Silva (2020) studied the effect of Portuguese external debt for the period 1999–2019 and found that external debt was not allocated to positively and significantly increase economic growth. Based on the literature on the relationship between public debt and economic growth, Panizza and Presbitero (2013) conclude that theoretical models give ambiguous results, so the answer to this question is purely empirical. They add that, although a large number of studies confirm the negative connection between public debt and economic growth, in their opinion, that connection is not strong. In further research Panizza and Presbitero (2014), confirm the existence of a negative correlation between public debt and economic growth, but state that this relationship weakens or even disappears completely when they correct the model by endogeneity. Wheeler (1999) shows that "wealth falls as the government debt rises." He further concludes that "an increase in government debt leads to decreases in interest rates, output, and the price level." Balassone, Francese and Pace (2013) exploring the impact of public debt in Italy in the period 1861-2009 showed that the growth of public debt has a negative impact on the growth of per capita income and that public spending affects the reduction of income by discouraging investment. Ferreira (2009) in a study on a sample of 20 OECD member countries in the period 1988-2001, shows that there is a mutual causality between the growth of public debt and per capita income. Elmendorf and Scheiner (2017) show that "population ageing affects public debt growth for any given budget policy, and has implications for optimal debt, and thus for optimal policies." From a macroeconomic perspective, they conclude that "an ageing population will reduce the number of workers relative to the total population, which means a drop in GDP per capita for any given amount of capital, productivity and labour force participation.

Lower fertility (but not increased longevity) also reduces labour growth, which reduces the savings needed to equip new workers with any amount of capital. Together, these two factors will reduce sustainable per capita consumption by a few decades from now by about 11% compared to what it would be if the population did not age." Asteriou, Pilbeam and Pratiwi (2021) examined the relationship between public debt on both short and long-run economic growth, in a panel of selected Asian countries for the period 1980–2012 and show that an increase in government debt is negatively associated with economic growth in both the short and long-run. Kostarakos (2021) found evidence indicating the presence of a nonlinear relationship between debt and investment. Lee (2018), studying social expenditures in developed countries (34 OECD economies) and its impact on public debt find that the rise in public debt is not attributable to social expenditure.

A study of the effects of different fiscal policy directions in selected countries of Europe and Central Asia, conducted by the World Bank (2007), offers useful recommendations and conclusions. The study points to the effects of fiscal policy on economic growth through four dimensions: the effects of the budget deficit and fiscal consolidation on economic growth, the impact of public spending on growth, the impact of public policy quality, and the impact of expenditure and tax structures on growth. Fiscal adjustment is an integral part of economic policy in all countries in transition, as they have entered the transition process with high public spending and public debt. The World Bank study notes the experience of OECD countries in the process of fiscal adjustment, concluding that, in those countries where fiscal adjustment was aimed at increasing taxes and reducing public investment, it proved unsustainable, while examples, where the focus was on structural public finance reforms, are examples of sustainable structural adjustment policies. The analysis of the public spending in middle-income countries resulted in a similar conclusion. The size of public spending also affects economic growth. A high level of public spending leads to inefficient resource allocation, while the need to finance spending with higher taxes discourages investment, savings and innovation. The analysis indicates that in ECA countries with high government spending, most often accompanied by a high budget deficit, interest payments on debt have doubled (2.9% of GDP) compared to countries with lower government spending (1.4%). The study also suggests that public spending above 35% of GDP has a negative impact on economic growth. An increase in public spending by 1% leads to a decrease in the GDP growth rate by an average of 0.3-0.4% per year. This is particularly a characteristic of economies where public administration is inefficient, while unfavourable administration can significantly reduce negative effects. The structure of public spending is also an important factor that determines the developmental character of fiscal policy.

Costs aimed at increasing the efficiency of the use of productive resources are considered productive, as well as expenditures aimed at strengthening the protection of property rights, efficient legal system, lower transaction costs, etc. In contrast, high government expenditures, especially if they lead to bureaucratization and reduced efficiency of public administration, combined with high defence costs, are not stimulating for economic growth. Also, intensive social policy can have a demotivating effect on the labour market by reducing the motivation for productive economic activity. Research further shows that "productive" expenditures (education, infrastructure) are on average lower in economies where costs for basic government functions and social protection are higher. The tax system also affects growth. Progressive income tax demotivates investment. High tax rates on employees encourage employment in the grey economy. On the other hand, indirect taxes, as a value-added tax, have a less negative direct effect, because they do not demotivate investment and employment, although any growth leads to a decrease in disposable income for personal consumption and savings.

Grosu, Pintilescu and Zugravu (2021) studied governments reactions to the accumulation of debt from 11 CEECs, using annual data from 2000 to 2019, showing that only a few countries have pursued sustainable public debt policies.

3. Methods, results and key findings

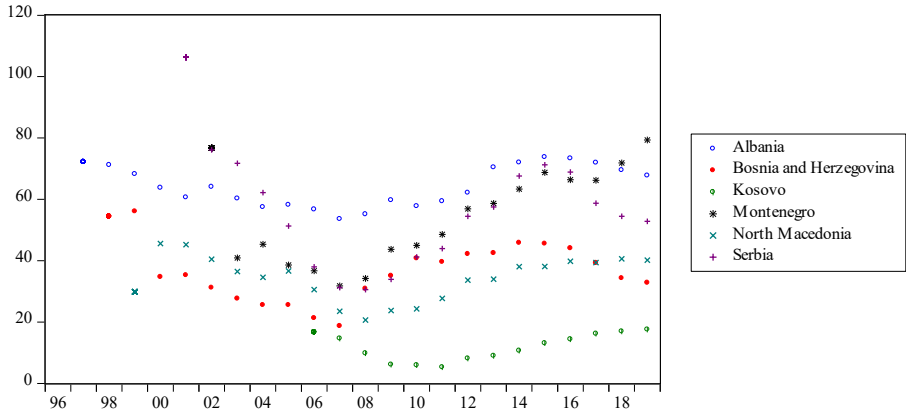
In order to investigate the impact of various public debt scenarios on GDP growth, as a first step, we estimated the impact of the changes in the level of public debt to GDP and labour productivity growth on a sample of six Western Balkan countries and the period from 1998 to 2019. Extended samples and the time frame were selected to provide more accurate and reliable results. As analysis of debt scenarios was done using Montenegro as a case, further research was focused on the empirical analysis of the government revenues, expenditures and public debt in Montenegro from 2006 to 2020. Applying the arithmetic approach, we forecasted budget revenues, expenditures and fiscal balance from 2021 to 2040, applying two sets of assumptions in two scenarios. This was followed by applying the macroeconomic model of equilibrium in the commodity market for Montenegro while using budget data forecasts, in order to assess the impact of two approaches in fiscal policy management on GDP growth.

3.1. Public debt and economic growth in the Western Balkans

In order to analyse the impact of changes in the level of public debt on GDP growth, we conducted empirical research on a sample of six (five)[6] Western Balkan countries (Albania, Bosnia and Herzegovina, Northern Macedonia, Montenegro, Serbia and Kosovo), and the period from 1998 (2001)[7] to 2019. Data used in this research were extracted from the IMF Economic Outlook database and have annual frequency.

In all Western Balkan countries, after a slight decline in the first decade of this century, public debt (% of GDP) increased in the last decade (Graph 1). The largest public debt in 2019 (79.3% of GDP) was observed in Montenegro, while in Albania, Bosnia and Herzegovina and Serbia we observed a declining trend in recent years.

Graph 1: Public Debt (% GDP), Western Balkan countries, 1996-2019



Source: *IMF*

Applying the ordinary least squares (OLS) method to panel data (fixed effects), we assessed the impact of the public debt growth rate (the level of public debt was originally expressed in the value of fixed dollars in 2010)[8] on GDP growth rate as:

$$LY_{i,t} = c + \alpha LPD_{i,t} + \varepsilon_t, \qquad (1)$$

Where $LY_{i,t}LY_{i,t}$ - GDP growth rate in the country *i* in the period *t*, $LPD_{i,t}LPD_{i,t}$ represents the growth rate of public debt in the country *i* in the period *t*, c is a constant, α is the coefficient of elasticity and ε_t is the standard error.

Applying the same methodological concept, we examined the impact of public debt growth on productivity growth in the Western Balkans, using a sample of five countries and the time period from 2001 to 2019.

6 Data for Kosovo were not available in all series

7 Based on available data

8 Data source: IMF Economic Outlook database (October 2020)

$$LLp_{i,t} = c + \beta LPD_{i,t} + \varepsilon_t, \qquad (2)$$

where $LLp_{i,t}LLp_{i,t}$ represents labour productivity (GDP per person employed) in the country *i* in the period *t,* $\beta\beta$ is the coefficient of elasticity (other as in the equation (1)).

Estimation results for equation 1, using data for the countries of the Western Balkans (Albania, Bosnia and Herzegovina, Northern Macedonia, Montenegro, Serbia and Kosovo), and the period from 1998 to 2019, are presented in Table 1.

Table 1: Impact of public debt growth on GDP growth, Western Balkans, 1998-2019 (panel data analysis)

Dependent Variable: DLOG(GDP US 2010)		
Method: Panel Least Squares		
Sample (adjusted): 1998 2019		
Cross-sections included: 6		
Total panel (unbalanced) observations: 111		
Variable	Coefficient	Std. Error
DLOG(PUBLIC DEBT US2010)	-0.036*	0.016
C	0.036***	0.002
*** p<.01, ** p<.05, * p<.1		

Source: *Authors' calculation*

The result of the estimated equation (1) shows that the impact of public debt growth has a statistically significant effect on the reduction of the GDP growth rate. The growth of public debt by one unit leads to a decrease in the GDP growth rate by 0.036 units.

Estimated results for equation 2 (sample of five countries) are presented in Table 2.

Table 2: Impact of public debt growth on productivity growth, Western Balkans, 2001-2019 (panel data analysis)

Dependent Variable: DLOG(PRODUCTIVITY)		
Method: Panel Least Squares		
Sample (adjusted): 2001 2019		
Cross-sections included: 5		
Total panel (unbalanced) observations: 92		
Variable	Coefficient	Std. Error
DLOG(PUBLIC DEBT US2010)	-0.079**	0.034
C	0.02***	0.004
*** p<.01, ** p<.05, * p<.1		

Source: *Authors' calculation*

The result of the estimated equation (2) shows that the impact of public debt growth has a statistically significant effect on reducing the productivity growth rate. The growth of public debt by one unit leads to a decrease in the productivity growth rate by 0.079 units (Table 2).

3.2. Fiscal policy and public debt in Montenegro

In order to assess the impact of different public debt management scenarios in Montenegro, the first step is to analyse the structure and dynamics of public finance. Therefore, we will present a detailed overview of the budget expenditures and revenues in Montenegro.

3.2.1. Budget expenditures and revenues in Montenegro

Total budget revenues (TT) in Montenegro consist of *basic revenues* (T_iT_i): taxes (TT) - (personal income tax, corporate income tax, real estate transfer tax, value-added tax, excise duties, international trade tax and transactions and other taxes), contributions (DD) – (pension and disability insurance, health insurance, unemployment insurance and other contributions), fees ($T_x)T_x$), benefits (NN), other income (OO), receipts from loan repayment (K_iK_i) and donations (T_dT_d); and *other revenues* (T_o T_o): income from sale of assets ($I)I$), loans and credits from domestic and foreign sources ($K_r)K_r$).[9]

$$T = T_i + T_o$$

$$T_i = T + D + T_x + N + O + K_i + T_d$$

$$T_o = I + K_r$$

In the structure of budget revenues of Montenegro, the tax revenues represent the largest share (23.2% of GDP, average per year in the period 2006-2020), followed by the contributions (11.6% of GDP), while the other revenues account for an average of 3.3% of GDP. Total basic revenues account for an average of 38% of GDP. Revenues from the sale of assets are on average equal to 0.6% of GDP, and loans account for 12.7% of GDP on average per year. With growing debt financing, total revenues, in relation to GDP, increased from 41% in 2005 to 71% in 2020 (Table 3).

9 Source: CBMN (https://www.cbcg.me/me/statistika/statisticki-podaci/fiskalni-sektor)

Table 3: Budget revenues in Montenegro, % of GDP, 2006-2020.

	Taxes	Contributions	Fees, benefits, other income, loan repayment receipts, donations	Basic revenues	Revenues from the assets sale	Loans	Total revenues
	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP
2006	23.0	11.8	4.9	39.7	0.9	1.1	41.7
2007	26.3	11.4	4.2	42.0	1.0	0.4	43.4
2008	26.7	11.0	3.9	41.5	0.8	0.3	42.7
2009	23.8	10.3	5.2	39.3	3.6	8.6	51.4
2010	21.6	12.2	2.8	36.6	0.2	7.2	44.0
2011	21.6	10.8	2.3	34.7	0.1	7.2	42.0
2012	21.6	11.4	2.4	35.4	0.1	10.1	45.6
2013	22.5	11.9	2.7	37.0	0.4	9.9	47.3
2014	24.1	12.8	2.2	39.1	0.2	15.5	54.8
2015	22.0	12.0	2.3	36.3	0.2	22.8	59.3
2016	22.4	11.7	3.5	37.6	0.1	16.4	54.1
2017	22.6	11.5	2.3	36.4	0.1	14.3	50.8
2018	22.9	11.2	3.3	37.4	0.3	24.1	61.9
2019	23.7	11.0	3.4	38.1	0.1	20.5	58.7
2020	23.0	12.7	3.4	39.1	0.2	32.1	71.4
Avg	23.2	11.6	3.3	38.0	0.6	12.7	51.3

Source: *Authors' calculation based on CBMN data (https://www.cbcg.me/me/statistika/statisticki-podaci/fiskalni-sektor)*

Total budget expenditures (GG) consist of *current expenditures* (G_tG_t)*:* gross wages and contributions paid by the employer (W_b)W_b), other personal income (W_i), expenditures for materials and services (M)M), current maintenance (TO)TO), interest (I_rI_r), rent (R)R), subsidies (SS), other expenditures (G_xG_x), capital expenditures in the current budget (G_{kt})G_{kt}), while *consolidated expenditures* (G_kG_k) in addition to current ones consist of: transfers for social protection (T_rT_r), transfers to institutions, individuals and NGOs sector ($T_{ri}T_{ri}$), capital budget-capital expenditures (G_kG_k), loans and credits (KK), reserves, repayment of guarantees ($PB_{gar}PB_{gar}$) and repayment of liabilities from the previous period (increase / decrease of liabilities) – (ΔG_{t-1})ΔG_{t-1}). Total *budget expenditures* are equal to consolidated expenditures increased by repayment of debts to residents and non-residents ($\Delta PB\Delta PB$), repayment of liabilities from the previous period and expenditures for the purchase of securities ($G_{fi}G_{fi}$). The *cash surplus/deficit* is equal to the difference between source revenues and consolidated expenditures, while the *primary balance* is equal to the cash balance adjusted for repayment of liabilities from the previous period and interest paid.

$$G = G_t + G_k$$

$$G_t = W_b + W_l + M + TO + I_r + R + S + G_x + G_{kt}$$

$$G_k = G_t + T_r + T_{ri} + G_k + K + PB_{gar} + \Delta G_{t-1}$$

$$G_u = G_k + \Delta PB + G_{fi}$$

In the structure of budget expenditures of Montenegro, the most significant items are the costs of gross wages (average annual 10.3% of GDP from 2006-2020) and transfers for social protection (13% of GDP). Debt repayment costs to residents and non-residents increase with the growth of public debt, and on average account for 9% of GDP (the difference between total expenditures and consolidated expenditures). The average annual cash deficit is 3.5% of GDP, while gross public debt has increased from 32.3% to 105.1% of GDP in 2020. Total expenditures increased from 41% in 2006 to 65% of GDP in 2020 (Table 4).

