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EDITORIAL

Issue 3 Volume 21 Year 2019 of the *Economic Horizons* scientific journal contains eight contributions – four original and two review papers, the Subject Index and a List of Authors and Titles of all the contributions published in the Journal in 2019. Simultaneously, we are highlighting the fact that a total of seven scientific papers written by the authors from abroad (Nigeria, Vietnam, Turkey, Bosnia and Herzegovina) have been published in Issues 1, 2 and 3 Volume 21 Year 2019, which is 38.89% of all the number of the scientific papers published in the Journal in 2019.

Based on the research study of a set of the activities conducted by banks in the Republic of Serbia in the period from 2010 to 2016, which are all intended to legally minimize the amount of a tax liability for a gained profit, the coauthors *Violeta Todorović, Jasmina Bogićević* and *Stefan Vržina* have established a fact that, due to the use of the tax incentives provided by the state, the effective tax-on-profit rate in the banks is considerably below the statutory rate. Based on the conducted empirical research study, the coauthors have concluded that an increase itself in the statutory tax rate from 10% to 15% did not exert an influence on either the tax liability or the financial structure of the banks. At the same time, a fact has been established that there is no strong correlation between the effective tax rate and the profitability of the banks. The attitudes the coauthors have come to based on the performed research study may undoubtedly be beneficial to the tax authorities when deciding on the manner in which the banking sector in the Republic of Serbia will be taxed.

The relationship between the moral hazard hypothesis and the Deposit Insurance Scheme in the Nigerian banking sector is the subject matter of the research study carried out by *Ebiaghan Orits Frank*. The study has established the existence of a significant positive relationship between the Nigerian bank asset quality indicators and the Deposit Insurance Fund. Pursuant to the said, the Government is recommended to strengthen its banking regulatory systems with the aim of mitigating the unplanned risks that might pose a threat to the stability of the financial system. Aimed at enabling the sustainability of the trust of savings depositors', whose savings deposits should be safe, deposit insurance is one of the measures to be taken by the state. In that way, the banking sector itself is supported, because problems in this segment of the financial system might lead to deformations in the financial market, which negatively reflects on the real sector, too, and simultaneously on economic growth and development.

As a traditional instrument for the determination of target production, income and costs of achieving a zero profit, the break-even-point model is tested by the author *Danijela Martinović* on a sample of 100 production enterprises in Bosnia and Herzegovina with the aim of demonstrating the advantages and limitations of the traditional (linear) and contemporary (nonlinear) break-even models. The author points at the fact that, in a business environment characterized by unsafety and risk, the break-even-point model needs to be modified and adapted to the contemporary conditions of business doing. It is appropriate to use modern models including the assumptions that pertain to change in key variables in a model, too, which results in a need for designing the nonlinear, dynamic and stochastic models that best represent the dynamic conditions of contemporary business doing.

Endeavoring to determine correlations between the personality dimensions and the employee

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communication satisfaction dimensions, the coauthors *Milena Nedeljković Knežević*, *Maja Milutinov* and *Slađana Nedeljković* have performed a study of the significance of employees' sociodemographic characteristics and personality dimensions to their satisfaction with communication. Based on the research study carried out on a sample of 119 employees, the coauthors establish a fat that, except for the sex structure of the respondents, all the other examined sociodemographic characteristics have an influence on certain communication satisfaction dimensions. The research results show that certain personality dimensions exert an undoubtable influence on certain communication satisfaction dimensions, which the specificity of the workplace also reflects on. In that sense, there is a recommendation for management to take care of brining personality dimensions into compliance with the specificities of the workplace when selecting candidates and forming teams.

Pursuant to the need for the development of a new theory of and a new model for asset evaluation, the author *Miljan Leković* considers the concepts of behavioral economists, who, contrary to standard finance theory, have developed behavioral finance theory, behavioral portfolio theory and a behavioral model for asset evaluation. By conducting a comparative analysis with the standard finance theories and models, the author shows the key characteristics of behavioral portfolio theory and the behavioral asset evaluation model, based on which the author draws a conclusion that, by incorporating psychological factors, behavioral portfolio theory and the behavioral asset evaluation model complement the standard finance learning and bring financial theory closer to reality. The knowledge gained in the field of behavioral finances may be useful to investors, portfolio managers and other market actors.

Respecting the significance of information-communications technologies (ICT) as a factor of the successfulness of an organization and the functioning of the economy as a whole and its economic entities, the coauthors *Aleksandra Zečević*, *Jelena Radović Stojanović* and *Aleksandar Čudan* have done research into the application of ICT in enterprises in the European Union member countries in the period between 2017 and 2018. Based on a comparative analysis of the European Union countries, a fact has been established that they significantly differ from one another according to their characteristics – demographic, geographic, economic, spatial, cultural-historical, technical-technological. The research study has revealed that the differences existent among the EU member countries, which on their part reflect on all the aspects of economic and social life, also have an influence on the achieved level of the adoption and application of information-communications technologies in the member countries' enterprises, with the specially pronounced influence of the regional position, geographic characteristics and size of a country, as well as the achieved level of its economic development.

On behalf of the Editorial Board of the Journal and on my own behalf I would hereby like to express gratitude to, first of all, the authors of the contributions published in this Issue of the Journal. At the same time, my special gratitude goes to the reviewers, whose constructive and critical comments and suggestions given to the authors of the submitted contributions have contributed to the raising of the level of the quality of the published papers.

Issue 3 Year 2019 contains a comprehensive Subject Index of the scientific papers published in the Journal in 2019, as well as a List of Authors and Titles of all the contributions published in the *Economic Horizons* in 2019.

Editor-in-Chief
Vlastimir Lekovic

Vlastimir Lekovic is a Professor at the Faculty of Economics, University of Kragujevac. He teaches several undergraduate, graduate and postgraduate courses, namely: Comparative Economic Systems, Public Sector Economics, Institutional Economics and Market Regulation Policies. He received his PhD in economics from the Faculty of Economics in Kragujevac, in the scientific field of the general concepts of economy and economic development. The key areas of his scientific research interests are economic systems, the economic policy and institutional economics.

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Original scientific paper
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INCOME TAX MANAGEMENT IN BANKS IN THE REPUBLIC OF SERBIA

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Income tax management includes a set of activities aimed at the legal minimization of income tax liabilities. Due to the tax law flexibility and cross-country differences in income taxation, banks may be in a position to significantly reduce their tax burden. An objective of the paper is to calculate the effective income tax burden of banks in the Republic of Serbia and examine the impact of income tax on banks' operations. A research study conducted on a sample of banks between 2010 and 2016 shows that the effective income tax rate in banks is well below the statutory rate, mostly due to the use of government tax incentives. Furthermore, 25% of the observations have an effective tax rate of 0% despite the reported pre-tax income. The latest increase in the statutory tax rate in the Republic of Serbia has not had an impact on bank leverage, either in the short or long term. This may be an indicator that tax shield effects are not considered when the statutory tax rate is relatively low. The paper also finds that the effective tax rate is not correlated with bank profitability.

Keywords: income tax, tax management, effective tax rate, financial structure, profitability, banks

JEL Classification: G21, G30, H25, H26

INTRODUCTION

The taxation of banks is an important issue of the taxation of economic activities in a country. The importance of banks as taxpayers stems from the role that banks, as financial intermediaries, have in society, a heavy regulation imposed on the banking sector and a potential monopoly power the banking sector may enjoy (Caminal, 2003).

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The 2008 economic crisis has led many countries to reexamine, and some are largely reforming, the taxation of financial institutions (Keen, 2011). A number of European countries and some of the leading economic powers among them have introduced a special tax on banks in addition to the usual types of corporate tax (Masiukiewicz & Dec, 2012).

Income tax in banks has a greater relative importance than that in the real sector. This viewpoint stems from the fact that, unlike most real-sector activities, the majority of financial activities are exempt from

value added tax, which is one of the most important tax types. Therefore, when taxing banks, the focus is primarily put on the reported bank income.

Accordingly, the subject matter of this paper is income tax management, implemented with the aim of minimizing the income tax liabilities of banks. Income tax management in banks is a complex issue. The need for interdisciplinary knowledge (in the fields of bank management, accounting, the tax law, etc.) and frequent changes in the tax regulation support this argument.

Bearing in mind the defined research subject, the objective of the paper is to calculate the effective tax burden of banks in the Republic of Serbia (RS) and examine the impact of income tax on banks' operations. The banks that have efficient income tax management should have lower effective tax rates and higher profitability. Furthermore, banks may use a tax-favorable treatment of borrowed financing sources in order to minimize the tax burden.

In line with the defined research subject and objective, the following research hypotheses are tested in the paper:

H1: An effective income tax rate in banks is statistically significantly lower than the statutory income tax rate.

H2: An increase in the statutory income tax rate leads to a statistically significant increase in bank leverage.

H3: There is a statistically significant strong negative correlation between the effective income tax rate and bank profitability.

The research study carried out in this paper is primarily empirically oriented since it captures commercial banks in the RS in the period 2010-2016. In this regard, quantitative research methods, with a special focus put on modern statistical methods, are dominant in this paper.

The paper contributes to the existing, primarily foreign, findings on income tax management in banks. According to the information available to the authors, this is the first research in the RS on income tax management in banks. The research results can be of interest to the owners and managers of banks in the RS, as well as to the national tax authorities.

Beside the introduction, the conclusion, and the appendix, the paper consists of three parts. The first part is a presentation of the theoretical and empirical findings on bank income taxation. In the second part, the research methodology is explained. The third part presents the results of the empirical research and the discussion.

THEORETICAL AND EMPIRICAL BACKGROUNDS

Bank Income Taxation

Income taxation in banks does not substantially differ from the income taxation of the companies operating in the real sector. The legal basis for bank income taxation is the Corporate Income Tax Law (Službeni glasnik Republike Srbije, 2017) with the related by-laws. The RS applies the proportional system of bank income taxation at a statutory tax rate of 15% (until 1 January 2013, the rate was 10%).

The taxable base (taxable income) is calculated in the tax balance after the adjustment of pre-tax income from bank income statement. The taxable income from the tax balance is often different from the pre-tax income from the income statement due to the different treatment of a certain revenue and certain expenses in the income statement and the tax balance. Certain categories of revenue and expenses presented in the income statement are not allowed in the tax balance; some categories are allowed in the tax balance only up to the prescribed amount, whereas some categories are allowed in the tax balance in a different accounting period compared to the income statement.

A difference between pre-tax income and taxable income and many tax incentives leads to a difference between the effective tax burden (the ratio of the

income tax burden and pre-tax income) and the statutory burden. Therefore, effective income tax management tends to maximize pre-tax income and minimize taxable income and the effective tax burden (Manzon & Plesko, 2002). Furthermore, H. Huizinga (2004) notes that the system of separate reporting for business and tax purposes makes the possibility of manipulating tax liabilities particularly available to the banking sector

Separate reporting for business and tax purposes leads to specific situations in banking practice. Thus, it is possible for a bank to have no income tax expense despite the reported pre-tax income. On the other hand, it is possible that, after an adjustment has been made in the tax balance, the realized pre-tax loss transforms into taxable income, so that the bank with the reported pre-tax loss has an income tax expense in the reporting period.