Table 4: Budget expenditures, deficit and public debt in Montenegro, % GDP, 2006-2020.

	Gross wages and contributions paid by the employer	Expenses for materials and services	Interest	Other current expenditures	Total current expenditures	Transfers for social protection	Transfers to individual NGOs and the public sector	Capital budget-capital expenditures	Other expenditures	Consolidated expenditures	Total expenditures	Cash surplus/deficit	Public debt (gross)
	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP	% GDP
2006	9.8	5.2	1.1	4.1	20.1	12.0	2.2	0.0	2.0	36.3	41.1	3.4	32.3
2007	9.5	5.1	1.0	2.7	18.4	11.1	2.1	3.1	0.7	35.4	41.4	6.6	27.4
2008	8.9	3.7	0.7	4.9	18.2	11.2	6.9	2.4	2.4	41.0	45.0	0.6	28.8
2009	8.7	3.7	0.8	4.0	17.1	13.8	6.8	3.8	2.0	43.5	49.5	-4.2	38.1
2010	9.1	3.6	1.0	3.8	17.4	13.5	5.6	2.0	1.5	40.1	47.0	-3.5	40.6
2011	11.4	3.4	1.4	3.2	19.4	13.9	2.7	2.1	2.4	40.4	45.4	-5.7	45.4
2012	11.8	4.8	1.8	2.6	21.0	15.1	1.0	2.4	2.4	41.9	46.7	-6.5	53.4
2013	11.0	2.3	2.0	2.7	18.0	14.4	2.8	2.3	5.9	43.4	48.1	-6.4	57.5
2014	11.2	2.4	2.2	4.3	20.1	14.2	2.9	2.2	2.9	42.2	54.8	-3.1	59.9
2015	10.5	2.3	2.2	3.0	18.0	13.3	3.7	6.5	2.2	43.9	58.7	-7.6	66.2
2016	10.7	2.3	2.1	3.6	18.7	14.0	4.3	1.6	2.0	40.7	54.2	-3.1	64.4
2017	10.4	2.2	2.3	2.8	17.7	12.5	3.9	6.4	1.8	42.3	50.6	-5.8	64.2
2018	9.9	2.4	2.1	4.2	18.6	11.7	4.5	5.2	1.7	41.7	58.1	-4.2	70.1
2019	9.6	2.2	2.1	4.2	18.1	11.2	4.4	5.5	1.8	41.0	52.4	-2.9	76.5
2020	11.9	2.7	2.6	3.2	20.5	13.3	6.7	5.3	3.3	49.1	65.0	-10.0	105.1
Avg	**10.3**	**3.2**	**1.7**	**3.6**	**18.7**	**13.0**	**4.0**	**3.4**	**2.3**	**41.5**	50.5	-3.5	

Source: *Authors' calculation based on CBMN data*

3.2.2. Two scenarios of public debt management - empirical results

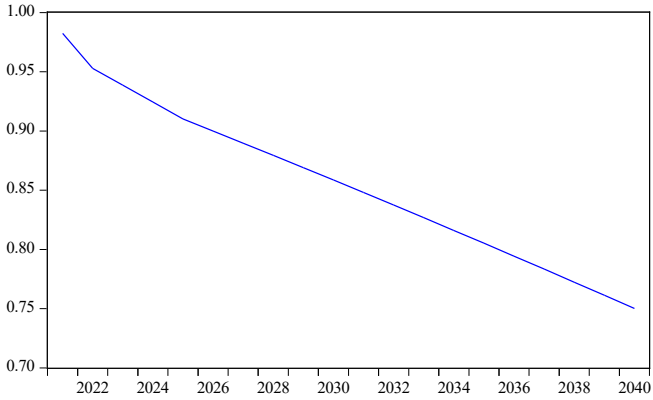
In the analysis of the impact of the two scenarios of public debt management in Montenegro, we start from the assumption of uniform (unchanged) average tax rates and contribution rates during the analysed period and other revenues (23.5%, 11.6% and 3.3% of GDP, respectively). On the expenditure side, transfers for social protection (pension insurance, health care costs, unemployment insurance) are also unchanged in relative terms (in relation to GDP), due to the assumption of population ageing and its impact on this expenditure category. Also, due to the importance of long-term development, capital expenditures of the budget are also uniform compared to the previous period.

The key "flexible" variables used in this study to define different scenarios are the gross wage costs of public sector employees and transfers to institutions, which are reduced in Scenario 2 by 1% of GDP compared to Scenario 1 (uniform fiscal policy).

An additional assumption is that in the period 2021-2040, expenditures for paid guarantees are equal to zero, as well as additional government borrowing to finance current or capital spending, except in conditions when borrowing is necessary to service the existing public debt. Forecasted fiscal indicators were presented in Table 11-13 (annexe).

The dynamics of public debt (% GDP) in scenario 1 is shown in Graph 2. The application of scenario 1 would result in a reduction of public (net) debt from 98% of GDP in 2021 to 75% in 2040.

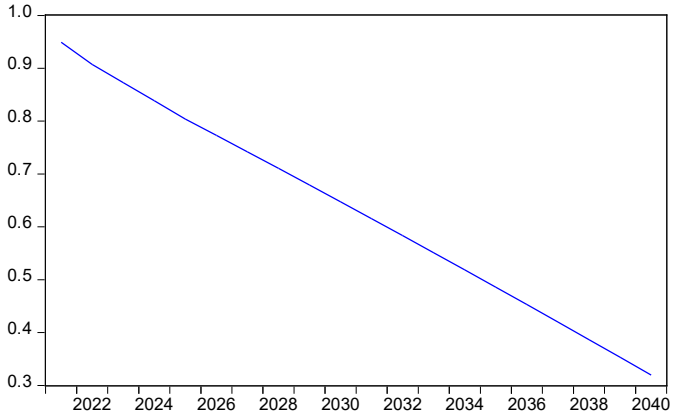
Graph 2: Public debt, % GDP (scenario 1)



Source: *Authors' calculation*

Applying Scenario 2, the share of public debt in GDP decreases to 31.9% in 2040 (graph 3).

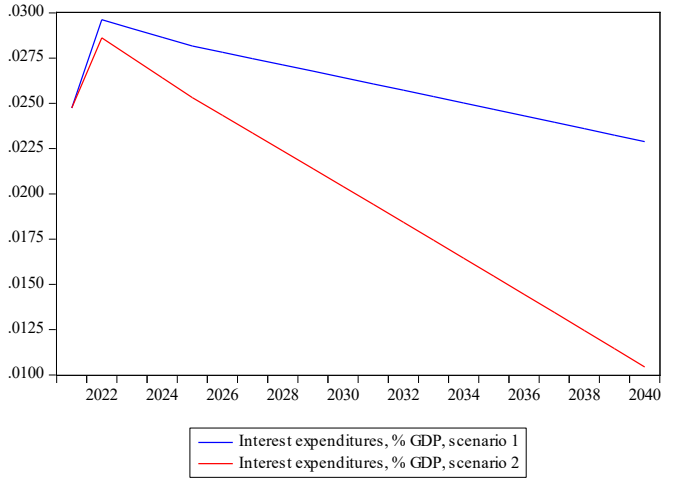
Graph 3: Public debt, % GDP (scenario 2)



Source: *Authors' calculation*

The scenarios of unchanged and the restrictive fiscal policy lead to different interest costs based on the public debt of Montenegro. While in the first case (Scenario 1), interest expenditures fall slowly and are in average equal to 2% of GDP, in the second scenario (restrictive fiscal policy), interest expenditures gradually fall to 1% in 2040 (Graph 4). Also, as public debt (% GDP) decreases significantly in the second scenario, this indicates the justification for preferring public debt management policies focused on reducing government spending.

Graph 4: Interest expenditures, % GDP, Scenario 1-2



Source: *Authors' calculation*

3.2.3. Macroeconomic model of equilibrium in the commodity market

In order to estimate the impact of estimated government expenditures in both scenarios (presented in section 3.3) to GDP growth, we estimated the macroeconomic model of equilibrium in the commodity market (Keynesian type) for Montenegro using data from 2006 to 2020, and later estimated forecasted values from 2021 to 2040.

The model is defined as follows:

$$Y = C + G + I + Z + Ex - ImY = C + G + I + Z + Ex - Im \quad (3)$$

$$C = c_0 + c_1 Y^d C = c_0 + c_1 Y^d \quad (4)$$

$$Im = d_0 + d_1 Y Im = d_0 + d_1 Y \quad (5)$$

$$Y^d = Y - T + Tr Y^d = Y - T + Tr \quad (6)$$

where: Y-gross domestic product; C – consumption of households; G – government consumption; I – gross investment; Z – stock change; Ex – exports of goods and services; Im – imports of goods and services; T – taxes and contributions; Tr – transfers to the households, $c_{0,}$ $c_{1,}$ $d_{0,}$ d_1- parameters.

Variables (endogenous and exogenous) in the model are presented in Table 5.

Table 5: Variables in the model

Variable	Status
Eq1 GDP, current prices, € 000	Endog
Exog Gross fixed capital formation, current prices, 000	Exog
Exog Exports of goods and services, current prices, 000	Exog
Eq2 Household consumption, current prices, 000	Endog
Exog Government consumption, current prices, 000	Exog
Exog Disposable income, current prices, 000	Exog
Eq3 Imports of goods and services, current prices, 000	Endog
Exog Change in inventories, current prices, 000	Exog
Exog Taxes and contributions, current prices, 000	Exog
Exog Social Protection Transfers, 000	Exog

The values of the parameters estimated in equation (4) - consumption function, are shown in Table 6. The estimated results show that one point increase in disposable income leads to growth in personal consumption for 0.683 points, while autonomous personal consumption is 936.5 million €.

Table 6: Consumption function

Dependent Variable: HOUSEHOLDS CONSUMPTION		
Method: Least Squares		
Sample: 2006 2020		
Included observations: 15		
Variable	Coefficient	Std. Error
DISPOSABLE INCOME	0.683***	0.052
C	936515.3***	147109,1
*** p<.01, ** p<.05, * p<.1		

Source: *Authors' calculation*

The values of the parameters estimated in equation (5) - import function, are shown in Table 7. The estimated results show that one unit growth in GDP leads to import growth by 0.486 units, while autonomous import is 645.5 million €.

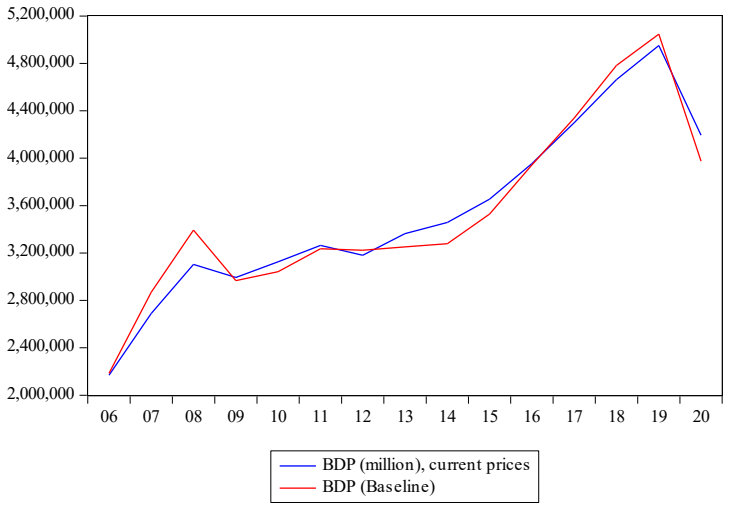
Table 7: Import function

Dependent Variable: IMPORTS OF GOODS AND SERVICES Method: Least Squares Sample: 2005 2020 Included observations: 15		
Variable	Coefficient	Std. Error
GDP	0.486***	0.097
C	645545.3*	352040.5
*** p<.01, ** p<.05, * p<.1		

Source: *Authors' calculation*

In relation to the official data for GDP in the period 2006-2020, the results obtained by applying the model deviate by an average of 0.1%, which indicates the reliability of the model (Graph 5).

Graph 5: Deviation of estimated and actual data - GDP (000 €, current prices)



Source: *Authors' calculation*

After the budget revenues and expenditures were forecasted, the exogenous value of the government consumption was used to assess two different scenarios of GDP growth in Montenegro from 2021 to 2040.

3.2.3.1. Scenario 1: Growth of exogenous variables at the average rate in the period 2006-2020

Applying the previously estimated macroeconomic model of the equilibrium in the commodity market (section 3.3.1), we introduced assumptions for all exogenous variables that determine GDP growth. Other than government consumption, which value is defined in two scenarios of fiscal indicators forecast, for all other variables we assume that its growth rate is equal to its average value from 2006 to 2020. Therefore, the value of these variables that have exogenous status in the model (gross investment, inventories, exports) is determined with the average annual share in GDP in the period 2006-2020, while the real GDP growth rate used to estimate their values are as follows: 9% (2021), 5.5% (2022), 3.5% (2023-2025) and 3% (2026-2040). The value of endogenous variables (household consumption, imports) was estimated on the basis of estimated functions of consumption and imports.

The assumptions in the model (scenario 1) are based on the average values of the corresponding variables in the period 2006-2020 and the projected GDP trend explained above. Fiscal policy is unchanged compared to the period 2006-2020, with no reductions in any component of spending (Table 8).

Table 8: Assumptions

Variable	Status	Description
Gross fixed capital formation, current prices, 000	Exog	25.2% of GDP
Exports of goods and services, current prices, 000	Exog	39.8% of GDP
Government consumption, current prices, 000	Exog	109% of current government expenditures
Disposable income, current prices, 000	Exog	Average GDP growth rate 2021-2040 - 3.4%
Change in inventories, current prices, 000	Exog	1.5% of GDP
Taxes and contributions, current prices, 000	Exog	33.5% of GDP
Transfers for social protection, 000	Exog	13% of GDP

A detailed overview of the trends in budget revenues, expenditures, balances (surplus/deficit) and public debt in Scenario 1 is shown in Tables 11-12 (Appendix).