The income statement made by banks in the RS prepared in line with the International Financial Reporting Standards contains the total income tax expense consisting of the current tax expense and the deferred tax expense. The current tax expense represents the amount of the income tax expense attributable to the reporting accounting period, whereas deferred tax represents the amount of the income tax related to future accounting periods, arising from the recognition of the revenue and expenses in the tax balance in different accounting periods compared to the income statement.

Efficiency of Income Tax Management in Banks

Tax liabilities management is an important category of banking management. M. Scholes, G. Wilson and M. Wolfson (1990) conclude that banks are motivated to take tax-reducing actions if the costs of such activities are lower than potential tax benefits.

Multinational banks, whose subsidiaries dominate the Serbian banking sector, are involved in international tax planning in order to minimize world-wide tax liabilities. E. Thalassinos, B. Venediktova, D. Staneva-Petkova and V. Zampeta (2013) argue that the taxes levied in the host country are an important factor for multinational banks' decisions to operate in the host country as a branch or as a subsidiary. E. Cerutti, G. Dell'Ariccia and M. Peria (2007) show that banks tend to operate as a branch in countries with high corporate taxes.

Like the real-sector companies, banks can also manage their tax liabilities through leverage adjustment. H. De Angelo and R. Stulz (2015) show that, due to the specific nature of the industry they operate in, banks have higher leverage compared to the real-sector companies. Substituting equity sources with borrowed financing sources increases the interest expenses that are, contrary to dividends paid, a deductible item in the tax balance. Using borrowed sources in order to reduce tax liabilities is known as a debt tax shield mechanism (Pyles, 2014, 262).

Multinational banks manage the leverage of their subsidiaries through intragroup lending transactions. This concept is based on lending to a subsidiary incorporated in a country with a high-income tax rate by a subsidiary of the same banking group incorporated in a country with a low-income tax burden. In this way, the calculated interest incurred on loans is transferred to the country with a favorable tax treatment, thus minimizing the amount of the world-wide income tax paid. A. Demirguc-Kunt and H. Huizinga (2001) conclude that such mechanisms of income shifting to countries with relatively low tax rates are the common practice of multinational banks, which is a significant comparative advantage of these banking groups.

Contrary to the real-sector companies, banks are imposed a considerably higher regulation, so the tax-motivated borrowing of banks should be discussed in parallel with efforts to maintain the regulatory capital level and secure capital adequacy. J. Graham, J. Raedy and D. Shackelford (2012) argue that banks are willing to forgo tax benefits when a reduction in tax liabilities would adversely affect the regulatory position of banks.

Banks may also use the other types of costs in order to minimize income tax liabilities. For instance, banks may contract certain services, such as market

research services or consulting services, with related-party entities. Such transactions increase the bank's costs and decrease its taxable base, thus leading to a reduced income tax liability.

The prior years' tax loss carryforward and the investment tax carryforward are the mechanisms equally available to both real-sector companies and financial institutions. However, unlike real-sector companies, banks are important investors in the shares of domestic organizations and government securities. Income from dividends and interest incurred on such investments is income-tax exempt in RS.

The minimization of income tax liabilities conducted within the legal framework should have positive effects on bank profitability. On the other hand, an increase in the income tax expense does not necessarily have a negative impact on bank profitability if banks are able to shift the tax burden to their customers through increased prices for their banking services. If such a shift is missing, G. Capelle-Blancard and O. Havrylchyk (2014) note that the tax burden is borne by bank shareholders or employees.

Regarding market value, M. Desai (2005) points out the fact that the market does not often award efficient income tax management, suspecting managerial malfeasance or the legality of tax minimization activities. However, the issue of the market reaction to income tax management in banks in the RS is of little importance since the shares of only a few banks are quoted on the Belgrade Stock Exchange.

In the last few decades, a number of income tax management measures have been developed in the literature. J. Slemrod (2004) concludes that an effective tax rate is the key measure for the efficiency of tax department managers in large organizations. M. Hanlon and S. Heitzman (2010) list three most widely used types of effective income tax rates, namely:

- the total effective tax rate (a ratio of the total income tax expense and pre-tax income),
- the current effective tax rate (a ratio of the current income tax expense and pre-tax income), and
- the cash effective tax rate (a ratio of income tax paid and pre-tax income tax).

The current effective tax rate will be used in the paper because the total effective tax rate, inter alia, captures a deferred tax expense as a non-cash income statement position, whereas the cash effective tax rate mixes real categories (an income tax outflow) and accrual categories (pre-tax income).

Review of the Empirical Research

An interest in income tax management in order to minimize tax liabilities is particularly evident in countries with high statutory income tax rates, often higher than 30%. With the statutory rate of 15%, the Republic of Serbia belongs to the countries with a moderate level of the tax burden.

G. Yin (2003) notes that the effective tax rate of the companies operating in the financial sector which are members of the S&P 500 index is continuously lower than the federal tax rate in the United States (US). Another US research study which tracked a ten-year cash effective tax rate shows that financial institutions are among the companies with the lowest income tax burden. Furthermore, two of the three sampled companies with the lowest ten-year cash rate are financial institutions (Dyreng, Hanlon & Maydew, 2008).

G. Schepens (2016) finds a significant impact of the tax treatment of dividends and interest rates on bank leverage - a reduction in the gap in the tax treatment between these two categories decreases bank leverage. T. Hemmelgarn and D. Teichmann (2014) find a statistically significant impact of the statutory income tax rate on bank leverage. They find that, in the period of three years after an increase in the statutory tax rate, there is an increase in bank leverage. A. Schandlbauer (2017) finds that an increased income tax burden in banks leads to an increase in the leverage of better-capitalized banks, primarily through non-deposit borrowing.

J. Merz and M. Overesch (2016) confirm that bank income taxation may be a significant determinant

of bank profitability. They studied the subsidiaries of multinational banks in 131 countries and found that the subsidiaries operating in the countries with higher statutory income tax rates have a lower level of profitability.

A number of research studies are dedicated to the study of the relation between the effective income tax burden and bank profitability. A research study conducted on Swiss banks shows that the effect of the effective tax rate on bank profitability is negative, though quite weak (Dietrich & Wanzenried, 2011). Another research shows that the effective tax rate negatively affects bank profitability in the middle- and low-income countries (Dietrich & Wanzenried, 2014). On the other hand, C. Gaganis, F. Pasiouras and A. Tsaklanganos (2013) find a positive non-linear correlation between the effective tax burden and bank profitability.

There are also important findings according to which the income tax burden will not derogate bank profitability due to the ability of banks to shift the tax burden to their clients. A. Demirguc-Kunt and H. Huizinga (1999) argue that banks are fully able to shift the tax burden to their clients. U. Albetrazzi and L. Gambacorta (2010) conclude that banks shift at least 90% of the burden to their clients. V. Chiorazzo and C. Milani (2011) conclude that banks can shift the income tax and value added tax burdens to their clients by increasing prices for their banking services.

RESEARCH METHODOLOGY

The research study on income tax management is empirically oriented. Abstracting other microeconomic and macroeconomic determinants, the study will examine how income tax management affects the effective tax rate, leverage, and bank profitability.

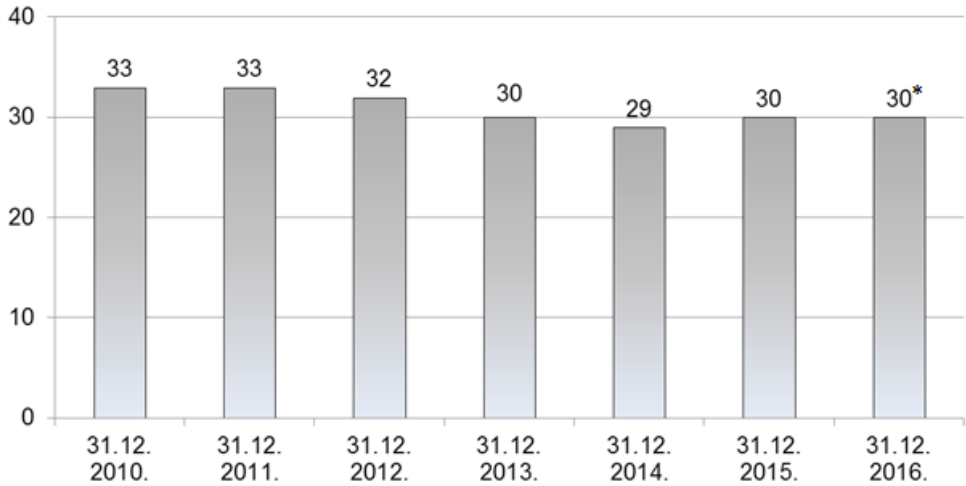
For the research purposes, a sample is formulated, comprising each commercial bank active in the territory of the RS in the period 2010-2016, at the end of the sampled years. In this way, the unbalanced panel data that initially consist of 217 observations are formed, while 131 of the 217 observations recorded pre-tax income. In order to avoid the existence of negative (and unusable) effective tax rates, these rates are calculated for the observations with pre-tax income only. The number of the active banks by years is shown in Figure 1. The list of all the banks included in the research study, presented by years, is given in the Appendix.

There are many arguments for sampling the banks that periodically reported a pre-tax loss during the observed period. First, all banks in the RS file the tax balance and the tax return for income tax regardless of their profitability. Second, it is possible that the banks with an accounting pre-tax loss have taxable income and an income tax liability. Third, it is possible that the banks that were profitable in each of the seven observed years had losses in some of the previous years and reduce their tax liabilities on the basis of the tax losses carryforward.

The research study is conducted by using the publicly available data. The data on the banking sector were retrieved from the official website of the National Bank of Serbia, while the financial data (from statutory financial statements) on the banks were retrieved from the official website of the Business Registers Agency of the RS. The confidence levels $\alpha = 0.10$, $\alpha = 0.05$, and $\alpha = 0.01$ are used to determine statistical significance.

Apart from descriptive statistics and the tests of normality, the testing of the defined research hypotheses is conducted as follows:

- the first hypothesis is tested by comparing the effective and the statutory income tax rates by using appropriate tests to compare the two dependent groups (i.e. the paired t-test or the Wilcoxon signed-rank test);
- the second hypothesis is tested by comparing the leverage of the banks at the time of the increase in the statutory income tax rate (31 December 2012) and the leverage of the banks at the time one year (31 December 2013), two years (31 December 2014) and three years (31 December 2015) after the increase in the statutory income tax rate by using



*As at 31 December 2016, a total of 31 banks had a license – however, one of them (Bank of China Serbia) did not actively operate in 2016 (it was established on 22 December 2016), so that bank is not included in the sample.

Figure 1 The number of the active banks in the RS in the period 2010-2016

Source: Authors

appropriate tests to compare the two independent groups (the t-test for the independent samples, or the Mann-Whitney test) - the debt ratio, i.e. the ratio of the total bank liabilities and total assets is used as a leverage proxy, and

- the third hypothesis is tested by applying the Pearson and Spearman correlation coefficients, whereby ROA (the ratio of net income and the total assets of a bank) is used as a profitability proxy.

RESEARCH RESULTS AND DISCUSSION

The obtained research results are interpreted following the defined research hypotheses. For the purposes of testing the validity of the first research hypothesis, Table 1 is formed, with the descriptive statistics of the current effective tax rates and the outcomes of the tests of the difference between the statutory and the effective tax rates.

Since the employed variable, i.e. the effective tax rate, does not follow a normal distribution, the results are more appropriate to be commented on a median rather than arithmetic mean basis. It is noticeable that the effective tax rate of the average bank in the RS is continuously below the statutory tax rate. The Wilcoxon test outcomes show that the difference between the statutory and the effective tax rate is statistically significant in almost each sampled year. Observed at the whole-sample level, the difference is statistically significant at the 1% level.

The results of the analysis are not quite different if a total of the 33 observations with the effective tax rate of 0% (the observations in which, despite the pre-tax income, not one dinar of the current tax expense was calculated, Panel B) are excluded. It is interesting to note that the two largest effective tax rates in Table 1 (i.e. 112.048% in 2015 and 70.130% in 2014) refer to the one and the same bank - Jugobanka.

There are a number of the reasons why there is a significant difference between the statutory and the effective tax rates in the banks. The banks that invest more than one billion dinars in fixed assets and employ one additional hundred workers are allowed to reduce the income tax liability due to the

Table 1 Testing the statistical significance of the difference between the statutory tax rate and the current effective tax rate

Year	Statutory tax rate	Current effective tax rate - descriptive statistics					Wilcoxon Z
		n	Arithmetic mean	Median	Minimum	Maximum	
Panel A. The observations with a positive result (income) before tax							
2010	10%	21	8.552%	6.130%	0.000%	65.833%	***-2.834
2011	10%	21	6.827%	5.612%	0.000%	27.167%	**-2.104
2012	10%	21	9.243%	6.948%	0.000%	49.778%	-1.582
2013	15%	15	3.163%	0.130%	0.000%	12.655%	***-3.447
2014	15%	17	7.820%	1.330%	0.000%	70.130%	***-2.726
2015	15%	17	12.490%	1.114%	0.000%	112.084%	**-2.018
2016	15%	19	3.588%	0.194%	0.000%	15.435%	***-3.804
Total	131	7.465%	4.821%	0.000%	112.084%	***-7.281	
Panel B. The observations with a positive result (income) before tax and the current effective tax rate higher than 0%							
2010	10%	18	9.978%	7.648%	0.131%	65.833%	**-2.373
2011	10%	17	8.434%	7.571%	0.032%	27.167%	-1.207
2012	10%	18	10.783%	8.526%	0.219%	49.778%	-0.936
2013	15%	8	5.931%	5.793%	0.130%	12.655%	**-2.521
2014	15%	13	10.226%	4.311%	0.011%	70.130%	**-2.132
2015	15%	12	17.694%	8.936%	0.014%	112.084%	-1.177
2016	15%	12	5.681%	4.075%	0.102%	15.435%	***-2.981
Total	98	9.979%	6.857%	0.011%	112.084%	***-5.236	

Note: *n* refers to the number of the observations; *, **, *** refer(s) to the statistically significant results at the levels of 10%, 5%, and 1%, respectively.

Source: Authors

investment tax incentive. The largest banks in the RS find these investment criteria relatively easy to meet.

A significant reduction in the income tax liabilities of the banks is a result of a reduction in the current tax expense in the name of the prior years' tax loss carryforward. Banks are allowed to use the tax loss carryforward in a period of five years after the year in which the loss is reported. The importance of the reported losses for a reduction in the tax burden can be illustrated with the fact that out of the 29 banks that continuously operated in the period from 2010 to 2016, only six banks (namely AIK banka, Banca Intesa, Erste Bank, ProCredit Bank, Raiffeisen banka and Unicredit bank Serbia) reported pre-tax income in each sampled year.

It is worth noting that the analysis of the notes to the banks' financial statements (the section on the reconciliation of pre-tax income to taxable income) shows that the adjustment of revenues represents an important and frequent item, particularly so in large banks. Although the notes usually do not state an explicit reason for such an adjustment, it is rational to assume that this is a result of the interest income on the government financial instruments and dividends paid by the legal entities residents in the RS.

On the other hand, there are 27 observations in which the pre-tax loss from the income statement has been transformed into taxable income in the tax balance, so the current tax expense (which is greater than zero) is reported despite the pre-tax loss. Although it is

possible to identify several reasons for this, the key reason is the taxation of the banks' capital gains taxed at the moment of income taxation, but independently of the reported income (a profit or a loss) from the other bank activities.

Previous paragraphs indicate that banks in the RS are relatively efficient in managing income tax as they use legal possibilities of reducing income tax liabilities to a significant extent. Therefore, the first research hypothesis is not rejected.

For the purposes of testing the validity of the second research hypothesis, it is necessary to examine the leverage of the banks in the RS at the end of the sampled years. The descriptive statistics of the banks' debt ratio and the outcomes of the non-parametric Mann-Whitney test (used due to a lack of a normal distribution of the debt ratio variable) are shown in Tables 2 and 3.

Table 2 The descriptive statistics for the debt ratio of the banks in the RS in the period 2010-2016

Year	*n*	Arithmetic mean	Median	Minimum	Maximum
2010	33	0.788	0.806	0.443	0.927
2011	33	0.793	0.807	0.447	1.000
2012	32	0.782	0.813	0.167	0.982
2013	30	0.774	0.820	0.146	0.925
2014	29	0.768	0.820	0.172	0.874
2015	30	0.762	0.803	0.182	0.880
2016	30	0.780	0.812	0.298	0.912
Total	217	0.779	0.807	0.146	1.000

Note: *n* refers to the number of the observations.

Source: Authors

The data in Table 2 show that the banks in the RS are highly leveraged, in line with the specific features of the industry they operate in. In each sampled year, the debt ratio median is higher than 80%. However, there are important extreme values in the leverage of the banks, primarily in smaller banks. The minimum values of the debt ratio in the period 2010-2011 relate to JUBMES bank, and in the period 2012-2016, to Jugobanka. The only observation with a debt ratio of 1.000 refers to Agrobanka, which, at the end of 2011, reported a loss above the owners' equity, only to have its license revoked in 2012.

The outcomes of the Mann-Whitney test, presented in Table 3, show that there is no statistically significant increase in bank leverage in the RS in any one observed period. In the next paragraphs of the research study, the two additional tests that were conducted - the one only including the banks that continuously operated in the period from 2012 to 2015 (Panel B) and the other only including the banks with the lowest debt ratios, i.e. the largest additional borrowing capacity (Panel C) - are presented. The results of these tests are not quite different from the original results.

It is obvious that bank managers in the RS did not incorporate the effects of the increasing statutory income tax rate in their financial decisions, expressed as an increase in the tax shield benefits. One of the reasons explaining why the bank managers failed to pay attention to the increase in the statutory rate rests on the fact that the Serbian banking system is dominated by the subsidiaries of foreign banks headquartered in the countries with quite higher statutory tax rates. At the time of the increase in the statutory tax rate (1 January 2013), the largest number of the Serbian banks were the subsidiaries of Greek, Austrian, French, and Italian multinational banking groups. According to Ernst & Young (2013), in 2013, corporate income in these countries had the following tax burdens:

- in Greece, the statutory tax rate was 26%,
- in Austria, the statutory tax rate was 25%,
- in France, the statutory tax rate was 33.33%, increased by the variable additional tax, and
- in Italy, the statutory tax rate was 27.5% plus additional regional income tax.

An important number of managers from the mentioned countries are on the boards of directors

Table 3 Testing the statistical significance of the difference in the leverage of the banks in the RS in different years

Year 1	*n*	Year 2	*n*	Mann-Whitney U	Z
Panel A. All the banks that operated in the sampled years					
2012	32	2013	30	472.000	-0.113
2012	32	2014	29	449.000	-0.217
2012	32	2015	30	437.000	-0.606
Panel B. The banks that operated in the period 2012-2015					
2012	29	2013	29	408.000	-0.194
2012	29	2014	29	418.000	-0.039
2012	29	2015	29	411.000	-0.148
Panel C. A total of 10 banks with the lowest debt ratio on 31 December 2012					
2012	10	2013	10	46.000	-0.302
2012	10	2014	10	50.000	0.000
2012	10	2015	10	50.000	0.000

Note: *n* refers to the number of the observations; *, **, *** refer(s) to the statistically significant results at the levels of 10%, 5%, and 1%, respectively.

Source: Authors

and executive boards of the Serbian subsidiaries of multinational banks. Given the fact that the income tax burden is significantly higher in these countries, the increase in the statutory income tax rate in the RS from 10% to 15% is obviously not seriously discussed by the managers of those banks.

Using borrowed financing sources implies the existence of the fixed maturity dates of liabilities and, in general, a priority in payment compared to equity financing sources. Such negative effects are obviously more valued by bank managers in the RS than the positive tax effects of additional borrowing. Since there has been no significant increase in bank leverage after the increase in the statutory tax rate, the second research hypothesis is rejected.

For the purposes of testing the validity of the third research hypothesis, the descriptive statistics for the banks' ROA in the sampled period are given in Table 4 below. Unlike moderate positive returns, there is an observation with an extremely negative rate of net return on total assets in almost every sampled year.

It is interesting that the minimum value of ROA (-142.145%) refers to Srpska Banka in 2014, whereas the maximum value (5.222%) refers to the same bank in 2015. The case of Telenor Bank is also interesting, this bank having the lowest ROA in 2013. After the losses incurred in the following two years and the ownership changes, this bank had the lowest ROA in 2016.

In Table 5, the results of the correlation analysis between the current effective tax rate and the ROA of the banks in the RS are shown. The Pearson *r* coefficient and the Spearman *rho* coefficient are presented; according to the outcomes of the normality tests (showing a lack of a normal distribution in the majority of the observed variables, both by years and in total), it is more appropriate to rely on the Spearman *rho* coefficient. The interpretation of the correlation coefficients is performed in line with the Cohen criteria (Hemphill, 2003), according to which the coefficient of correlation:

- between 0.10 and 0.29 indicates a weak correlation;
- between 0.30 and 0.50 indicates a moderate correlation, and
- higher than 0.50 indicates a strong correlation.

Table 4 The descriptive statistics for the banks' ROA in the RS in the period 2010-2016

Year	*n*	Arithmetic mean	Median	Minimum	Maximum
Panel A. All observations in the sampled years					
2010	33	-0.447%	0.325%	-8.539%	3.949%
2011	33	-1.314%	0.375%	-47.833%	3.062%
2012	32	-2.130%	0.144%	-55.737%	2.898%
2013	30	-6.492%	-0.105%	-141.310%	3.158%
2014	29	-6.697%	0.126%	-142.145%	2.735%
2015	30	-1.867%	0.105%	-17.186%	5.222%
2016	30	-0.956%	-0.396%	-11.851%	2.579%
Total	217	-2.765%	0.217%	-142.145%	5.222%
Panel B. The observations with a positive result before tax					
2010	21	1.235%	1.081%	0.001%	3.949%
2011	21	1.458%	1.448%	0.217%	3.062%
2012	21	1.116%	1.195%	0.019%	2.898%
2013	15	1.224%	1.082%	0.047%	3.158%
2014	17	0.903%	0.392%	0.031%	2.735%
2015	17	1.365%	1.012%	0.001%	5.222%
2016	19	1.225%	1.368%	0.050%	2.579%
Total	131	1.223%	1.095%	0.001%	5.222%

Note: *n* refers to the number of the observations.

Source: Authors

Observed at the total level (131 observations), it can be concluded that there is no strong negative correlation between the effective tax rate and ROA. The Spearman *rho* correlation coefficient indicates a weak and significant positive correlation between the observed variables. Observed by years, a significant and strong, though positive, correlation is only found in 2013.