Applying the model presented in section 3.3.1, with exogenously defined value of government spending in accordance with the fiscal policy defined in scenario 1, the dynamics of GDP in Montenegro in the period 2021-2040 was estimated. The average GDP growth rate in the period 2021-2040 is equal to 3.5%. The absolute values of GDP and expenditure components are presented in Table 9.

Table 9: GDP and expenditure components (€ 000), scenario 1, 2021-2040

	GDP	Households consumption	Government consumption	Investment	Stock change	Exports	Imports
2021	4,521,023	3,389,114	939,398	1,151,789	68,559	1,819,096	2,846,933
2026	5,384,511	3,891,377	1,098,631	1,387,662	82,599	2,191,625	3,267,385
2031	6,202,504	4,362,010	1,261,047	1,608,681	95,755	2,540,694	3,665,684
2036	7,149,332	4,907,602	1,447,177	1,864,902	111,006	2,945,361	4,126,717
2040	8,013,077	5,406,008	1,615,428	2,098,964	124,938	3,315,030	4,547,293

Source: *Authors' calculation*

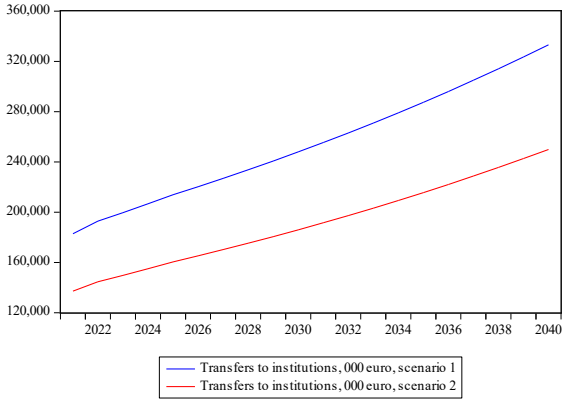
3.2.3.2. Scenario 2: Reduction of government spending through reduction of gross salaries and transfers to institutions; growth of other exogenous variables at the average rate in the period 2006-2020

The assumptions in the model (scenario 2) are based on the average values of the corresponding variables in the period 2006-2020 and the projected GDP trend explained in the previous section. Fiscal policy is restrictive compared to the period 2006-2020 (reduction of gross salaries and transfers to institutions by 1% of GDP, respectively). There is also the possibility of reducing the category of "other current expenditures", which average 6.7% of GDP, which can also be considered as an alternative in further research.

The differences in the values of expenditure budget categories in the scenarios of unchanged fiscal policy (1) and restrictive fiscal policy (2) are shown in Graphs 6-7.

Graph 6: Expenditures for gross salaries, 000 €, scenario 1-2

Graph 7: Graph 7. Transfers to institutions, 000 €, scenario 1-2



A detailed overview of budget revenue trends in Scenario 2 is presented in Table 11 (Appendix) and the trends in budget expenditures, balances (surplus / deficit) and public debt in Scenario 2 in Table 13 (Appendix).

Applying the model presented in section 3.3.1, with an exogenously defined value of government spending in accordance with the fiscal policy defined in scenario 2, dynamics of GDP in Montenegro in the period 2021-2040 was estimated. The average GDP growth rate in the period 2021-2040 is equal to 3.41%. The absolute values of GDP and expenditure components are presented in Table 10.

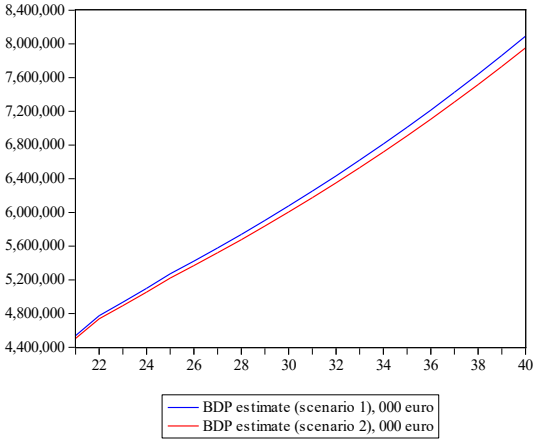
Table 10: GDP and expenditure components (€ 000), scenario 2, 2021-2040

	GDP	Households consumption	Government consumption	Investment	Stock change	Exports	Imports
2021	4,521,023	3,389,114	939,398	1,151,789	68,559	1,819,096	2,846,933
2026	5,330,092	3,891,377	1,017,716	1,387,662	82,599	2,191,625	3,240,887
2031	6,124,576	4,362,010	1,145,176	1,608,681	95,755	2,540,694	3,627,740
2036	7,041,607	4,907,602	1,286,999	1,864,902	111,006	2,945,361	4,074,263
2040	7,876,029	5,406,008	1,411,650	2,098,964	124,938	3,315,030	4,480,562

Source: *Authors' calculation*

The scenarios of the uniform and the restrictive fiscal policy lead to different GDP in Montenegro (Graph 8), due to the reduction of government spending in the second scenario, although the difference is not high as for all other exogenous variables assumptions were identical. The average annual GDP growth rate in scenario 1 is 3.5%, in scenario 2 it is 3.41%.

Graph 8: GDP (000 €), scenarios 1 and 2



Source: *Authors' calculation*

4. CONCLUSION

Growing public debt is one of the biggest challenges faced by both developing and developed economies. Available research indicates the negative impact of growing public debt on economic growth. As in Casares (2015), "at low levels of indebtedness, an increase in the proportion of external public debt to GDP could promote economic growth; however, at high levels of indebtedness, an increase in this proportion could hurt economic growth."

In all Western Balkan countries, after a slight decline in the first decade of this century, public debt (% of GDP) increased in the last decade, with a slight recovery in some countries in recent years. The highest and growing public debt in relation to GDP was observed in Montenegro.

Applying the OLS method on panel data using a sample of Western Balkan countries and the period from 1998 to 2019, we found that the growth in public debt by one unit leads to a decrease in the GDP growth rate by 0.042 units. Also, an increase in public debt by one unit leads to a decrease in the productivity growth rate by 0.086 units.

The results of the research (using Montenegro as a case) showed that the continuation of the fiscal policy approach implemented in the last decade (borrowing approach to finance expenditures) in the period from 2021 to 2040, due to the small difference between the average GDP growth rate (3.5%) and the interest rate (3.21%) leads to a slow change in the ratio of public debt and GDP during the analysed period (98% in 2021 and 75% at the end of the period). If the course of fiscal policy changes in the direction of reducing government spending, public debt would be reduced to 31.9%

of GDP in 2040. Although due to reduced government spending, GDP growth will slow down as a consequence of a decline in aggregate demand, a 1% reduction in public debt will have a positive impact on GDP (0.36%) and productivity (0.8%) growth in the long run. This indicates the justification for preferring a public debt management policy focused on reducing government spending.

Further research should incorporate more variables relevant for economic growth and productivity, but also impact from fiscal policy to them, so the wider picture of the prospects of various public debt management policies can be assessed.

REFERENCE:

1. Asteriou, D, K Pilbeam, and C.E. Pratiwi. (2021). "Public debt and economic growth: panel data evidence for Asian countries." *Journal of Economics and Finance, 45* 270-287.
2. Bacovic, Maja. (2007). "Demographic Changes in transition countries: Opportunity or Obstacle for Economic Growth? Case of Montenegro." *European Research Studies, XI (3-4)* 31-44.
3. Balassone, Fabrizio, Maura Francese, and Angelo Pace. (2013). *Public Debt and Economic Growth in Italy.* Economic History Working Paper, 11, Bank of Italy.
4. Baro, J Robert. (1998). *Macroeconomics, 5th edition.* Cambridge, Massachusetts; London, England: The MIT Press.
5. Blanchard, Olivier. 2012. *Macroeconomics, 5th ed.* Pearson/Prentice Hall.
6. Calderon, Cesar, and Rodrigo J Fuentes. (2013). *Government Debt and Economic Growth.* IDB Working paper series No. IDB-WP-424, Chile: Inter-American Development Bank.
7. Casares, Enrique R. (2015). "A relationship between external public debt and economic growth." *Estudios Economicos, 30(2).*
8. Dombi , Akos, and Istvan Dedak. (2019). "Public debt and economic growth: what do neoclassical growth models teach us?" *Applied Economics, 51(29)* 3104-21.
9. Elmendorf, Douglas W., and Louise M. Sheiner. (2017). "Federal Budget Policy with and Aging Population and Persistently Low Interest Rates." *Journal of Economic Perspectives, 31(3)* 175-194.

10. Ferreira, Maria Candida. (2009). *Public debt and economic growth: a Granger causality panel data approach.* UECE - Working Papers 24/2009/DE/UECE, ISEG - Departamento de Economia.

11. Gómez-Puig, M, and S Sosvilla-Rivero. (2017). *Public debt and economic growth: Further evidence for the euro area.* Working Paper 2017/15, Barcelona: Research Institute of Applied Economics.

12. Grosu, Alexandra-Claudia, Carmen Pintilescu, and Bogdan Zugravu. (2021). "Trends in public debt sustainability in Central and Eastern EU countries." *Post-Communist Economies.*

13. Kostarakos, Ilias. (2021). "Public debt and aggregate investment in the EU." *Applied Economic Letters.*

14. Lee, Insook. (2018). "Is social expenditure responsible for recent rise in public debt in OECD countries?" *Applied Economics Letters, 25(1)* 43-46.

15. Lee, Ronald D. (2014). "Macroeconomic Consequences of Population Aging in the United States: Overview of a National Academy Report." *American Economic Review: Papers & Proceedings, 105(5)* 234-239.

16. Maestas, Nicole, Kathleen J. Mullen, and David Powell. (2016). "The Effect of Population Aging on Economic Growth, the Labor force and Productivity." *NBER Working Paper Series.* Cambridge, MA: National Bureau of Economic Research, July.

17. Mankiw, Gregory. (2009). *Macroeconomics, 7e.* Worth Publishers.

18. Mencinger, Jernej, Aleksander Aristovnik, and Miroslav Verbic. 2014. "The Impact of Growing Public Debt on Economic Growth in the European Union." *Amfiteatru Economic Journal, 16(35)* 403-414.

19. Nur Hayati Abd, Rahman, Ismail Shafinar, and Ridzuan Abdul Rahim. (2019). "How does public debt affect economic growth? A systematic review." *Cogent Business & Management, 6(1)* 1-16.

20. Panizza, Ugo, and Andrea F Presbitero. (2013). "Public debt and economic growth in advanced economies: A survey." *Swiss Journal of Economics and Statistics, 149* 175-204.

21. Panizza, Ugo, and Andrea F Presbitero. (2014). "Public debt and economic growth: Is there a causal effect?" *Journal of Macroeconomics, 41* 21-41.

22. Petrakos, George, Panagiotis Artelaris, and Dimitris Kallioras. (2020). "Convergence and public debt in the European Union: An overlooked trade-off?" *Regional & Federal Studies.*

23. Ramos-Herrera, María del Carmen, and Simón Sosvilla-Rivero. (2017). "An empirical characterization of the effects of public debt on economic growth." *Applied Economics, 49(35)* 3495-3508.

24. Reinhart , Carmen M, Vincent R Reinhart, and Kenneth S Rogoff. (2012). "Public Debt Overhangs: Advanced Economy Episodes Since 1800." *Journal of Economic Perspectives, 26(3)* 69-86.

25. Romer, David. (2001). *Advanced Macroeconomics, 2e.* McGraw-Hill Higher Education.

26. Silva, J. 2020. "Impact of public and private sector external debt on economic growth: the case of Portugal." *Eurasian Economic Review, 10* 607-634.

27. The World Bank. 2017. "Montenegro Policy Notes (2017)." Washington, DC.

28. UNCTAD. (2016). "Managing Public Debt." *United Nations Conference on Trade and Development, 14.* https://unctad.org/system/files/official-document/iaosmisc200520_en.pdf.

29. Varoudakis, A, L Kasek , T Pushak, A Ryonca, E Skrok, and Tiongs. (2007). "Do Public Finance Systems Matter for Growth?" In *Fiscal Policy and Economic Growth, Lessons for Eastern Europe and Central Asia*. The World Bank.

30. Wheeler, Mark. (1999). "The Macroeconomic Impacts of Government Debt: An Empirical Analysis of the 1980s and 1990s." *American Economic Journal, 27(3)* 273-284.