The main reason for the absence of a strong significant correlation at the whole-sample level should be found in the fact that 25.19% of the observations (33 out of 131 observations) have an effective tax rate equal to zero. Therefore, in the next paragraph, these 33 observations are removed, so the correlation analysis is conducted with the remaining 98 observations (Panel B).

At the level of 98 observations, there is a statistically significant negative correlation between the employed variables in two years. However, such a negative correlation is not strong in either year. At the total level, only the Pearson r correlation coefficient is significant, though indicating a low correlation. Since it is concluded that there is no statistically significant strong negative correlation between the effective tax rate and ROA in the banks in the RS, the third research hypothesis is rejected.

CONCLUSION

The conducted research study presented in this paper included 34 banks having operated in the RS in period from 2010 to 2016 in order to examine the efficiency of income tax management in the banking sector.

The paper has shown that the effective income tax burden in an average bank in the RS is continuously below the statutory burden. Furthermore, as much as 25% of the observations with reported pre-tax

Table 5 The results of the correlation analysis of the current effective tax rate and the ROA of the banks in the RS in the period 2010-2016

Year	*n*	Pearson r	Spearman *rho*
Panel A. The observations with a positive result (income) before tax			
2010	21	-0.145	0.192
2011	21	-0.039	0.190
2012	21	-0.250	-0.095
2013	15	***0.774	***0.674
2014	17	-0.098	0.153
2015	17	-0.247	0.109
2016	19	0.365	0.349
Total	131	-0.088	***0.275
Panel B. The observations with a positive result (income) before tax and the current effective tax rate higher than 0%			
2010	18	-0.158	0.183
2011	17	**-0.496	*-0.426
2012	18	**-0.472	*-0.439
2013	8	**0.774	*0.667
2014	13	-0.186	0.066
2015	12	-0.358	-0.021
2016	12	***0.721	**0.692
Total	98	**-0.221	0.088

Note: *n* refers to the number of the observations; *, **, *** refer(s) to the statistically significant results at the levels of 10%, 5%, and 1%, respectively.

Source: Authors

income reduced the effective tax rate to 0%. The research results are consistent with the conclusions of a previous research study (Yin, 2003; Dyreng *et al*, 2008) on the ability of financial institutions to efficiently manage their income tax.

The latest increase in the statutory tax rate in the RS from 10% to 15% has not had an impact on the financial structure of the banks. The analysis has shown that the share of liabilities in the total financing sources of the banks has not statistically significantly increased after the increase in the statutory rate, regardless of the capitalization of the banks. This finding is contrary to prior research findings (Hemmelgarn & Teichmann, 2014; Schandlbauer, 2017). When comparing the obtained results with the results of prior research, the fact that the effective tax burden of the banks in the RS is significantly lower than the effective tax burden in prior research should be taken into consideration.

According to the analysis carried out in this paper, it is clear that there is no strong correlation between the effective tax rate and bank profitability. Such a finding indicates the fact that taxation is not an important determinant of the profitability of the banks in the RS. It is important to note that the previous research study (Demirguc-Kunt & Huizinga, 1999; Albetrazzi & Gambacorta, 2010; Chiorazzo & Milani, 2011) showing that the tax burden does not necessarily negatively impact bank profitability is based on quite different statistical methods.

There are, however, certain limitations pertaining to the presented results. The research study is based on the sampling method in a period longer than seven years. Also, only one measure for each (the efficiency of income tax management, the financial structure and profitability) are employed. It is possible that the research results would be different in the case of a different time period or the employment of different measures.

We believe that many interested groups may benefit from the results of this research study. When deciding on the future banking activities of their banks, the owners and managers of banks in the RS may benefit from the information on the impact of income tax on banks' operations. In addition, the national tax authorities may benefit from the research study when making decisions on the modality of the taxation of the banking sector in the RS.

Future research in this area could include the other measures for the efficiency of income tax management, such as the total or cash effective tax rate. It would be interesting to employ multiple regression analysis in order to examine the effect of the effective tax rate on banks' ROA, ROE and net interest income. In addition, the methodology of future research may include interviewing bank managers about the methods for income tax management.

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APPENDIX

The list of the active banks in the RS in the period 2010-2016

Bank	Sampled period	Bank	Sampled period
Addiko Bank	2010-2016	MTS banka	2010-2016
Agrobanka	2010-2011	NLB banka	2010-2016
AIK banka	2010-2016	Opportunity banka	2010-2016
Banca Intesa	2010-2016	OTP banka Srbija	2010-2016
Banka Poštanska štedionica	2010-2016	Piraeus Bank	2010-2016
Credit Agricole banka Srbija	2010-2016	Privredna banka Beograd	2010-2012
Direktna banka	2010-2016	ProCredit Bank	2010-2016
Expobank	2010-2016	Raiffeisen banka	2010-2016
Erste Bank	2010-2016	Razvojna banka Vojvodine	2010-2012
Eurobank	2010-2016	Sberbank Srbija	2010-2016
Findomestic banka	2010-2016	Societe Generale banka	2010-2016
Halkbank	2010-2016	Srpska banka	2010-2016
Jubanka	2010-2016	Telenor banka	2010-2016
JUBMES banka	2010-2016	Unicredit bank Srbija	2010-2016
Jugobanka Jugbanka	2010-2016	Univerzal banka	2010-2013
Komercijalna banka	2010-2016	Vojvođanska banka	2010-2016
Mirabank	2015-2016	VTB banka	2010-2016

Source: Authors

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THE DEPOSIT INSURANCE SCHEME AND THE MORAL HAZARD HYPOTHESIS: NIGERIAN EVIDENCE

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This study empirically investigates the nexus between the moral hazard hypothesis and the adoption of the Deposit Insurance Scheme (DIS) in Nigeria. Using the secondary data sourced from the Nigerian Deposit Insurance Corporation's (NDIC) annual reports and accounts, a multiple regression model was formulated, comprising a deposit insurance fund as a proxy for moral hazard (the dependent variable), whereas the asset quality indicators of Nigerian banks were the independent variables. The estimation technique according to the Generalized Method of Moments (GMM) was used to test the relationships between the variables. The study revealed a significant positive relationship between the asset quality indicators of Nigerian banks and the deposit insurance fund, which supports the moral hazard hypothesis. It is recommended that governments should strengthen their banking regulatory systems in order to mitigate the unintended risks which the adoption of the DIS portends.

Keywords: moral hazard hypothesis, total loans and advances, nonperforming loans, ratio of nonperforming loans to total loans, shareholders' fund

JEL Classification: G21, G28

INTRODUCTION

Globally, the functionality and sustainability of any economy is incumbent upon the ability of Deposit Money Banks (DMBs) to effectively discharge their financial intermediation role by ensuring a seamless flow of funds from surplus to deficit economic units; hence governments and financial service regulators constantly fine-tune measures and policies so as to further consolidate the banking operations aimed at safeguarding their customers' deposits. However, it is common knowledge that banks' intermediation role is very strategic, where long-term assets are, in most cases, financed with short-term deposits, which is a practice that could precipitate bank distress and failure. The need to mitigate this ugly scenario informed the design and implementation of the DIS as a financial safety net in Nigeria.

G. A. Ogunleye (2002, 2) defines a deposit insurance scheme (DIS) as a financial guarantee designed to protect customers' deposits, principally a small unsophisticated category, in the event of bank failure so as to boost their confidence in the financial

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system and forestall bank runs, equally serving as a regulatory measure utilized by the monetary authorities to efficiently manage disruptions and ensure that disruptions usually associated with distressed and failed deposit-taking financial institutions are resolved amicably. The scheme avails the government a regulatory framework in order to intervene and mitigate the potential disruptive effects that a failure of deposit-taking institutions might inflict on the stability of financial systems. Industry experts and scholars alike have argued that, despite the good economic intentions of establishing a DIS, its implementation comes with an unintended consequence by inadvertently increasing the risk-taking appetite of banks, the phenomenon referred to as the moral hazard hypothesis (Davis & Obasi, 2009, 3; Ume, Oleka & Obasikene, 2017, 38).

Basically, it entails a situation in which banks recklessly adopt a laissez -faire attitude towards granting loans and advances without recourse to conducting due diligence on potential borrowers, as it is erroneously believed that any loss arising therefrom will be indemnified by a deposit insurance mechanism (Forssbaeck, 2011). The extant literature identifies two distinct schools of thought as far as the reaction of banks to the DIS is concerned. The group of those who argue that the DIS is justified because it acts as a palliative for small unsophisticated depositors and ensures the stability of financial systems oppose the moral hazard hypothesis (Ogunleye, 2002, 2; Enkhbold & Otgonshar, 2013), whereas the other researchers posit that an explicit DIS encourages increased risk-appetite and financial recklessness amongst financial institutions, which, if not checked, could ultimately result in a systemic collapse (Demirgüç-Kunt, Kane & Laeven, 2015; Sahadewo, Purwanto & Pradiptyo, 2018)

Rationale for the Study

Given the fact that the economy is still recovering from a recession, Nigeria's banking sector continues to confront daunting challenges in its bid to efficiently perform its intermediation role and promote economic growth (World Bank, 2016, 4). The oil price shock of 2015, which plummeted revenue from oil, coupled with the exchange rate fluctuations has precipitated adverse levels in the asset quality indicators of DMBs (the total loans and advances, nonperforming loans, the ratio of nonperforming loans to the total loans and the ratio of nonperforming loans to shareholders' funds), the data collected from the 2017 annual report and accounts of the Nigerian Deposit Insurance Corporation (NDIC) indicate that the total loans and advances from the banking industry to the economy stood at ₦15.91 trillion in 2017, thus representing a 2.33% decrease in comparison with ₦16.29 trillion recorded in 2016. The industry's nonperforming loans increased by 13.46%, i.e. from ₦2.08 trillion in 2016 to ₦2.36 trillion in 2017 (Figure 1); the industry equally witnessed a high exposure to credit risk as the asset quality (the ratio of nonperforming loans to the total loans) further declined from 12.80% in 2016 to 14.84% in 2017 (Figure 2). That figure matched unfavourably with the industry's maximum prudential threshold of 5%. It is interesting to note that, despite the adverse statistics in the asset quality indicators, the deposit insurance fund increased from ₦827.81 to ₦959.56 billion between 2016 and 2017, thus bringing up the need to investigate the argument espoused by the proponents of the moral hazard hypothesis that the DIS increased the risk- taking appetite of banks.

Equally, the majority of the studies on the DIS and moral hazard were conducted in the developed economies of the United States of America (USA), Great Britain and the European Union (Peia & Vranceanu, 2017; Demirgüç-Kunt *et al*, 2015; Anginer & Demirgüç-Kunt, 2018; Storbacka, 2018). With very few studies on economies in sub-Saharan Africa (Anyanwu, 1997; Ani & Ogar, 2018). The only recorded study on this phenomenon in Nigeria by U. Ume, C. Oleka and C. Obasikene (2017) was at best a theoretical discourse; hence, this study is aimed at bridging these observed knowledge gaps by empirically investigating the nexus between the moral hazard hypothesis and the implementation of the DIS in the Nigerian banking industry.

Specifically, this paper seeks to address the research question pertaining to the extent to which the growth trend in the deposit insurance fund has significantly

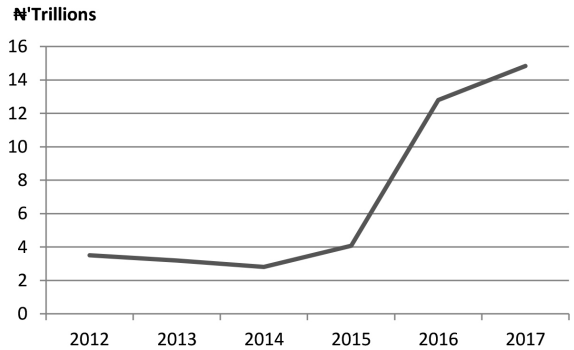

Figure 1 The trend of Nonperforming Loans in Nigerian Deposit Money Banks (2012-2017)

Source: NDIC Annual Report and Accounts 2017, 117

increased banks' risk appetite by exerting an impact on the volume of the Total Loans and Advances (TLA), the Nonperforming Loans (NPLs) portfolio, the ratio of Nonperforming Loans to the Total Loans (NPLsTL) and the ratio of Nonperforming Loans to Shareholders' Funds (NPLsSHF). In order to achieve this objective, a multiple regression model was formulated, comprising the deposit insurance fund as the proxy for moral hazard (the dependent variable), whereas the asset quality indicators of Nigerian banks viz: the TLA, NPLs, the ratio of NPLsTL and the ratio of NPLsSHF were the independent variables. Furthermore, the estimation technique according to the Generalized Method of Moments (GMM) was used to ascertain the relationships between these variables.

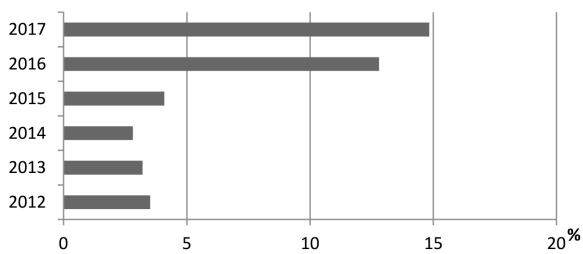

Figure 2 The trend of Nonperforming Loans to the Total Loans in Nigerian Deposit Money Banks (2012-2017)

Source: NDIC Annual Report and Accounts 2017, 118

Following the introduction and the rationale for the study, the rest of this paper is structured as follows: in Section 2, the conceptual underpinnings and prior empirical studies on the subject matter are discussed; in Section 3, the methodological framework is developed, incorporating the model formulation and the operationalization of the variables; in Section 4, the empirical findings and discussions are presented; finally, the conclusions are given in Section 5 of the paper.

REVIEW OF THE RELATED LITERATURE

The Nexus Between the Moral Hazard Hypothesis and the Deposit Insurance Scheme

Although the DIS can tackle small isolated incidences of bank failures, it cannot deal on its own with the collateral consequences that a systemic banking crisis might portend, for which reason it must be emphasized that the effective implementation of the DIS as a financial safety net mechanism will only thrive in a healthy banking system; equally, its credibility is incumbent upon a proper design, a faithful implementation and sufficient understanding by the banking public. It also requires the support of adequate prudential guidelines and supervision, timely accounting and disclosure requirements, coupled with the effective enforcement of legislations by the money market regulatory agencies (the Central Bank of Nigeria - CBN, and the Nigerian Deposit Insurance Corporation - NDIC). However, despite the inherent benefits of the DIS, theoretical and empirical evidence alludes to the argument that it orchestrates moral hazards in banking operations. Moral hazard represents a major negative consequence of implementing explicit deposit insurance. K. Ume, C. Oleka and C. Obasikene (2017, 39) assert that moral hazard refers to *"any situation in which someone makes a decision on how much risk to take and someone else bears the cost if anything goes wrong"*. The proponents of the moral hazard hypothesis argue that the implementation of explicit deposit insurance tends to

increase the risk-taking appetite of stakeholders in the financial services sector and encourages depositors' complacence in monitoring their bank deposits. In the same vein, P. A. McCoy (2007, 4) opines that, while the explicit DIS may significantly reduce the incidences of bank runs in countries with effective institutions and proper regulatory safeguards, on the flip side, it may exacerbate systemic banking crises by allowing unfettered leverage to take more risk by acting as a disincentive for insured claim holders to regulate the operations of bank management. However, M. J. Flannery and R. R. Bliss (2018, 7) espoused the relevance of financial structures, incentives and market discipline in stemming excessive risk-taking.

Review of the Developments of the Nigerian Banking Sector and the Deposit Insurance Framework

The period between 1994 and 2015 witnessed the closure of 49 DMBs by the Central Bank of Nigeria, with a sizeable number concentrated around 1998 (27) and 2006 (13), as is shown in Table 1. The 1998 and 2006 bank closures were largely triggered by the regulatory requirements geared towards enhancing bank capitalization, (Alford 2010; Alford 2012; Obienusi & Obienusi, 2015). The Central Bank increased the uniform minimum paid-up capital for commercial and merchant banks to ₦500 million in December 1998. Furthermore, in 2014, the Central Bank of Nigeria implemented far- reaching reforms to shore up bank capitalization, the major elements of this reform being the fixing of the minimum capital base for the DMBs at ₦25 billion and the establishment of the Asset Management Company (AMCON) (World Bank, 2016, 12). Between 2004 and 2007, there was a further reduction in the number of commercial banks from 89 to 25 by the CBN, which was effected through mergers and outright liquidation.

In 2002, all the commercial banks operating in Nigeria received universal banking licenses, borrowing from the European banking model. This universal banking model permitted the commercial banks to offer collateralized loans far in excess of equity securities, which exposed them to high levels of margin loans witnessed between 2007 and 2009. Nigeria's response to this financial turbulence was similar to that of the other countries that witnessed the government and central bank support programs for banks, which made provisions for government guarantees for all deposits and interbank lending, recapitalization, liquidity and the establishment of the Asset Management Corporation of Nigeria (AMCON), whose role was to buy back nonperforming loans from banks, thus allowing them to focus on intermediation activities rather than on managing toxic assets. These policy interventions were quite successful in averting systemic crises and enhancing the stability of the financial systems within the Nigerian banking industry by 2014.

Table 1 Closings of the Nigerian Deposit Money Banks, 1994-2015

1994	1995	1998	2000	2003	2006	2003	Total
4	1	27	2	1	13	1	49

Source: World Bank 2016, 19

The Nigerian Deposit Insurance Corporation (NDIC) is saddled with the responsibility for insuring deposits held in the vaults of the licensed banks and in other deposit-taking institutions, such as the Deposit Money Banks, Microfinance Banks and Primary Mortgage Banks, so as to boost public confidence in the Nigerian banking industry. The NDIC membership is compulsory for all deposit-taking institutions and it comprises all deposits, yet with certain specific exceptions to it. The coverage limit is variable, with the limits of ₦500,000 per account holder for the DMBs and ₦200,000 for the other deposit-taking institutions on a netted basis. The corporation is statutorily empowered to annually collect premiums from the member institutions and manage the Deposit Insurance Fund (DIF) set aside for the reimbursement of the insured deposits lost in the event of the failure of a financial institution and defray the costs of failure-resolution. It also has the authority to extend financial assistance or purchase the assets of an ailing bank outright, and also to

assume the receivership responsibility in the event of liquidation.

Recent legislative amendments have also enhanced the ability of the NDIC to liquidate banks and sell their assets in order to reimburse the depositors insured under the scheme. Given the fact that Nigeria's financial system strategy permits significant government intervention and support through open bank assistance to ailing financial institutions, the strategy aims to mitigate the collateral consequences of moral hazard by instituting timely corrective actions, which on their part might include supervisory intervention for solvent but poorly capitalized banks, setting limits for government lending and liquidity support to viable solvent banks and outright calls for the liquidation of all non-viable banks by the NDIC.

Empirical Review

There are several empirical and theoretical studies that have been conducted on the Deposit Insurance Scheme and moral hazard. Most of them are, however, concentrated abroad. In their study, G. Reint and V. Jukka (2001), examined the relationship between deposit insurance, bank charter values, the monitoring of the debt holder and risk-taking for European banks. Their findings revealed the fact that explicit insurance arrangements were more risk-prone when compared to the implicit ones. They advocate for the effective monitoring and faithful implementation of safety nets for the mutual benefits of all stakeholders. This view was further corroborated by U. W. Ani and A. Ogar (2018), who posit that, apart from moral hazard coming from deposit insurance, there were also the other factors hitherto overlooked, which accounted for the banking crises. They identified the mismanagement of not risk-taking as a factor that increased when insurance became a disincentive for depositors to monitor and react promptly to the soundness and safety of the DMBs.

In their study comprising 203 DMBs drawn from 10 Central and Eastern European countries, D. Isabella, R. Tchudjane, M. Amine and H. Tarazi (2011) discovered that the introduction of the explicit DIS in these countries actually incentivised higher risk-taking amongst the DMBs in their operations. This empirical opinion corroborates the views of A. Demirguc-Kunt and E. Detragiache (1999), and A. Demirguc-Kunt and E. Detragiache (2002).

H. Ngalawa (2011) studied the nexus between the DIS and banking instability, with an emphasis on the effect of moral hazard. They developed the empirical framework that differentiated the banking instability occasioned by bank runs from the instability caused by the insolvency of banks or their illiquidity. The study revealed a weak relationship between the DIS and moral hazard, although the result did invalidate the empirical findings that deposit insurance may result in a moral hazard, but opened up the areas neglected by other studies by distinguishing between the bank runs caused by illiquidity and insolvency from those triggered by careless risk-taking by bank managers, because of the existence of deposit insurance.

In their study comprising a relatively large sample of countries, Z. W. Calomiris and S. Chen (2018) discovered that the introduction of deposit insurance orchestrated higher debt-to-equity ratios and higher loan-to-asset ratios, which resulted in incessant bank defaults as a result of higher leverage and asset risk. A similar view was canvassed in the research study conducted by H. Ngalawa, F. Tchana and V. Viegi (2016) who argued that the costs imposed by moral hazard far outweighed the perceived benefits of deposit insurance.

D. Bonfim and J. Santos (2019) examined the Portuguese depositors' attitudes. After the adoption of deposit insurance in Cyprus, they discovered that the insured Portuguese depositors exhibited an inclination to reduce their savings in smaller, less profitable banks.

In their study, G. A. Sahadewo, B. M. Purwanto and R. Pradiptyo (2018) simulated laboratory experiments, involving actual bankers to assess the impact of the implementation of a differential premium regime on the bankers' attitude and found no significant relationship between the deposit offer rate and the coverage limit regimes. Equally, they found out that the coverage limits for the deposits had incentivized

smaller banks to take on more risky projects, thus evidencing moral hazard especially within small banks.

In Nigeria, K. Ume *et al* (2017) carried out a theoretical review on the phenomenon of moral hazard and harped on the necessity to institute deposit insurance as a financial safety net; those efforts, however, should be intensified so as to mitigate the untoward consequences of moral hazard, which is an unintended offshoot of the DIS implementation.

METHODOLOGY

The study is an *ex-post facto* research adopting a longitudinal research design, the population of interest comprising all 24 DMBs operating in Nigeria as at December 31st, 2017. The secondary data were sourced from the NDIC annual reports and accounts for the period between 2006 and 2017, as accounted for in Table 2. The employed data analysis method is statistical, through a descriptive analysis of the sourced data. The data collected for the study were analysed by applying multiple regression using the GMM estimation technique in order to test the formulated hypothesis. The validity and consistency of the results obtained in the system GMM technique depend on its statistical diagnostics of the estimated model.