ANNEX

Table 11: Budget revenues (000 €)

	Taxes	Contributions	Other basic revenues	Total revenues
2021	1,105,088	581,841	199,274	1,886,203
2022	1,109,054	554,527	154,303	1,817,884
2023	1,147,871	573,936	159,704	1,881,511
2024	1,188,047	594,023	165,293	1,947,363
2025	1,229,628	614,814	171,079	2,015,521
2026	1,266,517	633,259	176,211	2,075,987
2027	1,304,513	652,256	181,497	2,138,266
2028	1,343,648	671,824	186,942	2,202,414
2029	1,383,957	691,979	192,551	2,268,487
2030	1,425,476	712,738	198,327	2,336,541
2031	1,468,240	734,120	204,277	2,406,638
2032	1,512,288	756,144	210,405	2,478,836
2033	1,557,656	778,828	216,717	2,553,201
2034	1,604,386	802,193	223,219	2,629,798
2035	1,652,518	826,259	229,915	2,708,691
2036	1,702,093	851,047	236,813	2,789,953
2037	1,753,156	876,578	243,917	2,873,651
2038	1,805,751	902,875	251,235	2,959,861
2039	1,859,923	929,962	258,772	3,048,657
2040	1,915,721	957,860	266,535	3,140,116

Source: *Authors' calculation*

Table 12: Table 12. Budget expenditures, balance and public debt (000 €) - SCENARIO 1

	Gross wages	Interest	Other current expenditures	Transfers for social protection	Transfers to institutions	Consolidated expenditures	Surplus/ deficit	Public debt, net	Public debt, net % GDP
2021	523,223	113,075	225,535	574,252	257,809	2,369,159	-482,956	3,569,276	98.2
2022	491,841	114,770	284,497	626,857	192,879	1,869,969	-52,084	3,621,360	95.3
2023	509,056	116,445	294,454	648,797	199,630	1,933,076	-51,565	3,672,925	93.9
2024	526,873	118,103	304,760	671,505	206,617	1,998,316	-50,952	3,723,878	92.4
2025	545,313	119,741	315,426	695,007	213,848	2,065,762	-50,241	3,774,118	91.0
2026	561,673	121,357	324,889	715,857	220,264	2,125,758	-49,771	3,823,889	90.0
2027	578,523	122,957	334,636	737,333	226,872	2,187,490	-49,224	3,873,113	89.0
2028	595,879	124,540	344,675	759,453	233,678	2,251,009	-48,595	3,921,708	87.9
2029	613,755	126,103	355,015	782,237	240,688	2,316,366	-47,879	3,969,587	86.9
2030	632,168	127,642	365,666	805,704	247,909	2,383,613	-47,072	4,016,658	85.9
2031	651,133	129,156	376,636	829,875	255,346	2,452,806	-46,168	4,062,827	84.8
2032	670,667	130,640	387,935	854,771	263,007	2,524,000	-45,163	4,107,990	83.7
2033	690,787	132,092	399,573	880,414	270,897	2,597,253	-44,051	4,152,041	82.7
2034	711,510	133,509	411,560	906,827	279,024	2,672,624	-42,826	4,194,867	81.6
2035	732,856	134,886	423,907	934,032	287,394	2,750,175	-41,483	4,236,349	80.5
2036	754,841	136,220	436,624	962,053	296,016	2,829,967	-40,015	4,276,364	79.4
2037	777,487	137,506	449,723	990,914	304,897	2,912,066	-38,415	4,314,779	78.3
2038	800,811	138,742	463,214	1,020,642	314,044	2,996,538	-36,678	4,351,457	77.2
2039	824,835	139,921	477,111	1,051,261	323,465	3,083,452	-34,795	4,386,252	76.1
2040	849,581	141,040	491,424	1,082,799	333,169	3,172,876	-32,760	4,419,012	75.0

Source: *Authors' calculation*

Table 13: Budget expenditures, balance and public debt (000 €) - SCENARIO 2

	Gross wages	Interest	Other current expenditures	Transfers for social protection	Transfers to institutions	Consolidated expenditures	Surplus/ deficit	Public debt, net	Public debt, net % GDP
2021	523,223	113,075	225,535	574,252	137,118	2,174,232	-333,000	3,419,320	94.9
2022	443,622	109,948	284,497	626,857	144,659	1,768,708	49,177	3,370,143	90.7
2023	459,148	108,367	294,454	648,797	149,722	1,825,183	56,328	3,313,815	87.3
2024	475,219	106,556	304,760	671,505	154,963	1,883,460	63,903	3,249,912	83.9
2025	491,851	104,501	315,426	695,007	160,386	1,943,597	71,924	3,177,988	80.4
2026	506,607	102,188	324,889	715,857	165,198	1,996,457	79,529	3,098,459	77.3
2027	521,805	99,631	334,636	737,333	170,154	2,050,728	87,538	3,010,921	74.2
2028	537,459	96,816	344,675	759,453	175,258	2,106,446	95,968	2,914,952	71.1
2029	553,583	93,730	355,015	782,237	180,516	2,163,649	104,838	2,810,115	67.9
2030	570,190	90,359	365,666	805,704	185,932	2,222,376	114,166	2,695,949	64.7
2031	587,296	86,688	376,636	829,875	191,510	2,282,665	123,972	2,571,977	61.5
2032	604,915	82,702	387,935	854,771	197,255	2,344,558	134,278	2,437,698	58.3
2033	623,063	78,384	399,573	880,414	203,173	2,408,096	145,106	2,292,593	55.1
2034	641,754	73,718	411,560	906,827	209,268	2,473,322	156,476	2,136,117	51.8
2035	661,007	68,687	423,907	934,032	215,546	2,540,278	168,414	1,967,703	48.6
2036	680,837	63,271	436,624	962,053	222,012	2,609,011	180,942	1,786,761	45.3
2037	701,262	57,453	449,723	990,914	228,673	2,679,565	194,086	1,592,675	42.0
2038	722,300	51,212	463,214	1,020,642	235,533	2,751,987	207,873	1,384,801	38.7
2039	743,969	44,528	477,111	1,051,261	242,599	2,826,326	222,330	1,162,471	35.3
2040	766,288	37,379	491,424	1,082,799	249,877	2,902,631	237,485	924,986	32.0

Source: *Authors' calculation*

Maja Baćović

JAVNI DUG I PRIVREDNI RAST: DVA SCENARIJA UPRAVLJANJA JAVNIM DUGOM U CRNOJ GORI

SAŽETAK

Rast javnog duga jedan je od najvećih izazova s kojim se suočavaju i zemlje u razvoju i razvijene ekonomije. Dostupna istraživanja ukazuju na negativan uticaj rasta javnog duga na privredni rast. Primjenjujući OLS metod na panel podacima za zemlje Zapadnog Balkana i period od 1998. do 2019. godine, ocijenili smo da procentni rast javnog duga dovodi do smanjenja stope rasta BDP -a za 0,036 procentnih poena. Osim toga, povećanje javnog duga za jedan procentni poen dovodi do smanjenja stope rasta produktivnosti za 0,079 procentnih poena. Rezultati istraživanja za Crnu Goru (dva scenarija fiskalne politike i period 2021-2040), pokazali su da, ako rashodi ostanu nepromijenjeni, zbog male razlike između prognozirane prosječne stope rasta BDP-a u periodu 2021-2040 i kamatne stope (pretpostavljene konstantne), takav scenarij će dovesti do sporije promjene omjera javnog duga u BDP-u (smanjenje od 23% u dvije decenije). Osim toga, trošak kamata na javni dug u ovom scenariju tokom cijelog perioda veći je od 2% BDP -a. Ako se fiskalna politika promijeni u smjeru smanjenja državne potrošnje, kratkoročna stopa rasta BDP-a bi se neznatno smanjila, ali i rashodi za kamate (manje od 2% BDP-a) i javni dug (smanjenje od 63% za dvije decenije). Iako će smanjena državna potrošnja imati kratkoročni negativan utjecaj na rast BDP -a, zemlja će imati dugoročne koristi jer će smanjeni javni dug imati pozitivan utjecaj na BDP i rast produktivnosti.

Ključne riječi: *Javni dug, državna potrošnja, ekonomski rast*

JEL: *H6*

Bojan Krstić, [1]

Ivana Janjić[2]

Milica Jovanović[3]

Sandra Milanović[4]

THE SIGNIFICANCE OF R&D ACTIVITIES FOR MANAGING INTELLECTUAL CAPITAL OF ENTERPRISES

ABSTRACT

Enterprises are developing, increasing their profits, value and competitiveness based on successful synergies of human, structural and relational intellectual capital. In addition, R&D (Research and Development) has been acknowledged as a crucial contributor to the competitive advantage in today's competitive market. By performing R&D activities, companies create, develop and use intellectual resources (the knowledge of employees and managers, the knowledge contained in technology and processes), which are valorized on the market and converted into a certain value. R&D is the primary source of knowledge stored within individuals in the enterprise. The most generally used indicators of R&D outputs are patents and innovations, and very important components of structural intellectual capital. Both of these indicators are used to evaluate a company's technological strength and capabilities.

The purpose of this paper is to investigate the relationships and connections between investment in R&D, the components of the intellectual capital of enterprises and the efficiency of intangible assets as visible intellectual capital and the efficiency of the total intellectual capital. This paper aims to point out the importance of performing R&D activities for managing the intellectual capital of the enterprises. Correlation and regression analysis were used for that purpose. The results of the analysis show that R&D investments are positively correlated with visible and invisible intellectual capital, and the efficiency of intangible assets, while R&D investments have a positive influence on visible and invisible intellectual capital.

Keywords: *R&D activities, intellectual capital management, efficiency of intangible assets, efficiency of the total intellectual capital*

JEL: O32, O34

---

1 Full professor, bojan.krstic@eknfak.ni.ac.rs, Trg Kralja Aleksandra Ujedinitelja, 18000 Niš, Serbia

2 Junior researcher, ivana91.ekfak@gmail.com, Kraljevića Marka 56/15, 18000 Niš, Serbia

3 Research assistant, jovanovicmilicaa90@gmail.com, Cara Dušana 86/53, 18000 Niš, Serbia

4 Junior research assistant, sandramilanovic89@yahoo.com, 18000 Niš, Serbia

1. INTRODUCTION

Having in mind the importance of research and development for the creation of intangible assets of the company, the paper analyzes the impact of R&D activities on the components of intellectual capital and intellectual capital management in the company. The paper explores the relationship between investment in R&D, visible and invisible intellectual capital of the company and the efficiency of the use of intellectual capital, on the example of companies from the high-tech sector in nine years period. Correlation and regression analysis will indicate the strength and direction of these interdependencies. Based on that, it will be concluded about the importance of allocating funds in the company for research and development in order for the company to maintain and further develop intangible assets that become a key resource for acquisition and preservation of competitive advantage.

2. Literature review

The development of research on the intellectual capital of enterprises can be observed through three phases. The initial focus was on raising awareness of the importance of intellectual capital for market success and business competitiveness. The second phase was based on the importance of developing intellectual resources and increasing investment in these resources in order to increase the value of the company's intellectual capital. In the third phase, the researchers sought to find non-financial and financial criteria for monitoring and measuring this valuable asset to provide a better information basis for decision-making (Tan et al., 2008). The ultimate goal of these indicators is the more successful management of the company's intellectual capital.

Intellectual capital management gained prominence in the eighties of the last century when the importance of intellectual capital for the success of business operations was emphasized (Harrison & Sullivan, 2000). In the last decade of the twentieth century, proactive intellectual capital management developed, when top management became increasingly involved in these activities and intellectual property (IP) dominated concerning physical and financial assets. Under the influence of such changes, IP managers appear in the company, as there were, for example, IT managers (Grindley & Teece, 1997).

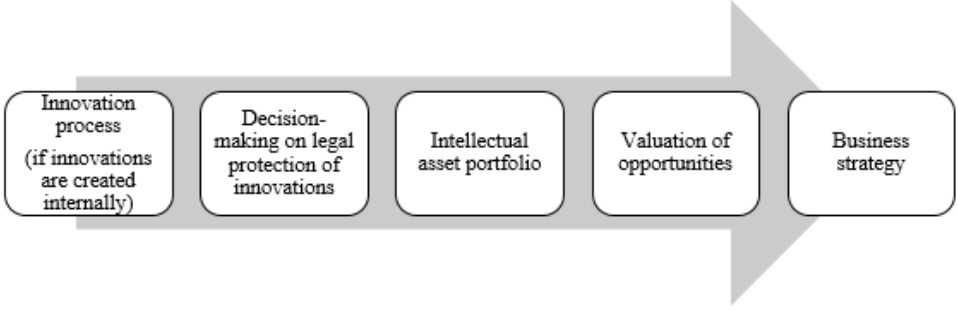
Edvinson (2000) highlights that intellectual capital consists of human competencies, abilities, skills, experience and other forms of knowledge that can contribute to the growth of the organization. Edvinsson and Malone (1997) point to the existence of three segments of intellectual capital - human, structural and capital based on relations with customers. Nick Bontis (1998) emphasizes that intellectual capital consists of human capital (human intellect), structural capital (organizational routine) and client capital (market relations).

Roos and Roos (1997) indicate that the concept of intellectual capital relies on three segments – human capital, organizational capital and capital contained in relationships with consumers and other stakeholders. Bollen et al. (2005) suggest that intellectual capital is based on three elements: 1) human capital, 2) structural capital and 3) relational capital. Human capital includes knowledge and competence of employees; structural capital is based on intellectual property, technology, processes, culture and internal relationships; relational capital consists of relations of the company with institutions, investors, partners, suppliers and customers (Stewart, 1995; Jurczak, 2008; Cricelli et al., 2013).

The structure of the intellectual capital of the company will be explained first, and then the key determinants of the management of intellectual capital.

Intellectual capital management is based on five key elements (Figure 1). The first segment of this system is the innovation process if the company itself develops new ideas that are the basis of innovation, within the R&D department or the creativity department. On the other hand, it starts from the second segment (decision-making on the legal protection of innovations) if the company comes to innovation externally, by buying on the market. Each company has certain methods for assessing the importance of innovation for the realization of the company's strategy. Based on these methods, the company will decide whether the innovation will be part of the intellectual asset portfolio. Such an assessment is necessary bearing in mind that legal protection implies certain costs, so it is necessary to perform a cost-benefit analysis. It is first necessary to conduct a qualitative evaluation, and then determine the quantitative contribution of a particular innovation. In addition, it is necessary to assess competitive conditions, that is, to consider the innovations and technology of competitors. Finally, the assessment of intellectual property from the aspect of the company's business strategy is also important. This means considering how each intellectual resource contributes to the achievement of the corporate strategy.

Figure 1: Intellectual capital management system



Source: *Harrison and Sullivan, 2000*

Intellectual capital management requires a long-term focus on intellectual capital and two perspectives – creating value and extracting value. It involves: 1) tightly managing the quality of the company's patents to eliminate non-profitable patents from portfolios, 2) research of insufficiently protected intellectual resources to develop commercialized innovations and 3) improving the efficiency of the process of creating commercialized innovations (Edvinsson & Sullivan, 1996).

Marques and his co-workers (2006), in their research on the impact of innovations (which is the result of investment in R&D activities) on intellectual capital management, came to the following conclusions: 1) R&D activities are crucial for creating knowledge assets (human capital); 2) R&D management has a significant positive influence on long-term relationships with suppliers, customers and other stakeholders (relational capital); 3) R&D competencies have a positive and strong relationship with structural intellectual capital. Ren and Song (2020) concluded in their analysis that there is a significant positive correlation between human and organizational capital and R&D investment, using the data of Chinese listed firms from 2007 to 2017. Additionally, Chang and Hsieh (2011) indicate, in their study conducted on 367 Taiwan semiconductor companies, that R&D expenditure and intellectual property rights have a significant positive association with the companies' intellectual capital performance. The R&D activities of the company create new opportunities for the company through the creation of new knowledge and the ability to assimilate and exploit external knowledge (Tsai & Wang, 2004). In this way, these activities improve the quality of the human capital of the company. Companies that invest more in R&D also have a larger number of product and process innovations (Stock et al., 2001), which indicates a favourable impact on the structural intellectual capital of companies.

On the one hand, the management of intellectual capital that is in line with the company's strategy contributes to the understanding of the value creation process in the company as well as uncertainties in the field of research and development. On the other hand, management of intellectual capital enables the company to evaluate the success of R&D activities, ie the efficiency and effectiveness of R&D investments (Dong-Young & Vinod, 2009).

Chen and co-authors (2010) concluded in their research of the impact of innovation capacity on the components of intellectual capital, that innovation capital - expressed in the intensity of R&D, has a strong positive impact on the sustainability of customer relationships, which is a key segment of the relational intellectual capital of the company. They also reported that R&D activities have a slightly positive impact on human capital.