Arellano and Bond Test of Hypothesis

According to M. Arellano and S. Bond (1991), the GMM estimator requires the existence of first-order serial autocorrelation, the AR (1) process, in residuals, but simultaneously the non-existence of second-order serial autocorrelation, the AR (2) process, in residuals. This test is particularly important since lags are used as instruments. This examines the hypothesis of the non-existence of second-order serial autocorrelation in a disturbance term. Hence, the null hypothesis of no first-order serial autocorrelation is rejected, but that of the second-order serial autocorrelation test is not rejected in order to obtain appropriate diagnostics. Therefore, the GMM approach can be regarded as consistent in the case when there is no significant second-order serial autocorrelation, the AR (2) process, in residuals.

Table 2 The asset quality indicators of the Deposit Money Banks in Nigeria 2006-2017

Year	Total loans and advances (TLA)	Nonperforming loans (NPLs) (₦ billions)	Ratio of nonperforming loans to total loans (NPLsTL) (in %)	Ratio of non-performing loans to shareholders' funds (NPLsSHF) (in %)
2006	2,840.1	225.08	7.92	22.5
2007	4,676.34	387.99	7.39	23.98
2008	7,411.43	-	6.86	25.46
2009	8,912.14	2,922.80	32.8	135.7
2010	7,166.76	1,077.66	15.04	250.85
2011	7,273.75	360.07	4.95	17.13
2012	8,150.03	286.09	3.51	14.34
2013	10,042.73	321.66	3.2	13.35
2014	12.626.96	354.84	2.81	12.01
2015	13,328.77	648.91	4.88	12.79
2016	16.26 trillion	2.08 trillion	12.80	43.84
2017	15.91trillion	2.36 trillion	14.84	69.21

Source: NDIC Annual Report (Several Editions) and Insurance & Surveillance Department 2017

F-Test of Joint Significance

According to this test, estimated coefficients on the regressors are jointly equal to zero ($P = 0.000$) at any conventional level of significance.

Research Hypothesis

The following hypothesis is formulated in order to achieve the objectives of this study:

H1: There is no significant relationship between the growth of the deposit insurance fund and a bank's volume of total loans and advances, nonperforming loans, ratio of nonperforming loans to the total loans and ratio of nonperforming loans to shareholders' funds.

Model Specification and the Operationalization of the Variables

Following the M. Arellano and S. Bond (1991) Generalized Method of Moments - GMM, a linear reduced form dynamic panel data model of the following pattern is specified, namely as follows:

$$y_t = \beta y_{t-1} + \delta' X_t + \varepsilon_t \qquad (3.1)$$

where:

y_t - the observation of the dependent variable denoted by the Deposit Insurance Fund, which serves as the proxy for moral hazard, and

X_t - the natural logarithm of the total loans and advances (TLA), nonperforming loans (NPLs), the ratio of nonperforming loans to the total loans (NPLsTL) and the ratio of nonperforming loans to shareholders' funds (NPLsSHF).

The regression model is specified below:

$$DIF_t = \alpha_0 + \alpha_1 TLA_t + \alpha_2 NPLs_t + \\ + \alpha_3 NPLsTL_t + \alpha_4 NPLsSHF_t + \mu \qquad (3.2)$$

where:

DIF_t - the deposit insurance fund of the DMBs in the year t

TLA_t - the total loans and advances of the DMBs in the year t

$NPLs_t$ - the nonperforming loans of the DMBs in the year t

$NPLsTL_t$ - the ratio of nonperforming loans to the total loans in the year t

$NPLsSHF_t$ - the ratio of nonperforming loans to shareholders' funds

μ - the error term

EMPIRICAL FINDINGS AND DISCUSSIONS

The first step is to determine the order of integration for each variable include in the study so as to find out potential correlations between the consecutive variables.

Table 3 above presents some basic statistics on the deposit insurance fund, the measure of moral hazard and the four measures of bank worthiness or the asset quality, which includes nonperforming loans, nonperforming loans to shareholders' funds, nonperforming loans to the total loans and the total loans and advances, as regards the financial sector. The mean value of nonperforming loans and total loans and advances (6.476) and (9.059), respectively, suggests that, for the selected period, national banks face a higher credit risk on average, as this is reflected in the deposit insurance fund's mean value (7.585). This implies that the aforementioned asset quality indicators portray an impending hazard to the deposit insurance fund, which in turn implies that, according to Table 3, nonperforming loans to shareholders' funds is below the required fixed maximum percentage, implying that the DMBs still maintain a high level of capital in relation to their risk profiles.

Table 4 shows a correlation relationship between the adopted variables. It is evident that nonperforming loans show a negative relationship with the deposit insurance fund, with the correlation coefficient value of (-0.329), which implies that increases in nonperforming loans will trigger a negative impact

Table 3 The summary statistics of the variables

Panel A: Summary statistics (without a log)							
	N	Mean	Std. Dev.	Min.	Max.	Jarque- Bera	Prob.
Deposit Insurance Fund (DIF)	12	440088.6	279348.9	90179.09	920776.0	0.944	0.623
Nonperforming loans (NPLs)	12	964.66	943.869	225.080	2922.800	2.557	0.278
Nonperforming loans to shareholders' funds (NPLsSHF)	12	53.430	71.674	12.010	250.850	12.540	0.001
Nonperforming loans to total loans (NPLsTL)	12	9.750	8.466	2.810	32.800	9.799	0.007
Total loans and advances (TLA)	12	9549.918	4221.590	2840.100	16260.00	0.542	0.762
Panel A: Summary statistics (with a log)							
Deposit Insurance Fund (DIF)	12	7.585	2.542	5.413	12.076	2.548	0.279
Nonperforming loans (NPLs)	12	6.476	0.896	5.416	7.980	1.387	0.499
Nonperforming loans to shareholders' funds (NPLsSHF)	12	3.425	0.993	2.485	5.524	2.023	0.363
Nonperforming loans to total loans (NPLsTL)	12	2.006	0.741	1.033	3.490	0.646	0.723
Total loans and advances (TLA)	12	9.059	0.507	7.951	9.696	0.974	0.614

Source: Author

on the deposit insurance fund, thus constituting a major risk to the financial sector. The nonperforming loans to shareholders' funds ratio suggests a negative correlation with the deposit insurance fund, with the correlation coefficient value of (-0.235). Also, the nonperforming loans to the total loans ratio shows a negative correlation with the deposit insurance fund, with the correlation value of (-0.169), and the total loans and advances show a negative correlation with the deposit insurance fund, with the correlation coefficient (-0.551). These suggest that increasing percentages/ratios constitute a potential hazard and risk to the financial sector. Banking regulations should essentially be aimed at cutting down excesses so as to reduce the disk profiles related to the Nigerian banking sector.

The results shown in Table 5 reveals the fact that not all the variables were stationary at the ADF adoption level. The ADF test applied to the first difference of the data rejects the null hypothesis of non-stationarity for all the adopted variables. Based on the foregoing results, it is worth concluding that the whole null hypothesis of the unit test process using the ADF is rejected and that the null hypothesis is accepted based on the Akaike Information Criterion (AIC) and the serial correlation diagnostic test from results of the unit root test.

Table 4 Correlation Matrix

	DIF	NPLs	NPLsSHF	NPLsTL	TLA
DIF	1.000				
NPLs	-0.329	1.000			
NPLsSHF	-0.235	0.481	1.000		
NPLsTL	-0.169	0.878	0.653	1.000	
TLA	-0.551	0.551	-0.071	0.081	1.000

Source: Author

Table 5 The results of the unit root tests

Variable	Augmented Dickey-Fuller Unit Root Test		
	At level (prob.)	First difference (prob.)	Decision
DIF	-1.294 (0.831)	-3.844 (0.077)***	I(1)
NPLs	-1.863 (0.606)	-3.413 (0.037)**	I(1)
NPLSSHF	-2.463 (0.334)	-3.302 (0.043)**	I(1)
NPLSTL	-2.175 (0.455)	-3.526 (0.031)**	I(1)
TLA	-2.306 (0.392)	-4.284 (0.048)**	I(1)

*significant at 1%, **significant at 5%, ***significant at 10%

Source: Author

The GMM estimates given in Table 6 indicate that the unlimited DIS in Nigeria is triggered by the ratio of NPLsTL, damaging the efficiency of the allocation of deposits. With the deposit insurance new legal framework, however, the insolvency risk of a bank has become less important to depositors since there is full coverage in place. Therefore, this process damages the credit allocation mechanism with an increased nonperforming loan ratio. Also, with the high coefficient value of nonperforming loans to shareholders' funds (that value being 0.580), it simply implies that most banks were reporting huge losses and that stakeholders' funds were completely erased by the nonperforming loan portfolio within the studied period. Despite the Central Bank's cash injection intended to recapitalize the ailing DMBs, the effective regulatory measures for stemming the inept corporate governance practises resulting in poor credit ratings and the nonperforming loan portfolio did not alleviate the issues. Table 6 shows that the reported number of the instruments across all of the estimations is 6 < 11 observations and the *p*-value of the Hansen J-test for all the estimations satisfies these rules. The F-test of the joint significance reports that the null hypothesis implying that the estimated coefficients on the regressors are jointly not equal to zero ($p = 0.175$) is accepted across all the estimations. Based on the AR (2) probability value of (0.596), the hypothesis on the non-existence of any serial correlation is accepted, implying the absence of the first-order serial correlation.

Table 6 The GMM test results

Dependent variable: LNDIF				
Variable	Coefficient	Std. Error	t-Statistics	Prob.
LnDIF(-1)	0.795	0.264	3.012**	0.023
LnNPLs	0.580	3.226	0.179	0.863
LnNPLsSHF	0.299	1.347	0.222	0.831
LnNPLsTL	-1.514	5.132	-0.294	0.777
LnTLA	-0.069	1.631	-0.042	0.967

Model Diagnostics
F-test of joint significance (p-value) = 0.175
Arrelano-Bond test for AR (2) (p-value) = 0.149 (0.596)
Number of Observations = 12
Number of Instruments = 6

*significant at 1%, **significant at 5%, ***significant at 10%

Source: Author

CONCLUSION

This study investigates the DIS and the moral hazard hypothesis in Nigeria. The Arellano and Bond (GMM) estimation technique was used to estimate and test the hypothesis on the DIS and moral hazard. The study spanned a period of 11 years, i.e. the period 2006-2017, and all the data were generated from reliable secondary sources. Deposit insurance is one of the elements of the government safety nets that are designed to maintain depositors' confidence by protecting their savings. The reason for the implementation of such schemes lies in the fact that problems in the banking sector may degenerate to systemic distortions in financial markets, which negatively impacts the real sector, ultimately hampering economic development. However, like

any insurance venture, deposit insurance comes with attendant challenges, such as moral hazard, adverse selection, or agency problems. If not timely arrested, these pitfalls portend inherent threats to the stability of financial systems as their negative impact may exceed any benefits derivable from deposit protection. Summarily, a poorly designed deposit insurance scheme may occasion systemic distortions of the entire financial system.

The most significant research findings presented in this paper are indicative of the fact that the adoption of the DIS in Nigeria has triggered off a high coefficient value of nonperforming loans to the total loans (NPLsTL), and of nonperforming loans to shareholders' funds (NPLsSHF), thereby hampering an efficient credit allocation, thus corroborating earlier studies conducted by D. Anginer and A. Demirgüç-Kunt (2018), and G. A. Sahadewo *et al* (2018). This implies that the majority of the banks were reporting huge losses and shareholders' funds were being rapidly eroded by the burgeoning nonperforming loan portfolio within the studied period. This scenario signposts a red flag for an urgent policy intervention by the Central Bank of Nigeria through a cash injection in order to recapitalize the ailing Deposit Money Banks and strengthen its regulatory measures so as to stem inept corporate governance practises in the DMBs. However, it must be noted that this research is limited in its scope to the extent that it did not appraise the relative effectiveness of the various Central Bank's policy interventions and the regulatory measures instituted for the purpose of mitigating the associated risks of the adoption of the DIS in Nigeria. Equally, there is an urgent need to ascertain the level of enforcement and compliance on the part of the DMBs. Hence the following research questions are considered as relevant for future studies on the DIS in Nigeria:

- How effective are the CBN's policy interventions and regulatory measures in curtailing the associated risks posed by the adoption of the DIS in Nigeria?
- What is the level of the enforcement of and compliance with these directives by the DMBs operating in Nigeria?

Therefore, it is recommended that governments should put in place banking regulation systems characterised by prophylactic rules, entry restrictions, activity restrictions, examinations and sanctions. In a similar fashion, stringent bank resolution techniques, including the prompt closure of critically undercapitalized banks, are crucial safeguards against moral hazard. Conclusively, this research aligns itself with the following measures espoused by P. A. McCoy (2007), which are geared towards reducing the risk created by the implementation of the DIS. First, there is an urgent need to incorporate risk-reducing mechanisms in all deposit insurance schemes. Second, there is a need for countries to incentivize shareholders, creditors and large depositors to closely monitor their banks. Third, and finally, these safeguards will be futile if there are no institutions to faithfully implement and enforce them. Unless countries put strong institutional environments in place, explicit deposit insurance schemes will portend more risks than benefits to the overall stability of financial systems.

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ADVANTAGES AND LIMITATIONS OF LINEAR AND NONLINEAR BREAK-EVEN MODELS

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The break-even point model is a well-known instrument for determining target production, income and costs for the purpose of gaining a zero profit. Although it is a concept that was present in the literature as early as in the late XIX century, the break-even point is applied in the contemporary business practice even today. This paper aims to demonstrate the advantages and limitations of the traditional (linear) and contemporary (nonlinear) break-even models. Particular attention is paid to the assumptions needed for a successful application of both models. The frequency of the use of the break-even point, limitations and assumptions were studied on a sample of 100 manufacturing enterprises in Bosnia and Herzegovina. The research study has revealed management's awareness of the potentials for applying the break-even point concept and the need to use the modern models that include assumptions pertaining to change in the key variables in the model. This results in the need to design such nonlinear, dynamic and stochastic models that best represent the dynamic conditions of contemporary business.

Keywords: break-even point, linear and nonlinear model, cost classification, application in Bosnian and Herzegovinian enterprises

JEL Classification: M210

INTRODUCTION

The subject matter of the research study conducted in this paper is the presentation of the break-even point concept and the analysis of the advantages and limitations of the application of the linear (traditional) and nonlinear (contemporary) models of the break-even point. The research study is aimed at presenting the applicability of these models in the business practice of Bosnian and Herzegovinian enterprises and the assumptions about their successful application.

The theoretical and applicative research studies were aimed at improving the theoretical basis of the models, diagnosing the actual conditions in the Bosnian and Herzegovinian business practice related to the application of the break-even point model, and the improvement of the implementation of break-even point analysis in business practice.

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Break-even point models are significant planning and controlling instruments related to making a series of business decisions. Based on the research study carried out in a hundred manufacturing enterprises in Bosnia and Herzegovina, the paper presents the frequency of the application of the break-even point in making the described business decisions, or more accurately in the analysis of business performance, making decisions on the cost-effectiveness of introducing new products in the product range, the replacement of the existing products with new ones, product recalls, making investment decisions, determining business liquidity and planning and controlling the existing results. The research results showed that, on average, the surveyed enterprises had assessed the analysis using the break-even point as a significant tool for making all described decisions.

The results of the theoretical and empirical research studies have revealed the existence of a series of assumptions about the successful application of the break-even point with a focus on the need to efficiently classify costs and analyze the nonlinearity of revenues and expenditures. Therefore, the second aspect of the research study was focused on the frequency, ways and problems of the cost classification, as well as the need to monitor and forecast the nonlinearity of revenues and expenditures.

The following hypotheses were tested:

H1: Break-even point models have a potential for a broad applicative use in the business practice of Bosnian and Herzegovinian enterprises, regardless of their size and sectoral affiliation.

H2: An efficient cost classification, as well as the awareness of the existence of the nonlinearity of revenues and expenditures, contributes to the successful application of the break-even point.

H3: Managers have problems when classifying costs and estimating future revenues and costs and their (non)linearity.

The analysis and interpretation of the results is based on descriptive statistics.

The paper consists of the theoretical presentation of the break-even point (Chapter 2) and the presentation of the traditional (Chapter 3) and contemporary models of the break-even point (Chapter 4). Particular attention was paid to the assumptions about the application of such traditional and contemporary models. The paper ends with the empirical presentation of the research results (Chapter 5) and a concluding discussion.

BREAK-EVEN POINT CONCEPT

The break-even point (the cost-efficiency threshold, the profitability threshold, the zero point, the dead point, a CVP analysis) is a situation in an enterprise's business when its sales income (operating income, i.e. production value) becomes equal to the costs incurred in the production of the given products (Kilger, 1993, 802).

The break-even point primarily implies the quantity of the products that an enterprise has to manufacture and sell in order to cover its costs. The break-even point defined in this way is a natural expression of the described concept. It also implies the existence of homogenous production, i.e. the production of a single kind of a product. The break-even point may also be understood as the degree of the capacity utilization necessary for manufacturing a required quantity of products. Besides, business operations, i.e. reaching a cost coverage at a lower degree of the capacity utilization, implies an efficient use of resources, i.e. it creates room in the enterprise for it to utilize a greater part of the remaining capacity in order to gain a profit. The transformation of the break-even point into value indicators requires the presentation of production by means of the income necessary to cover the costs, a coverage contribution, i.e. a profit margin, etc. Naturally, beside the algebraic way of presentation, the break-even point can be presented graphically as well. The basis for both the graphic presentation and the mathematical calculation of the break-even point and a number of supplemental (derived) indicators can be found in traditional economic theories, classical and neoclassical theories.

The break-even point is a significant instrument for strategic planning related to making decisions on the quantity of the products that need to be produced and sold so as to cover costs. However, it is also used in making decisions on the depth and scope of the product range, change in the sale price, cost management, investment decisions (Nikolaevič, 2015, 18), namely in all interfaces between benefits and costs, or the "what-if" scenarios pertaining to making decisions on business alternatives (Gean & Gean, 2015, 127).

Apart from the above-said, an analysis using the break-even point provides managers with an insight into the size and relations among its key categories: the cost structure, the production volume and a profit (Gean & Gean, 2015). It is the analysis using the break-even point that helps an enterprise achieve its target profit, since the goal of the analysis is not "the achievement of the break-even point, but rather the maximization of the periodical business result." (Janjić, Todorović i Jovanović, 2010, 561) The break-even point, i.e. its analysis, is also applicable in the determination of an enterprise's liquidity (Mehar, 2005, 259-271) and financial position.

That revenue, cost and profit factors (CVP factors) can affect the financial structure of a firm is accepted in the finance literature (McCabe, 1979, 119-135; Myers, 1984, 575-592; Welch, 1994).

Besides, the analysis using the break-even point is also used when making operational decisions and in the process of short-term decision-making (Kondratova & Umrikhina, 2014, 28-35).

Since the application of the break-even point is related to taking into account a number of assumptions and limitations, some authors consider it to be "an instrument for exclusively short-term business decision-making in situations of an insufficient capacity utilization within a stable economic environment" (Riznić i Marjanović, 2011, 713). These authors believe that the analysis using the break-even point is a suitable basic quantitative instrument for making short-term decisions due to its sublimity and the transparency of the presentation of the basic business parameters, such as revenues and costs. The authors, however, problematize the assumptions that form the basis of the traditional break-even point model, which will be discussed in more detail in Chapters 3 and 4. The cost structure (Janjić *et al*, 2010), as well as the way of accounting the calculation of a profit, (Riznić i Marjanović, 2011) also have a significant influence on the applicability of the break-even point in an enterprise's business practice. The total costs composed of either dominantly fixed or dominantly variable costs will differently respond to a change in the production volume, and therefore to the construction of the break-even point (Janjić *et al*, 2010, 561). Besides, the analysis using the break-even point must take into account the coverage of all costs and the way of their categorization into the fixed and the variable components (Underwood, Bush & Heath, 2009, 13-22). The analysis needs to take into consideration these assumptions (Guidry, Horrigan & Craykraft, 1998, 74-86). The analysis of the break-even point becomes even more complex in the case of the existence of several products, different production technologies, the nonlinearity of revenues and costs, and the uncertainty of business doing (Chung, 1990, 1311-1328; Chung, 1993, 583-592), which in turn implies the possibility of the existence of more than one break-even point for the different values of the basic categories of a CVP analysis (Yunker, 2001, 127-149). These issues will be discussed in more detail in Chapter 4.

TRADITIONAL BREAK-EVEN POINT MODEL

Classical and neoclassical theories and assumptions about designing the break-even point

When elaborating the traditional model of the break-even point, economic theoreticians started from a number of determinants originating from classical or neoclassical enterprise theory. What both theories have in common is that they are based on the view that there is no uncertainty and unpredictability. Business conditions are invariable, i.e. known in advance and foreseeable, for which reason decision-makers may be fully, perfectly informed. Decision-makers

have timely and correct information on all possible alternatives and are not time-limited in the decision-making process. Apart from that, decision-makers behave rationally, i.e. they are able to rationally decide and select the best solution. Managers, therefore, have no problems in choosing the most favorable alternative. The selection of the most favorable alternative is, on its part, related to the achievement of the main and only goal in the enterprise, namely the maximization of a profit (Sikavica, Bebek, Skoko i Tipurić, 1999, 83).

However, there are differences between classical and neoclassical theories. Classical theory assumes the existence of a single objectively correct decision, whereas neoclassical theory assumes the existence of several potentially correct decisions, only one of which is the best (Sikavica *et al*, 1999, 51). The best decision should result in the maximization of a profit, whereas such maximum profit is gained in the situation when, i.e. with the production volume at which, marginal income and marginal costs become equal. The described marginal principle of microeconomics applies to both short- and long-term profit maximization. Short-term profit maximization implies a profit maximization in the long term (Nikolić, 2000, 369-371). The treatment of the long-term as a simple sum of the individual short-term periods of business doing is possible since, let us not forget that fact, the basic assumption of the described theories says that there is no change in business conditions.

From the assumptions of classical and neoclassical theories related to market invariability and the stability of the internal and external environments, a profit maximization as the main goal, perfect information and the rationality of decision-makers and the equalization of the short- and long-term ways of decision-making, the assumptions of the traditional break-even point model are derived (Keat & Young, 2003, 184).