There is also research that analyzes intellectual capital indicators that play a key role in maximizing the performance of R&D activities. According to Dong-Young and Vinod (2009), human capital plays a dominant role in the creation of superior R&D performance, while structural and ultimately relational capital has a significantly lower impact. Following this research, the following indicators influence R&D activities, with declining significance: 1) leadership, 2) commitment, 3) work attitude, 4) employee satisfaction, 5) patent per employee, 6) competence utilization, 7) standards contribution per person, 8) paper per employee, 9) education satisfaction, 10) working years, 11) training expenses per employee, 12) training hours per employee. Similarly, the analysis of other authors (Leitner, 2011) shows that if a company wants to improve its innovation capacity through investment in R&D, it is first necessary to invest in human capital, bearing in mind that R&D activities are key to improving the innovation capacity of the company (Chang, 2013).

2.1. R&D and human capital

Managing intellectual capital in R&D is a novel technique for assessing the efficiency and effectiveness of R&D efforts. R&D activities were described as input of innovative capability, while human capital was defined as absorptive capacity (Castellacci & Natera, 2013). R&D and human capital investments are intertwined and are both determinants of the knowledge-based economy.

Intellectual capital (IC) resources employed to generate innovativeness in products and services through investment in R&D and human capital (personnel investment and research & development) appear to be widely accepted as the fundamental drivers of sustainable competitive advantage and market value (Grant, 1996; Chen, Cheng & Hwang, 2005).

The development of new ideas, as well as the R&D of new technologies, is heavily influenced by human capital (Tullao, 2012). Human capital is the most important factor for technological progress. Some scholars claimed that firms' ability to learn is determined by their internal capabilities, which can be assessed by the number of researchers in their R&D department (Cohen & Levinthal, 1990)

Companies generate, develop, and utilize intellectual resources (knowledge of employees and managers, knowledge included in technology and processes) as a result of R&D operations, which are then commercialized and converted into a given value in the market. According to Hoffman et al. (1998), highly educated R&D human resources improve a company's innovation capability by facilitating the absorption, transformation, and invention of new technologies.

Satisfied and well-educated human capital plays an important role in driving innovation and performance in R&D and are likely to build organizational capital such as procedure, culture, and brand value (Elickson, 2002). Some researchers (Lynch & Black, 1995) stated that in the US, the ratio of highly skilled and educated employees is positively correlated with R&D activities. Based on the results of the empirical study, Ma et al. (2013) concluded that a "1% increase in R&D employee intensity input will contribute to 0.121% increase in innovation performance for emerging industries".

2.2. R&D and structural capital

Following a review of the literature, some studies proposed a major revision to the intellectual capital scheme, which includes human capital, structural capital, social capital, and the addition of R&D derived from organizational capital (Edvinsson & Malone, 1997; Ross & Ross, 1997; Bounfour, 2002), as well as the underlying concept of intellectual property (Brooking, 1996; Sullivan, 2001). Structural capital is a combination of knowledge and intangible assets created from the organization's operations, and it includes organizational processes, organizational design, organizational culture, procedures, technologies, information resources and intellectual property rights (Edvinsson & Malone, 2001).

Organizational design that blends internal and external R&D activities, provides not only benefits in terms of different information, but also challenges in terms of integrating such knowledge across organizational boundaries (Rosenkoph & Almeida, 2003). The management of R&D activities depends on the cultural environment and cultural patterns of an organization. A set of values, understandings, beliefs inside an organization is referred to as organizational culture. Within an organization, culture establishes suitable attitudes and approved ways of doing things. For a corporation to manage its R&D activities properly, it must strike a balance between uncertainties and processes on the one hand, and employee creativity and innovation on the other hand.

In order to commercialize innovation and develop its technological capability, which can boost the novelty and uniqueness of new products, a company must invest in R&D efforts (Zahra & Nielson, 2002). The most generally used measures of R&D outputs are patents and innovations and very important components of structural intellectual capital. Both of these are used to evaluate a company's technological strength and capabilities. Laursen and Salter (2006) indicate that a company must frequently invest significantly in R&D to accomplish a radical innovation, which has a lower likelihood of success but higher performance.

Mairesse and Mohnen (2004) investigated the correlation between R&D and innovation outputs on the sample of 5500 French manufacturing companies for the period 1998-2000. The results of conducted research showed that R&D is positively correlated with all innovation indicators in the low-tech sectors more than in the high-tech sectors.

For the period 1981 to 2001, Prodan (2005) examined the association between R&D investments and patent applications in OECD countries. According to this empirical research, a positive link between R&D and patent applications exists. Some prior empirical studies analysed the relationship between R&D and patents (Bound et al., 1982; Hall et al., 1986) and concluded that there is a positive and significant association between R&D efforts and patents.

2.3. R&D and relational capital

In addition to human and structural capital, relational capital is one of the three basic components of intellectual capital. In today's dynamic and global environment, relational capital has become a means of gaining a competitive advantage. Relational capital has been observed from different perspectives and different conceptualizations and there is no one generally accepted definition. According to Brooking (1996) and Sveiby (1997), relational capital encompasses relations with customers, suppliers, competition, institutions and other agents, as well as reputation and corporate image.

In recent years has the significance of firm R&D cooperation between firms and customers has grown, which is reflected in the fact that these interactions have effects on R&D expenditures and the innovation effort of firms. In some studies, it has been found that customer participation reduced innovation investment (Henkel & Hippel, 2004; Jeppesen, 2005; Lettl et al., 2006), increasing innovation efficiency (Tether, 2002), reducing the trial and error process and the number of faulty prototypes (Lettle et al., 2006). Concerning R&D activities, the tighter collaboration and knowledge integration between firms and suppliers can assist in improving products and processes, making a decision and solving problems in the process of product development (Appleyard, 2003; Cousins et al., 2011).

Porter (1979) discovered that companies that place a greater emphasis on R&D activities create "entry barriers", which can help with reputation building. According to Chun (2006), R&D activities have a major positive impact on corporate reputation. Padgett and Moura-Leite (2012) highlighted that innovation acts as a moderator between R&D and business reputation.

3. Hypotheses and research methodology

Given the previous literature review, the following research hypotheses have been proposed:

H1. A positive correlation exists between R&D investments, the intangible assets and goodwill (Iag), the invisible intellectual capital (ΔIC), the efficiency of intangible assets (Eiag) and the efficiency of the total intellectual capital (EIC).

H2. R&D investments influence positively the company intellectual capital - visible (Iag) and invisible (ΔIC).

H3. R&D investments influence positively the efficiency of the use of company intellectual capital - visible and invisible (EIC).

Following the paper's aim, the research model is developed to measure the influence of R&D investments on intellectual capital categories. In this paper, secondary data for 15 high-tech companies from their annual financial reports were used. The analyzed period covers the period from 2012 to 2019. Except for investments in R&D and Iag which were derived from financial statements, other intellectual capital indicators were calculated separately by the authors. Therefore, ΔIC as the part of the intellectual capital of the enterprise that is not visible in the balance sheet of the enterprise is obtained as the difference between the market capitalization of the company and the net assets of the company. This part of the total intellectual capital of the enterprise together with intangible assets and goodwill constitutes precisely the total intellectual capital of the enterprise (Krstić, 2014). The efficiency of intangible assets (Eiag) and the efficiency of the use of company intellectual capital - visible and invisible (EIC) are calculated according to the methodology developed by Krstić and Bonić (2016).

According to Ren and Song (2020), all data was transformed and calculated as the logarithm of the original values. The descriptive statistics of the researched variables are presented in the following table.

Table 1: Descriptive statistics, 2012-2019

Variable	Meaning	N	Mean	SD	Min	Max
R&D	the logarithm of annual R&D investment	136	3,7398	,38177	2,80	4,56
Iag	the logarithm of the annual intangible assets and goodwill	123	4,2448	,43634	3,08	5,02
ΔIC	the logarithm of the annual invisible intellectual capital	120	4,9207	,53795	3,14	6,00
Eiag	the logarithm of the annual efficiency of intangible assets	123	,2433	,45436	-,44	1,24
EIC	the logarithm of the annual efficiency of the use of company intellectual capital	125	-,4876	,49760	-1,15	1,44

Source: *Authors' calculation*

In this research, all calculations were made by using the IBM SPSS program (version 23). Besides the data transformation technique and descriptive statistics, the test of the normality of data was conducted. In order to test the first hypothesis, correlation analysis was conducted, two-tail, and all significant coefficients were marked. For the second and third hypotheses testing, the simple linear regression analysis was applied. Moreover, the assumptions of the analysis were also tested and confirmed (multicollinearity and autocorrelation). For the obtained data, statistically significant results were considered if its p-value was equal to or smaller than 0.05.

The stated hypotheses were tested according to the following research models:

$$Iag = \alpha + \beta R\&D\ investment + \varepsilon \quad (1)$$

$$\Delta IC = \alpha + \beta R\&D\ investment + \varepsilon \quad (2)$$

$$EIC = \alpha + \beta R\&D\ investment + \varepsilon \quad (3)$$

4. Results and discussion

The results of the conducted analysis and relevant conclusions will be presented below.

Firstly, the data of the correlations analysis will be presented for testing the first hypothesis, and, secondly, the linear regression analysis will be presented.

Table 2: Correlation analysis results

Variable	1	2	3	4	5
1. R&D	1				
2. Iag	.311**	1			
3. DeltaIC	.390**	.142	1		
4. Eiag	.258**	-.726**	.309**	1	
5. EIC	.101	-.067	-.703**	.216*	1

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

***Source:** Authors' calculation*

According to the previous table, a positive and statistically significant relationship between R&D investments and Iag is identified ($r = .311$, $p \leq .01$), R&D investments and ΔIC ($r = .390$, $p \leq .01$) and R&D investments and Eiag ($r = .258$, $p \leq .01$). This further means that the intangible assets and goodwill (Iag), the invisible intellectual capital (ΔIC) and the efficiency of intangible assets (Eiag) are positively correlated with R&D investments and if a company invests in R&D, it will increase positively its Iag, ΔIC and Eiag. Additionally, the size of correlation coefficients varies from small to medium practical effect, thus increasing the significance of the obtained results for the practice.

On the other hand, there was no significant correlation identified between investments in R&D and efficiency of the use of company intellectual capital (EIC). Therefore, the first hypothesis was for the most part confirmed.

After the correlation analysis was conducted, the linear regression analysis was applied. Table 3 gives an overview of the obtained data.

Table 3: Regression analysis's results

	Dependent variable		
Independent variable	Iag	ΔIC	EIC
R&D	.345***	.518***	4.058E-6
R square	.096	.152	.003
Adjusted R square	.089	.145	-0.05
Change R2	.096***	.152***	.003
F statistics	12.911***	21.167***	.363

****. Correlation is significant at the 0.001 level.*

***Source:** Authors' calculation*

The previous table presents the results of testing three proposed research models. The first model tests the influence of R&D investments on Iag is the visible component of the intellectual capital. The results indicate that R&D investments have a statistically significant and positive influence on Iag ($\beta = . .345$, $p \leq .001$) and the model is statistically significant ($F = 12.911$, $p \leq .001$). According to the results, only 9.6% of the variance in Iag is explained by the change in R&D. The second model shows that the R&D investments have a statistically significant and positive influence on ΔIC ($\beta = .518$, $p \leq .001$). F statistics of the model is statistically significant ($F = 21.167$, $p \leq .001$). When it comes to the variance explained by the model, 15.2% change in ΔIC is caused by the change in the investments in the R&D. The last model is not statistically significant or the beta coefficient. Consequently, the second research hypothesis, which stated that there is a statistically significant and positive influence of R&D investments on visible and invisible intellectual capital, is confirmed. On the other hand, the influence of R&D investments on the efficiency of the use of company intellectual capital (EIC) is not identified and the third research hypothesis is rejected.

The study proved that R&D investments are positively correlated with both visible and invisible intellectual capital, and efficiency of intangible assets, while R&D investments have a positive influence on visible and invisible intellectual capital meaning that raise in R&D investments will generate visible and invisible intellectual capital for the company. The results of the analysis are somewhere in line with the previous researches on the same subject. Petković and Đorđević (2021) identified the positive influence of the R&D intensity indicator on Iag, but the negative influence of return on research capital impact on the intangible assets of the 11 French high-technology industries.

Additionally, Ren and Song (2020) stated that in their research conducted on the data of the Chinese companies', regression analysis presented a positive relationship between intellectual capital and investments in the R&D and applications of patents. In the research of Marques et al. (2006) investments in Schumpeterian competencies, as the radical progress of knowledge stock and generative learning, and in continuous improvement competencies, as incremental evolution of knowledge stock, loaded as significant predictors of the human, structural and relational capital change.

5. CONCLUSIONS

The study researched the relationship between R&D investments and intellectual capital (visible and invisible) and the efficiency of the use of company intellectual capital on the example of 15 companies for the period 2012-2019. In order to provide the empirical investigation of the impact of R&D investments on the intangible assets and goodwill, the invisible intellectual capital and the efficiency of the use of company intellectual capital, correlation and regression analyses have been utilized.

Based on the value of the coefficient of simple linear correlation, there is a strong linear correlation between R&D investments, intangible assets and goodwill and the invisible intellectual capital. Furthermore, the results have shown that there was no correlation between R&D investments and the efficiency of the use of company intellectual capital. Therefore, the obtained results partially confirmed our first hypothesis. The regression analysis findings confirmed that R&D investments have a statistically significant and positive impact on a company's intellectual capital (visible and invisible). Hence, these results confirm the second hypothesis. The analysis of the impact of R&D investments on the efficiency of the use of company intellectual capital shows that this is not recognized and the third hypothesis is rejected. The originality and value of this research are reflected in the identification of the results of the survey and creation of business policy and strategies with having this as a guideline. The conclusions of this research give directions for R&D policy makers in enterprises. In addition, this study promotes awareness of the importance of R&D investments and their implications for managing intellectual capital.

REFERENCES

1. Bollen, L., Vergauwen, P., and Schnieders, S. (2005). "Linking intellectual capital and intellectual property to company performance". *Management Decision*, 43(9), pp. 1161-1185.
2. Bontis, N. (1998). "Intellectual capital: an exploratory study that develops measures and models". *Management Decision*, 36(2), pp. 63-76.
3. Bound, J., Cummins, C., Griliches, Z., Hall, B., and Jaffe, A., (1982). "Who Does R&D and Who Patents?". Working paper nº 908, NBER.
4. Bounfour, A. (2002). "How to measure intellectual capital's dynamic value: the IC-dVAL approach". Paper presented at *the 5th World Congress on Intellectual Capital*. McMaster University, Hamilton, Ontario, Canada
5. Brooking, A. (1996). "*Intellectual Capital: Core Assets for the Third Millennium Enterprise*". Thompson Business Press, London
6. Brooking, A. (1996). "*Intellectual capital. Core asset for the triad millenium enterprise"*. London: International Thomson Business Press.
7. Castellacci F., and Natera J. M. (2013). "The Dynamics of National Innovation Systems: A Panel Cointegration Analysis of the Co-evaluation between Innovative Capability and Absorptive Capacity". *Research Policy*, 42, pp. 579-594.
8. Chang, S. W., and Hsieh, J. J. (2011). "Intellectual Capital and Value Creation-Is Innovation Capital a Missing Link?" *International Journal of Business and Management*, 6(2), pp. 3-12.
9. Chang, W. S. (2013). "Are R&D and intellectual property rights related to the firms' financial performance? The perspectives on intellectual capital". *International Journal of Technology, Policy and Management*, 13(3), pp. 245-260.
10. Chen, M., Cheng, S., and Hwang, Y. (2005). "An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance". *Journal of Intellectual Capital,* 6(2), pp.159-176.
11. Cheng, M.-Y., Lin, L.-Y., Hsiao, T.-Y., and Lin, T. W. (2010). "Invested resource, competitive intellectual capital, and corporate performance". *Journal of Intellectual Capital*, 11(4), pp. 433-450.
12. Cohen, W. M., and Levinthal, D.A. (1990a). "Absorptive capacity: A new perspective on learning and innovation". *Administrative Science Quarterly*, 35(1), pp. 128-152.

13. Cricelli, L., Greco, M., and Grimaldi, M. (2013). "The assessment of the intellectual capital impact on the value creation process: a decision support framework for top management". *International Journal of Management and Decision Making*, 12(2), pp. 146-164.

14. Development". *Industrial technology and economy*, 23(6), pp. 74-76.

15. Dong-Young, K., and Vinod, K. (2009). "A framework for prioritization of intellectual capital indicators in R&D". *Journal of Intellectual Capital*, 10(2), pp. 277-293.

16. Edvinson, L. (2000). "Some perspectives on intangibles and intellectual capital". *Journal of Intellectual Capital*, 1(1), pp. 12-16.

17. Edvinsson, L., and Malone, M .S. (1997). *"Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Roots"*. New York: HarperCollins Publishers, Inc.

18. Edvinsson, L., and Malone, M.S. (2001). "*Intellectual Capital*". Wydaw: Naukowe PWN

19. Edvinsson, L., and Sullivan, P. (1996). "Developing a model for managing intellectual capital". *European Management Journal*, 14(4), pp. 356-364.

20. Ellickson, M.C. (2002). "Determinants of job satisfaction of municipal government employees". *Public Personnel Management*, 31(3), pp. 343-58.

21. Grant, R. (1996). "Toward a knowledge-based theory of the firm". *Strategic Management Journal,* 17, pp.109-122.

22. Grindley, P. C., and Teece, D. J. (1997). "Managing intellectual capital: Licencing and cross-licencing in semiconductors and electronics". *California Management Review*, 39(2), pp. 8-41.

23. Hall, B.H., Griliches, Z. and Hausman, J.A. (1986). "Patents and R&D: is there a lag?". *International Economic Review,* 27(2), pp. 265–283.

24. Harrison, S., and Sullivan, P. H. (2000). "Profiting from intellectual capital. Learning from leading companies". *Journal of Intellectual Capital*, 1(1), pp. 33-46.

25. Henkel, J., and Hippel, V. E. (2004). "Welfare implications of user innovation". *The Journal of Technology Transfer*, 30(1-2), pp. 73-87.

26. Hoffman, K., Parejo, M., Bessant, J., and Perren, L. (1998). "Small firms, R&D, technology and innovation in the UK: A literature review". *Technovation*, 18(1), pp. 39-55.

27. Jeppesen, L.B. (2005). "User toolkits for innovation: consumers support each other". *Journal of Product Innovation Management*, 22(4), pp. 347-362.

28. Jurczak, J. (2008). "Intellectual Capital Measurement Methods". *Economics and Organization of Enterprise*, 1, pp. 37-45.

29. Krstić, B. (2014). "*Upravljanje intelektualnim kapitalom preduzeća*". Niš: Ekonomski fakultet.

30. Krstic, B. and Bonic, Lj. (2016). "EIC: A New Tool for Intellectual Capital Performance Measurement", *Prague Economic Papers*, 25(6), pp. 723-741.

31. Laursen, K. and Salter, A. (2006). "Open for Innovation: The Role of Openness in Explaining Innovation Performance among U.K. Manufacturing Firms". *Strategic Management Journal*, 27(2), pp. 131–50.

32. Leitner, K. H. (2011). "The effect of intellectual capital on product innovativeness in SMEs". *International Journal of Technology Management*, 53(1), pp. 1-18.

33. Lettl, C., Herstatt, C., and Gemuenden, H.G. (2006). "Learning from users for radical innovation". *International Journal of Technology Management,* 33(1), pp. 25-45.

34. Lynch, L., and Black. S. (1995). "Beyond the Incidence of Training: Evidence from a National Employers Survey". *Discussion Paper 5231.* National Bureau of Economic Research: Cambridge, Ma.

35. Ma, W., Yu, H., and Guilong, Z. (2013). "The impact of R&D investment and personnel incentive on innovation performance: A comparative study on emerging industries and traditional industries". *Science of science and management of S.&T*, 34(3), pp. 58-68.

36. Mairesse, J., and Mohnen, P. (2005). "The importance of R&D for innovation: A reassessment using French survey data". *The Journal of Technology Transfer,* 30(2_2), pp. 183-197.

37. Marques, D. P., Simon, F. J. G., and Caranana, C. D. (2006). "The effect of innovation on intellectual capital: an empirical evaluation in biotechnology and telecommunications industry". *International Journal of Innovation Management*, 10(1), pp. 89-112.

38. Petković, M., and Đorđević, M. (2021). "Intellectual Capital Investments and Company's Profitability: French Context". *Economic Analysis (0013-3213)* 54.1

39. Prodan I. (2005). "Influence of R&D Expenditures on Number of Patent Applications: Selected Case Studies in OECD Countries and Central Europe". *Applied Econometrics and International Development*, 5(4), pp. 5-22.

40. Ren, S., and Song, Z. (2020). "Intellectual capital and firm innovation: incentive effect and selection effect". *Applied Economics Letters*, 28(7), pp. 617-623.

41. Roos, G., and Roos, J. (1997). "Measuring your Company's Intellectual Performance". *Long Range Planning*, 30(3), pp. 413-426.

42. Rosenkopf, L., and Almeida, P. (2003). "Overcoming local search through alliances and mobility". *Management Science,* 49(6), pp. 751-766.

43. Ross, G. and Ross, J. (1997). "Measuring your company's intellectual performance". *Long Range Planning*, 30(3), pp. 413–426.

44. Stewart, T. A. (1995). "Trying to grasp the intangible". *Fortune*, October 2, pp. 157-161.

45. Stock, G. N., Greis, N. P., and Fischer, W. A. (2001). "Absorptive capacity and new product development". *Journal of High Technology Management Research*, 12, pp. 77–91.

46. Sullivan, P.H. (2001). "*Profiting from Intellectual Capital: Extracting Value from Innovation*". New York: John Wiley & Sons.

47. Sveiby, K.E. (1997). "*The new organizational wealth: Managing & measuring knowledge-based assets"*. San Francisco: Berrett-Koehler Publishers.

48. Tan, H. P., Plowman, D., and Hancock, P. (2008). "The evolving research on intellectual capital". *Journal of Intellectual Capital*, 9(4), pp. 585-608.

49. Tether, B.S. (2002). "Who cooperates for innovation and, why: an empirical analysis". *Research Policy*, 31(5-6), pp. 947-967.

50. Tsai, K. H., and Wang, J. C. (2004). "The R&D performance in Taiwan's electronics industry: a longitudinal examination". *R&D Management*, 34(2), pp. 179-189.

51. Tullao, T. (2012). "Investing in Human Capital: The Key to Transforming the Asia- Pacific Region". *Asia Pacific World*, 4(1), pp. 15-31.

52. Zahra, S. A., and Nielsen, A. P. (2002). "Sources of capabilities, integration and technology commercialization". *Strategic Management Journal,* 23(5), pp. 377-398.

Bojan Krstić
Ivana Janjić
Milica Jovanović
Sandra Milanović

ZNAČAJ AKTIVNOSTI ISTRAŽIVANJA I RAZVOJ ZA UPRAVLJANJE INTELEKTUALNIM KAPITALOM PREDUZEĆA

SAŽETAK

Preduzeća se razvijaju, povećavajući svoj profit, vrednost i konkurentnost na osnovu sinergije ljudskog, strukturnog i relacionog intelektualnog kapitala. Osim toga, istraživanje i razvoj predstavljaju ključni pokretač konkurentske prednosti u savremenim uslovima poslovanja. Istraživačko -razvojnim aktivnostima preduzeća stvaraju, razvijaju i koriste intelektualne resurse (znanje zaposlenih i menadžera, znanje sadržano u tehnologiji i procesima), koji se valorizuju na tržištu i pretvaraju u određenu vrednost. Istraživanje i razvoj je primarni izvor znanja uskladištenog u pojedincima u preduzeću. Najčešće korišćeni pokazatelji rezultata aktivnosti istraživanja i razvoja su patenti i inovacije, što su važne komponente strukturnog intelektualnog kapitala i koriste se za procenu tehnološke snage i sposobnosti preduzeća.

Svrha ovog rada je istražiti odnose i veze između ulaganja u istraživanje i razvoj, komponenti intelektualnog kapitala preduzeća i efikasnosti nematerijalne imovine kao vidljivog intelektualnog kapitala i efikasnosti ukupnog intelektualnog kapitala. Ovaj rad ima za cilj da ukaže na značaj istraživačko-razvojnih aktivnosti za upravljanje intelektualnim kapitalom preduzeća. U tu svrhu korišćena je korelaciona i regresiona analiza. Rezultati analize pokazuju da su investicije u istraživanje i razvoj pozitivno povezane sa vidljivim i nevidljivim intelektualnim kapitalom, i efikasnošću nematerijalne imovine, dok ulaganja u istraživanje i razvoj imaju pozitivan uticaj na vidljivi i nevidljivi intelektualni kapital preduzeća.

Ključne riječi: *R&D aktivnosti, upravljanje intelektualnim kapitalom,efikasnost nematerijalne imovine, efikasnost ukupnog intelektualnog kapitala i*

JEL: *032, 034.*

Abdulkadir Kaya[1]

THE EFFECT OF AGRICULTURAL INVESTMENTS BY GOVERNMENTS ON ECONOMIC GROWTH AND FINANCIAL MARKETS: AN APPLICATION ON DEVELOPED AND DEVELOPING COUNTRIES

ABSTRACT

In this study, Bound Test Analysis (ARDL) was applied for the 2001-2016 period in order to examine the effects of the Agricultural Orientation Indices (AOI) representing the agricultural investments of countries on the Stock Exchange Index (SE) and Gross Domestic Product (GDP) of developed and developing countries. The independent variables of the two ARDL models created are AOI and the dependent variables are SE and GDP.

To estimate the relations between the variables, yearly panel date series belonging to the period of 2001 – 2016 are taken into account. According to the results of the analysis of border tests, Agriculture Orientation Index (AOI) and the Stock Exchange Index (SE) and Gross Domestic Products (GDP) variables are cointegrated in both developed and developing countries. AOI variable has no statistically significant effect on SE variable, GDP variable is negatively affected by the AOI variable in the long term both developed countries and developing countries. In developed countries, the AOI variable has a negative relationship with the SE variable. In addition, it was determined that the AOI variable has a negative effect on the GDP variable in the short term. AOI variable does not affect on both SE and GDP variables in the short term.

Keywords: *Developing and Developed Countries, Agricultural Investment, Economic Growth, Financial Markets, Agricultural Orientation Indices (AOI)*

JEL: *E44, E60, G00, O13, O47*

1 Assoc. Prof., Erzurum Technical University, Faculty of Economics and Administrative Science, Department of Business, e-mail: akadirkaya@erzurum.edu.tr

1. INTRODUCTION

A significant part of the nutritional needs that the society will need to survive is provided by the agricultural sector. The agricultural sector is a sector that produces many nutrients, diversifies the nutrients by processing these substances, and supplies the need of individuals for these substances, thus having a significant impact on the health and development of societies. For individuals to eat enough and balanced nutrition, they first find the desired amount and type of nutrients, and then they must have an income to purchase these items. Therefore, the agricultural sector will always be an important factor for both economic and social development.

Agriculture is an indispensable industry all over the world because of the healthy life of a society, its contribution to the national income and employment of the country, the supply of raw materials and capital to many agricultural and non-agricultural sectors, its direct and indirect impact on exports, and its contribution to biological diversity and ecological balance. The agricultural sector, which is vital for society, contributes to the increase in the national income of a country, and is an important factor in the financial sector in terms of supplying the financing resources it needs.

Private sector enterprises operating in the agriculture sector are required to carry out important research and development activities and provide the necessary financing in order to develop their activities, research new production methods, make product diversity, have sufficient production areas.

The fact that the research and development activities to be carried out in the agriculture sector are in the public interest and require significant investments, and that the required financing is not sufficiently provided due to the asymmetric information between the enterprises and financial institutions, necessitates government support to the sector. In addition, governments should provide agricultural support for situations such as drought, flood, and excessive rainfall in the important risk group for the sector.

Government expenditures on agricultural land and activities will also contribute significantly to increasing physical and human capital in the sector and increasing the efficiency, productivity and profitability of the sector.

Government expenditures are the sector's policy and program expenditures, land improvement expenditures, irrigation and reservoir expenditures, animal health expenditures, animal husbandry expenditures, aquaculture research expenditures, afforestation and forestry expenditures, etc. Government expenditures on the agricultural sector will contribute to economic growth and financial markets by leading to new investments to be made by the sector.

The Agriculture Orientation Index (AOI) is calculated by the Food and Agriculture Organization of the United Nations (FAO) in order to measure the agricultural investments of the governments. AOI is calculated by the formula below:

AOI = (Agriculture Share of Government Expenditures) / (Agriculture Share of GDP),

In formula;

Agriculture Share of Government Expenditures: (Central Government Expenditures on Agriculture) / (Total Central Government Outlays), Agriculture Share of GDP : (Agriculture Value-Added) / GDP.

Government expenditures used in AOI calculation are obtained through a survey prepared by FAO. Since countries often compile government spending data according to their financial systems, there is no possibility of sampling and sampling errors.

The purpose of this study is to determine the effect of the agricultural expenditure levels of governments on the development of the country's economies and financial markets. In other words, in the study, it will be determined whether the agricultural expenditures of the countries have an effect on the country's economy and financial markets, and if there is, the degree of the effect will be determined.

This paper contains the following structure. Chapter 2 will briefly focus on the literature review on the subject. Section 3 will describe the ARDL methodology applied for this research. In Chapter 4, information will be given about the findings, and in the last chapter, the findings will be evaluated in general and recommendations will be presented.

2. Literature review

The findings of some of the literature studies on the subject are as follows: Iftekhar et al. (2009) investigated the role of legal institutions, financial deepening and political pluralism on growth rates in Chinese provinces. They found that stronger growth is associated with financial market development, legal environment, property rights awareness of and political pluralism.

Alam et al. (2014) investigated the relationship between financial development and environmental quality in Malaysia. As environmental quality variables, they have used population density per kilometer, agricultural production, air pollution, fossil fuel consumption and energy resources. As a result of their analysis, while there was no relationship between financial development and carbon dioxide emission rate, they found a negative relationship with population density. There is a positive relationship between grain production and domestic loans, while a negative relationship is with inflation.

Khan et al. (2014) examined the relationships between financial development and economic development, agricultural production and commercial openness in Pakistan. As a result of the research, they concluded that there is a long-term relationship between financial development and agricultural product exports, and that agricultural raw material exports and trade openness positively affect economic growth.

Usman (2016) examines the contribution of the agricultural sector to economic growth in Pakistan. The study used major crops, live stocks and other crops. As a result of the study, it is determined that there is a significant strong relationship between economic growth and the agricultural sector in Pakistan. In addition, it has been concluded that major crops have a significant effect on the agricultural sector and contribute to growth, and livestock has a significant effect on the agricultural sector.

Zortuk and Karacan (2016) investigate the causality between the agricultural sector and economic development for the 1995-2015 period in transition countries. The result of the study shows that there is a homogeneous causality from economic growth to agricultural development and a heterogeneous causality from agricultural development to economic growth.

Shahbaz et al. (2016) examined the relationship between agriculture, the modern sector, economic growth, financial development and energy consumption in the case of Pakistan. As a result of the study, they determined a bidirectional causality between energy consumption and financial development and modern sector growth.

Shahbaz et al. (2013), who aimed at determining the relationship between agricultural growth and financial development, determined that there is a long-term relationship between financial development and agricultural growth as a result of the study. They also found that the improvement in financial development, capital and labour force factors in the economy had a positive effect on agricultural growth. Finally, they revealed that there is a bidirectional causality relationship between financial development and agricultural growth.

Examining the relationship between agricultural product exports and economic growth in the case of Pakistan, Khalid and Shehla (2017) found that there is a positive but weak relationship between agricultural exports and economic growth, in other words, agricultural exports in Pakistan have little contribution to economic growth.

The study done by Oliynyk-Dunn (2017) aims to demonstrate the importance of financial development for agricultural growth in Ukraine. The findings of the study show that based on integral indicators, financial development does not affect agricultural growth, however, based on non-integrated indicators, it is found that there is a significant positive relationship between agricultural growth and financial development.

Also, the regression models in the study indicate that bank deposits to GDP (%) increase the value-added per worker in agriculture increases exponentially. The study findings show that agriculture is more sensitive to lending changes than the majority of the other sectors of the economy.

3. Methodology: Research method and data sources

Ariel Bounds Test Analysis (ARDL) was used to determine the relationships between the Agricultural Orientation Index (AOI) variable and the GDP and Stock Exchange Index (SE) variables of developed and developing countries. Panel data of the variables for the period 2001 - 2016 were obtained from the official websites of the Food and Agriculture Organization of Nations (FAO).

In order to determine the relationship between AOI and SE and GDP, the following equation is used:

$$SE = C + \beta_1 AOI + \varepsilon_t SE = C + \beta_1 AOI + \varepsilon_t \quad (1)$$

$$GDP = C + \beta_1 AOI + \varepsilon_t \, GDP = C + \beta_1 AOI + \varepsilon_t \quad (2)$$

In the equations show;

SE : Stock Exchange Index,

GDP : Gross Domestic Product

AOI: The Agriculture Orientation Index,

ε : Error term.

It is an important assumption that stationary of variables in time series analysis. The fact that the variables are not stationary can cause the spurious regression problem (Granger and Newbold; 1974). Therefore, first of all, it should be tested whether the variables are stationary or not. MacKinnon (1991) states that the pseudo-regression problem of variables can be eliminated and reliable results can be obtained by using unit root tests on variables.

The ARDL boundary test developed by Pesaran, Shin, and Smith (2001) can determine the cointegration relationship of the series, regardless of the stationary level of the series, using Wald or F statistics. The ARDL boundary test method is able to determine the relationships between variables without the need to look at the stationary level and with less sample size. Therefore, ARDL analysis differs significantly from the cointegration tests developed by Johansen (1988), Johansen and Juselius (1990) and Engle and Granger (1987), which are frequently preferred in the literatüre (Akıncı & Yılmaz, 2012).

The ARDL boundary test is an approach based on the prediction to be performed with the unlimited error correction model and OLS estimator. This approach is determined based on the unlimited error correction model for the cointegration relationship in the regression models (3) and (4) below. Models (3) and (4) are formed as follows:

$$\Delta SE_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta SE_{t-k} + \sum_{i=0}^{p} \beta_2 \Delta AOI_{t-k} + \theta_1 SE_{t-1} + \theta_2 AOI_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta GDP_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta GDP_{t-k} + \sum_{i=0}^{p} \beta_2 \Delta AOI_{t-k} + \theta_1 GDP + \theta_2 AOI_{t-1} + \varepsilon_t \quad (4)$$

In the ARDL test approach, first of all, the models (2) and (3) are estimated by OLS analysis and by using these estimates, the lag length expressed as "m" is determined. AIC, SBC, FPE and HQ information criteria will be used to determine lag lengths. When determining the appropriate lag length, the lag length for which the values of the information criteria are minimum is selected for the models. In order for the results obtained from the F test to be correct, there should be no autocorrelation between the error terms. Due to the use of delayed values of ΔSE, which are used as dependent variables in models, Breusch - Godfrey test will be used to determine the autocorrelation between lagged values.

After analyzing lag length and autocorrelation, the null hypothesis that accepts the existence of a long-term relationship will be tested by applying zero constraints to the coefficients of AOI_{t-1}, and SE_{t-1} and GDP_{t-1} variables with lagged values in models (3) and (4). For this, the level values of the coefficients of the variables are analyzed using the F test, taking into account the hypothesis (Ho = α2 = α3 = 0). The determined F statistic value is compared with the lower and upper critical values determined by Pesaran Pesaran, Shin and Smith (2001). If the F statistic value found is greater than the upper limit of the compared value, it is concluded that the variables are cointegrated. If the F statistic value found is less than the lower critical value, it cannot be stated that the variables are not cointegrated, and if it is between the lower and upper critical values, there is a clear cointegration relationship between the variables (Akıncı & Yılmaz, 2012).

The long-term and short-term coefficients of the variables can be estimated with the ARDL Bound test approach. In the estimation of long-term coefficients: The value found by adding the negative values of the lagged values of the coefficients of the independent variables is divided by the result obtained by subtracting 1 from the value obtained from the sum of the coefficients of the dependent variables. The calculation is shown in equation number (7) (Akıncı & Yılmaz, 2012). The ARDL models shown below are used to determine the long-term relationship between variables.

The coefficients expressing the level of a long-term relationship between variables will be calculated with the models (5) and (6) shown below.

$$\Delta SE_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta SE_{t-i} + \sum_{i=0}^{p} \beta_2 \Delta AOI_{t-i} + \varepsilon_t \quad (5)$$

$$\Delta GDP_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta GDP_{t-i} + \sum_{i=0}^{p} \beta_2 \Delta AOI_{t-i} + \varepsilon_t \quad (6)$$

$$\emptyset \frac{\sum_{i=0}^{k} \beta_2}{1 - \sum_{i=1}^{j} \beta_1} \quad (7)$$

Current period lag coefficients of independent variables represent short term coefficients (Yapraklı, 2010). Therefore, the short-term relationship between variables will be determined by an error correction model based on ARDL bounds test approach. The model to be used in determining the short-term relationship between variables is shown below:

$$\Delta SE_t = \beta_0 + \beta_1 ECM_{t-i} \sum_{i=1}^{p} \beta_2 \Delta SE_{t-i} + \sum_{i=0}^{p} \beta_3 \Delta AOI_{t-i} + \varepsilon_t \quad (8)$$

$$\Delta GDP_t = \beta_0 + \beta_1 ECM_{t-i} \sum_{i=1}^{p} \beta_2 \Delta GDP_{t-i} + \sum_{i=0}^{p} \beta_3 \Delta AOI_{t-i} + \varepsilon_t \quad (9)$$

The ECMt-1 variable in models (8) and (9) expresses the one-period lag value of the error terms series of the models used to determine the long-term relationship.

4. Results and discussions

This article aims to examine the impact of AOI on economic growth and the development of financial markets on developed and developing countries. 18 developing and 14 developed countries were included in the study. In the selection of developed and developing countries of the countries included in the analysis, countries with high agricultural expenditures were tried to be selected. The developed and developing countries included in the study are presented in Table 1.

Table 1: The Countries included in the analysis

Developing Countries	Developed Countries
Argentina	Denmark
Bangladesh	Finland
Brazil	France
Chile	Germany
China, P.R.: Mainland	Greece
Colombia	Ireland
Egypt	Japan
India	Netherlands
Israel	Norway
Korea, Republic of	Portugal
Malaysia	Sweden
Mexico	Switzerland
Philippines	United Kingdom
Russian Federation	United States
Singapore	
South Africa	
Turkey	
United Arab Emirates	

Source: *Author's calculation*

The correlation relationship between the variables to be used in the analysis is presented in Table 2.

Table 2: Matrix of the correlation between the variables

Variables	Developed Countries			Developing Countries		
	AOI	GDP	SE	AOI	GDP	SE
AOI	1			1		
GDP	-0,3120 (0,0000)	1		-0,1918 (0,0007)	1	
SE	0,0734 (0,2591)	-0,0471 (0,4700)	1	-0,0122 (0,8316)	0,0266 (0,6425)	1

Source: *Author's calculation*

When the correlation table is examined, it is seen that there is no significant relationship between the AOI variable and the SE variable while there is a negative and significant relationship between the AOI variable and the GDP variable, in both developed and developing country groups.

In the first stage of ARDL analysis, it is necessary to determine the appropriate lag length for the models. Schwarz Info Criterion (SIC) is generally used to determine the appropriate lag length for it tends to define more parsimonious specifications.

For the regression models (2) and (3), the F-statistic value was estimated and the results are presented in Table 3.

Table 3: The Results of the bounds testing analysis

Countries	Variable Pairs	k*	F-Statistic	5% Critical Values		1% Critical Values	
				Lower Bound	Upper Bound	Lower Bound	Upper Bound
Developed Countries	SE - AOI	1	20.284	4.94	5.73	6.84	7.84
	GDP-AOI	1	31.467				
Developing Countries	SE - AOI	1	52.675	4.94	5.73	6.84	7.84
	GDP-AOI	1	40.565				
All Countries	SE - AOI	1	73.307	4.94	5.73	6.84	7.84
	GDP-AOI	1	74.977				

** k represents the critical value suitable for the number of independent variables.*

Source: *Author's calculation*

According to Table 3, it has been determined that the Agriculture Orientation Index (AOI) and the Stock Exchange Index (SE) and Gross Domestic Products (GDP) variables are cointegrated in both developed and developing countries. In other words, it has been determined that there is a long-term relationship between the Agricultural Orientation Index and the Stock Exchange Index (SE) and the Agriculture Orientation Index and the Gross Domestic Products (GDP). After finding this relationship, ARDL model will be used to analyze long and short term dynamics between variable pairs.

For the developed, developing and all countries, ARDL models were established to estimate the long-term relationship between the AOI variable and the SE and GDP variables, and model estimates are presented in Table 4-5-6.

Table 4: The Results of the long-term dynamics of ARDL for developed countries

Dependent Variables	Independent Variables	Coefficient	t-Statistic	p-Value	Descriptive Statistics
SE	C	0.067	3.149a	0.000	R2 = 0.821
	SE(-1)	0.900	31.818a	0.000	F= 509.5 p=0.000
	AOI	0.000	0.042	0.966	DW = 2.001
GDP	C	2.277	4.474 a	0.000	R2 = 0.237
	GDP(-1)	0.393	6.584 a	0.000	F= 34.443 p=0.000 DW = 2.016
	AOI	-0.839	-2.941 a	0.003	

a represents 1% significant levels.

Source: *Authot's calculation*

When the results of developed countries in Table 4 are examined, the AOI variable has no statistically significant effect on SE variable. It can be stated that SE variable is positively affected by its previous values at 1% significance level in the long term. The GDP variable is positively affected by its previous values and negatively by the AOI variable at 1% significance level in the long term.

In other words, the increase in the GDP variable will increase the GDP in the next period, but the increase in the AOI variable will decrease the GDP variable.

Table 5: The Results of the long-term dynamics of ARDL for developing countries

Dependent Variables	Independent Variables	Coefficient	t-Statistic	p-Value	Descriptive Statistics
SE	C	0.021	2.453[b]	0.014	R^2 = 0.926 F= 1809.4 p=0.000 DW = 2.056
	SE(-1)	0.958	6.015[a]	0.000	
	AOI	-0.001	-0.101	0.919	
GDP	C	2.833	6.786[a]	0.000	R^2 = 0.126 F= 20.703 p=0.000 DW = 1.937
	GDP(-1)	0.297	5.334[a]	0.000	
	AOI	-0.895	-2.463[b]	0.014	

Source: *Author's calculation*

When long term ARDL results of developing countries are analyzed, it is determined that SE variable is affected only by its own previous values at 1% significance level, but the AOI variable has no effect on SE variable. The GDP variable is positively affected by its previous values at 1% significance level and it is negatively affected by the AOI variable at 5% significance level.

In the long term, agricultural investments of developed and developing countries do not have any impact on financial prices, but they have a negative effect on economic growth.

Table 6: The Results of the long-term dynamics of ARDL for all countries

Dependent Variables	Independent Variables	Coefficient	t-Statistic	p-Value	Descriptive Statistics
SE	C	0.030	4.267	0.000	R2 = 0.930 F= 21.33 p=0.000 DW = 2.091
	SE(-1)	0.937	2.124	0.000	
	SE(-2)	0.010	0.232	0.815	
	AOI	0.001	0.131	0.895	
GDP	C	2.694	8.742	0.000	R2 = 0.195 F= 61.967 p=0.000 DW = 1.977
	GDP(-1)	0.334	8.187	0.000	
	AOI	-0.973	-4.789	0.000	

Source: *Author's calculation*

Table 6 shows the long-term ARDL results in which developed and developing countries are evaluated together. When Table 6 is examined, it is seen that SE variable affected positively only by its 1 lagged value. GDP variable is affected both by its previous value and AOI variable at 1% significance level.

When evaluated in general, it can be stated that the increase in the agricultural investments of the governments had a negative effect on the economic growth for the 2001-2016 period.

The short term relationship of the AOI variable on SE and GDP is investigated by considering the error correction model based on models 8 and 9. The result of the short term relationships for developed, developing and all countries are presented in Tables 7, 8 and 9.

Table 7: The Results of the short-term dynamics of ARDL for developed countries

Dependent Variables	Independent Variables	Coefficient	t-Statistic	p-Value	Descriptive Statistics
SE	C	0.001	0.094	0.924	R2 = 0.053 F= 6.198 p=0.002 DW = 2.001
	ΔAOI	-0.099	-3.517	0.000	
	EC(-1)	-0.0001	-0.029	0.976	
GDP	C	0.016	0.087	0.930	R2 = 0.319 F= 51.854 p=0.002 DW = 2.025
	ΔAOI	-1.157	-1.761	0.079	
	EC(-1)	-0.601	10.041	0.000	

Source: *Author's calculation*

When the short-term relationships for developed countries are analyzed, it is determined that the AOI variable has a 1% significance level and a negative relationship with the SE variable. In addition, it was determined that the AOI variable has a 10% significance level and negative effect on the GDP variable in the short term.

Table 8: The Results of the short-term dynamics of ARDL for developing countries

Dependent Variables	Independent Variables	Coefficient	t-Statistic	p-Value	Descriptive Statistics
SE	C	-0.0003	-0.105	0.916	R2 = 0.032 F= 451.43 p=0.000 DW = 2.066
	ΔAOI	-0.04	-1.471	0.142	
	EC(-1)	-0.039	-2.725	0.006	
GDP	C	-0.004	-0.023	0.981	R2 = 0.359 F= 80.093 p=0.000 DW = 1.940
	ΔAOI	-2.30	-1.268	0.205	
	EC(-1)	-0.704	-1.264	0.000	

Source: *Author's calculation*

Table 8 shows the short term relationships between the variables of developing countries and it is seen that the AOI variable affects niether SE nor GDP variable in the short term. In other words, agricultural investments of governments in the short term have no impact on financial markets and economic growth.

Table 9: The Results of the short-term dynamics of ARDL for all countries

Dependent Variables	Independent Variables	Coefficient	t-Statistic	p-Value	Descriptive Statistics
SE	C	5.54	0.021	0.983	R2 = 0.039 F= 6.560 p=0.000 DW = 2.090
	ΔSE(-1)	-0.01	-0.237	0.812	
	ΔAOI	-0.004	-0.0372	0.709	
	EC(-1)	-0.052	-4.359	0.000	
GDP	C	0.002	0.012	0.990	R2 = 0.343 F= 132.8 p=0.000 DW = 1.980
	ΔAOI	-1.382	-2.049	0.040	
	EC(-1)	-0.664	-16.222	0.000	

Source: *Author's calculation*

When the short-term relations for all countries are analyzed, it is concluded that the AOI variable does not have a significant effect on the SE variable, while there is a 5% significance level and negative effect on the GDP variable.

5. CONCLUSIONS

For determining the effects of the Agriculture Orientation Index (AOI) on the Stock Exchange Index (SE) and Gross Domestic Product (GDP) of developed and developing countries the Bounds Test Analysis (ARDL) is applied. To determine the relationship between AOI and SE and GDP, it was used with the panel data set covering the 2001-2016 period, obtained from the official websites of the United Nations Food and Agriculture Organization (FAO).

According to the results of the Bounds Testing Analysis, SE and GDP of the developed, developing and both group countries and the variable pairs AOI and SE and AOI and GDP were statistically significant at the 1% significance level.

According to the results of the long-term dynamics of ARDL, the GDP variable is positively affected by its previous values and negatively by the AOI variable at 1% significance level in the long term for developed, developing and both group countries.

According to the results of the short-term dynamics of ARDL, the AOI variable has a 1% significance level and a negative relationship with the SE variable. In addition, it was determined that the AOI variable has a 10% significance level and negative effect on GDP variable in the short term for developed countries. The AOI variable affects niether SE nor GDP variables in the short term for developing countries. The AOI variable does not have a significant effect on the SE variable, while there is and 5% significance level of a negative effect on the GDP variable for both group countries.

When we analyzed overall findings, agricultural spending of developing countries appears to have a negative impact on GDP in the short term. In other words, there was no increase in GDP in the short term in return for government expenditures, but a decrease was observed. The development of the agricultural sector depends on long-term and maintaining investments. Therefore, government spending in the short term will not affect the GDP positively. Problems related to the long-term agricultural structure should also be eliminated in order to obtain the short-term return of the agricultural expenditures of the governments. In addition, considering the contribution of the high value-added technological sector in the economic development of developed and developing countries, it can be seen as a reason for the negative impact of the increase in government expenditures on the agricultural sector with a lower value added to the GDP.

Especially in developing countries, the aim of agricultural policies is to protect both producers and consumers in a sector that has strategic importance and concerns the entire population of millions, both producers and consumers. With the agricultural policies implemented, countries are trying to increase the standard of living of the people dealing with this sector, and on the other hand, they are trying to guarantee the production of foodstuffs that society needs. As the market economy is not fully developed especially in developing countries, agricultural enterprises do not have competitive potential. Therefore, it is of great importance to improve the agricultural infrastructure in the long term. The purpose of countries to intervene in the agricultural sector is to determine product prices, regulate the production and market conditions in the short term, bring the population in the agricultural sector closer to the living standards of those working in non-agricultural sectors and realize economic development by developing industries that process agricultural products in the long term. Therefore, the impact of agricultural supports on the GDP can be considered as expected in the short term.

REFERENCES

1. Akıncı, M., Yılmaz, Ö. (2012). "Validity of the Triple Deficit Hypothesis in Turkey Bounds Test Approach". Istanbul Stock Exchange Review, 13:1-28.
2. Arif A. et al. (2015). "Environmental Quality İndicators And Financial Development in Malaysia: Unity in Diversity". Environ Sci Pollut Res, 22:8392–8404
3. Engle, R. F. & Granger, C. W. J. (1987). "Co-Integration and Error Correction: Representation, Estimation, and Testing". Econometrica, 55(2): 251-276.
4. Granger C W J, Newbold, P. (1974). Spurious Regressions in Econometrics. Journal of Econometrics, 2: 111-120.
5. http://www.fao.org/home/en Accessed date: 23.04.2020
6. Iftekhar H. et al. (2009). "Institutional Development, Financial Deepening And Economic Growth: Evidence from China". Journal of Banking & Finance, 33, 157-170.
7. Johansen, S., Juselius, K. (1990). "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money". Oxford Bulletin of Economics and Statistics, 52(2): 169-210.
8. Khalid, M., Shehla, M. (2017). "Agricultural Exports And Economic Growth İn Pakistan: An Econometric Reassessment". Qual Quant, 52, 1561-1574.
9. MacKinnon, J. G. (1991). *Critical Values for Cointegration Tests, (Long-Run Economic Relationship: Readings in Cointegration*. Oxford University Press, New York: Ed. Engle R F, Granger C W J.
10. Muhammad S. et al. (2016). "Finance–Growth–Energy Nexus and the Role of Agriculture and Modern Sectors: Evidence from ARDL Bounds Test Approach to Cointegration in Pakistan". Global Business Review, 17 (5), 1037-1059.
11. Muhammad, Z. K., Abdul, S. L. (2014). "Nexus between Financial Development, Agriculture Raw Material Exports, Trade Openness and Economic Growth of Pakistan". Pakistan Journal of Commerce and Social Sciences, 8 (3), 629-639.
12. Olena O. D. (2017). "Financial System and Agricultural Growth in Ukraine. Organizacija". Research Paper, 50 (3), 244-253.
13. Pesaran, M. H., Shin, Y., Smith, R. J. (2001). "Bounds Testing Approaches to the Analysis of Level Relationships". Journal of Applied Econometrics, 16(3): 289-326.

14. Shahbaz, M. & Butt, M. S. (2013). “Effect of Financial Development On Agricultural Growth İn Pakistan New Extensions From Bounds Test To Level Relationships And Granger Causality Tests”. International Journal of Social Economics, 40 (8), 707-728.

15. Usman, M. (2016). “Contribution of Agriculture Sector in the GDP Growth Rate of Pakistan”. Journal of Global Economics, 4 (2), 1-3.

16. Zortuk, M. & Karacan, S. (2016). “Agricultural Development and Economic Growth Relationship in Transition Countries from an Empirical Perspective”. Dumlupınar University Journal of Social Sciences, Special number of Afro-Eurasia 102-110.

Abdulkadir Kaya

UTJECAJ ULAGANJA VLADE U POLJOPRIVREDU NA EKONOMSKI RAST I FINANSIJSKA TRŽIŠTA: PRIMJENA NA RAZVIJENE ZEMLJE I ZEMLJE U RAZVOJU

SAŽETAK

U ovoj studiji je primijenjena Bound Test Analysis (ARDL) za period 2001-2016, kako bi se ispitali efekti poljoprivrednih orijentacijskih indeksa (AOI) koji predstavljaju poljoprivredna ulaganja zemalja na berzanski indeks (SE) i bruto domaći proizvod (BDP) razvijenih zemalja i zemalja u razvoju. Nezavisne varijable dva kreirana ARDL modela su AOI, a zavisne varijable su SE i GDP.

Za procjenu odnosa između varijabli uzete se u obzir godišnje panelne serije datuma koje pripadaju periodu od 2001. do 2016. godine. Prema rezultatima analize graničnih testova, varijable Orijentacioni Poljoprivredni indeks (AOI), Berzanski indeks (SE) i bruto domaći proizvod (BDP) su kointegrisane i u razvijenim i u zemljama u razvoju. AOI varijabla nema statistički značajan uticaj na SE varijablu, na varijablu BDP-a negativno utiče AOI varijabla dugoročno i razvijene zemlje i zemlje u razvoju. U razvijenim zemljama, AOI varijabla ima negativan odnos na SE varijablu. Pored toga, utvrđeno je da AOI varijabla ima negativan uticaj na varijablu BDP-a u kratkom roku. AOI varijabla nema utjecaja ni na SE ni na BDP varijable u kratkom roku.

Ključne riječi: *zemlje u razvoju i razvijene zemlje, poljoprivredne investicije, ekonomski rast, finansijska tržišta, indeksi poljoprivredne orijentacije (AOI)*

JEL: *E44, E60, G00, O13, O47*

REVIEW FORM

The journal of the BH Economic Forum of the Faculty of Economics of the University of Zenica publishes scientific and expert papers in the field of economics. The papers can be sent to the address: University of Zenica, Faculty of Economics, Travnièka 3, 72000,Zenica, BH ECONOMIC FORUM or electronically to the following email addresses: bh_ekonomski_forum ©ef.unze.ba, or bh.ekonomski.forumgmail.com, or almir.dr2©gmail.com). The received papers do not return.

Types of papers

The papers can be classified as:

Original scientific paper which contains unpublished and new results of original research in its complete form. The work is characterized as being original when it makes a significant contribution to a particular scientific problem or its understanding and when it describes new research results from a certain field; it is written so that any expert from a given area on the basis of the above information can repeat the experiment and achieve the described results with the same accuracy or within the limits of the error stated by the author or may repeat the authors observations, calculations or theoretical statements.

Preliminary note - contains new, yet unpublished results of original research, but in a preliminary form, this form of the article implies the publication of new scientific results, but without sufficient detail to enable the reader to check the reported data, as is the case in the original scientific paper.

Review article - contains an original, concise and critical presentation of one area of theory or practical research, in which the author himself actively criticising participates, in which the role of the author's original contribution to the area in relation to already published works must be emphasized, as well as a review of these papers. The overview contains a complete presentation of the state of a certain field of the theory or its application, the author presents his own critical review and evaluation, and obligatory lists the data on all published works that he used as a starting point for his work.

Professional paper - which contains useful contributions from a particular profession and a particular profession, but does not represent original research; reviews (critique), reviews and reports, other uncategorized papers are published in a special, for this purpose, part of the journal.

Review process

All papers will undergo a double blind review process, i.e., they are sent to at least two independent anonymous reviewers.

Only papers with affirmative reviews will be published in the journal. After the completed review, within 60 days, the authors will be notified of the status of the work sent. The papers accepted by the Editorial Board of the Journal obligate the authors, do not to publish them in other scientific-professional publications.

Formatting requirements

When submitting the papers, authors should should be paid special attention to the following technical details: The paper is delivered in electronic form as a Word document [Times New Roman (TNR) or Arial, 12] with a double spacing of not more than 20 pages, numbered.

On the first page in the upper left corner, the name and surname of the author (scientific or professional title) are given, and the name of the institution in which he is employed, the address of the institution or private address are placed in the footnote. The title is written in TNR, or Arial format, 14, bold, centred.

Summary of paper length up to 250 words, keywords (three to five) and JEL classification. The summary contains a general topic view, a subject and a research problem, a methodology of the paper, an indication of results and conclusions. Tables, charts, and equations contain the title and numerical tag in the order in which they are listed. Legend and source of data and author's notes are listed below the tables and charts in italics (TNR 11, or Arial 11).

Papers are quoted in the text of paper or footnotes under the paper (plants) instead of the existing text.

Article structure

The paper is necessary to be structured from the following parts:

- Title of paper.
- Abstract.
- Keywords.
- Introduction.
- Review of previous research.
- Methodology.
- Results.
- Conclusion and recommentations.

The title of the paper is marked with regular numbers and written in bold letters.

1. Heading.

   1.1. Subheading.

2. Heading.

   2.1. Subheading.

Additional clarifications are given in the footnotes whose numbering begins with each new page.

References are placed at the end of the paper, arranged according to the Harvard referencing system for various units, such as:

Books:

Zečić, Dž., Huskanović, A., i Alajbegović, H., 2009. *Matematika za ekonomiste*. Zenica

For Journals:

Allen, F., Jackowicz, K., Kowalewski, O., Kozlowski, L. (2017). „Bank lending, crises and changing ownership structure in Central and Eastern European countries", Journal of Corporate Finance, No.4, pp.494-515.

For electronic sources:

North, D.C., 2003. The Role of Institutions in Economic Development. *Discussion Paper Series*, [online]. No. 2003.2. United Nations Economic Commission for Europe, Geneva, Switzerland.Available at: http://www.unece.org/oes/disc_papers/ [Accessed on September 19, 2008].

For official documents in electronic version:

Central Bank of Bosnia and Herzegovina, 2009. Annual Report, [online]. Available at: www.cbbh.ba [Accessed on July 27, 2009].