The assumptions pertaining to the traditional model are as follows:

- Total costs only consist of absolutely fixed and proportionally variable costs and, therefore, develop linearly;
- The total income is equated with the value of the realized production;
- There is no change in the manufacturing capacity, the product range and market prices;
- The enterprise's economic result is only affected by a change in the quantity of manufactured products;
- All values are observed in a short period of time.

Total costs only consist of absolutely fixed and proportionally variable costs and, therefore, develop linearly. Total costs only consist of the two components: absolutely fixed and proportionally variable costs (Šunjić-Beus, Stavrić i Berberović, 2005, 161). Fixed costs do not change with changes in the degree of the capacity utilization and their level is determined when the manufacturing capacity is put in place. It is assumed that the capacity is not expanded and thus relatively fixed costs are nonexistent. Variable costs - the costs of the basic and accessory materials, labor in production etc. - must also be directly proportional to the realized production volume. Thus, variable costs must be proportionally variable. There are no progressively variable, digressively variable or relatively fixed costs, i.e. in the event of a possible occurrence of the listed cost components, special procedures of linearization are used in order to reduce them to the linear components - proportionally variable and absolutely fixed. This is the reason for the assertion that the function of total costs is always linear and that the cost structure is invariable. These assumptions related to the linearity and invariability of the structure were aimed at avoiding a complication of the model, which would occur on the occasion of establishing and forecasting the course of relatively fixed costs and unproportionally variable costs. Besides, the linearity of the total cost function allows for a simple determination of the cost level and structure for an unknown, greater production volume, and the simpler monitoring and control of the cost level.

The total income is equated with the value of the realized production. The total income is treated as the value of the realized production and calculated as the multiple of the produced and sold products and the sale price.

Thus, only regular, operating income, i.e. the income generated through the sales of the final products, is taken into consideration. Extraordinary income is not taken into account, and neither is financial and capital income, since their inclusion in the model would make the design of the break-even point difficult. Besides, it is assumed that the enterprise does not own stocks of such final products, i.e. that all manufactured products were sold on the market in the same period. The described assumption allows for the determination and comparison of all the revenues and costs of the same period. It is also assumed that the price at which products are sold on the market in the observed period is fixed. The size of the total income, therefore, only depends on the quantity of the products sold on the market. This relationship is directly proportional, i.e. an increase in the sales of products for one unit will result in an increase in the total income for one unit.

There is no change in the production capacity, the product range or market prices. Theoreticians assume that no change will occur in the size and degree of the utilization of the production capacity. For this reason, there are no relatively fixed costs, i.e. fixed costs are constant. It is also assumed that there is no change in the product range. The invariability of the capacity and the product structure results from the assumption that there are no significant changes in market supply and demand for products, or changes in consumers' preferences. Theoreticians go a step further, and in order to construct the break-even point model more easily, they assume the existence of homogenous production, i.e. only one kind of the products that the enterprise manufactures. Moreover, both the sale prices for the final products and the purchase prices of production factors are invariable. Therefore, the functions of, primarily variable, costs are proportional to the volume of the realized production.

The enterprise's economic result is only affected by a change in the quantity of the realized products. Consequent to the described assumptions of the invariability of the capacity, the sale price, the structure of the product range, the nonexistence of financial and extraordinary income and costs, a change in the level of costs and income is only due only to a change in the quantity of manufactured and sold products. It has already been pointed out that the total income and costs are only equated with operating income and costs.

All values are observed in a short period of time. All income and costs are observed in a selected, short-term period. Each observed period is viewed in isolation and a long term is only a sum of numerous short periods. Basically, it means that the neoclassical theory does not recognize the long term. The short term is a fundamental prerequisite for the capacity, sales and demand, sale and purchase prices, the product mix and consumers' preferences to be constant. A short term is also a prerequisite for a linear course of the function of the total income and total expenses. Indeed, theoreticians believe that, over a shorter time period, one can detect the production interval in which costs and income really behave linearly. In the literature, such an interval is called the relevant range.

Based on the described assumptions, the traditional break-even point model presented in Figure 1 can be constructed.

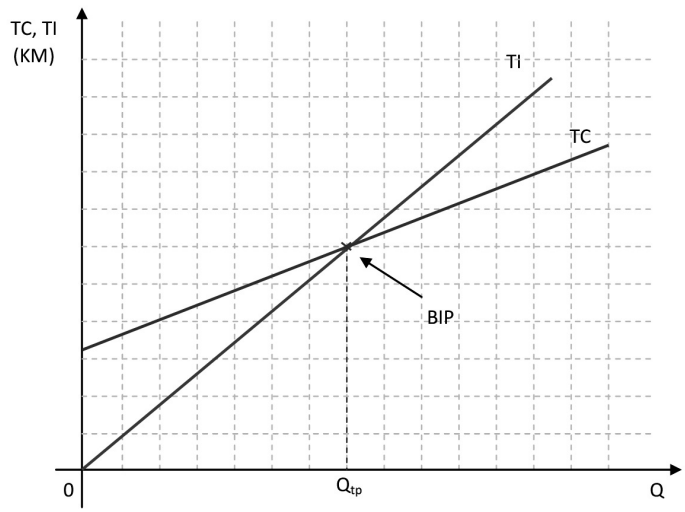
Cost classification

In order to successfully construct the break-even point and carry out a corresponding analysis, it is necessary that costs should be classified into their fixed and variable components, respectively. A successful cost classification relates to a prior detailed analysis aimed at determining cost behavior. According to most economists, determining cost behavior is the biggest problem in designing an analysis using the break-even point.

Assumptions about a successful cost classification

G. Riedel (1975, 28) lists the three assumptions about a successful cost classification into fixed and variable components:

- costs should be classified based on the type of a cost and the point at which a cost was incurred (cost centers);



TI – the total income, TC – total costs, Q – the quantity of the realized products, Qtp – the quantity of the realized products at the break-even-point, BIP – the break-even-point

Figure 1 The traditional break-even point model

Source: Santini, 1999, 174

- the classification should begin from secondary cost centers;
- whether the fundamental assumptions relate to the manner in which costs were incurred, i.e. if cost drivers still apply, should be examined;

Costs should be classified based on the type of a cost and the point at which a cost was incurred (cost centers). This assumption forms the basis for a successful cost classification since it is necessary for the determination of a number of facts, such as: that individual cost centers have different cost "burdens", i.e. that they participate in total costs in different percentages, and also that different measurement units are used for expressing individual parts of the capacity, i.e. cost centers (e.g. kilograms, tons, hours, etc.). Besides, individual types of products are often manufactured in different varieties, i.e. their structure and composition change. It is also a fact that individual types of costs differently respond to changes in the degree of the capacity utilization in different cost centers (Riedel, 1975, 28-29). Due to all of the listed facts, it is necessary to be very much cautious when determining the cost center and the nature of particular types depending on cost centers, cost bearers, and the way to respond in an individual (different) situations.

The classification should begin from secondary cost centers. The identification of costs in secondary (nonmanufacturing) cost centers (the service department and overheads) and their transfer to primary (manufacturing) cost centers is a standard procedure for a cost calculation and defining the cost price of the final products in cost accounting. Before the very procedure of transferring costs to primary cost centers, it is necessary to accurately classify the costs of secondary centers into their fixed and variable components and add fixed components to the fixed costs of manufacturing centers and variable ones to the variable costs of the manufacturing plant.

The examination of the fundamental assumptions related to the way in which costs were incurred and cost drivers. It frequently happens that the once established

assumptions and measurement units related to cost drivers are not subjected to critical examination, and as such are used over years. Naturally, changes in market conditions, the way of business doing and applied technologies require occasional reviews of the defined base values and their correction to a lesser or greater extent (Martinović, 2013, 42-45).

In his theoretical discussions, J. Dean (1952) also pays particular attention to the prerequisites that must be satisfied in order to classify costs successfully, particularly so in the conditions of a variable environment. He believes that (Dean, 1952: in Martinović, 2013, 42-45):

- obtaining relevant business data requires the selection of the year's period to be observed. Besides, one should bear in mind that the selected observation period should be typical, i.e. relatively stable, and that it should best reflect the trends of the key variables. Naturally, data comparability is important as well.
- when selecting factors for the analysis, one should be careful about the selection of the fundamental categories - income, costs and the production volume - and the significant factors that have an effect on the listed components. For the sake of obtaining comparable data, it is often necessary to simplify the model components, naturally not at the expense of the accuracy and relevance of the results.
- the issue of measuring the level of activities is related to monitoring and classifying costs in enterprises with a significant depth and breadth of the product range. The use of input and output indices is one of possible solutions.

Cost classification methods

There are different methods for cost classification. In economic practice, there is a mention of the application of different calculation methods, statistical tools, bookkeeping records and estimates and graph techniques. We will opt for the following classification of the methods, which includes:

- Experience-Based Observation and Estimation Method,
- Bookkeeping Method, and
- Mathematical-Statistical Methods.

The frequency of the application of these methods was empirically studied in a research study conducted in Bosnia and Herzegovina. This topic will be discussed in more detail in the empirical section of the paper.

Experience-Based Observation and Estimation Method - The observation and estimation method attempts to estimate the nature of each individual cost and the way it responds to a change in the production volume. Cost observation and estimation are closely related to the decision-maker's experience and rely upon data bookkeeping and accounting. It is for this reason that this method is discussed as a whole with the bookkeeping method. Some theoreticians consider these two methods as a single one. "*Indeed, both methods are founded on the estimation of the cost nature based on their behavior with respect to a change in the production volume, i.e. the size of the utilized capacity. The estimate is related to decision-makers' previous experience in monitoring costs, and to the ability of the accounting system to monitor and analyze costs*" (Riedel, 1975, 36). Some theoreticians believe that observation is used if there are usual, regular costs, whereas estimation is used in the situation of forecasting future costs, as well as unusual, extraordinary costs. This method is considered to be one of the simplest.

Bookkeeping Method - The continuous and thorough monitoring of business developments and the analysis of an account in the ledger book are aimed at breaking down total costs into fixed and variable. In the process, semi-variable and relatively fixed costs are broken down into their absolutely fixed and absolutely variable components, respectively. Its success requires the following conditions to be met (Riedel, 1975, 198):

- the continuous and detailed accounting monitoring of business developments and changes, and a detailed accounting analysis; in this respect, a detailed cross-section of accounts in the ledger on the same basis in a period longer than one year is required;

- relative invariability in the level of salaries, material prices, the capacity size, technology, etc.;
- an experience with the high level of the fluctuation of the production volume.

Mathematical-statistical methods - They are considered to be the most exact methods for cost classification and linearization and for designing dynamic and statistical break-even point models. There is a great number of mathematical-statistical methods: the interpolation method, the trend line method, the least square method (Turk, 1971; Markovski, 1983, 82-91), statistical analysis, the engineering approach (Dean, 1952, 195); the algebraic and graphical methods (Riedel, 1975, 29).

Economic theoreticians believe that none of the listed cost classification methods is sufficient and that combining the given methods is required for obtaining the best results.

MODERN BREAK-EVEN POINT MODELS

The traditional break-even point model assumed the invariability of the cost structure and level, the existence of only the nonlinear cost components and, among other things, the invariability of the sale price. In reality, however, these assumptions only apply to the short term. Over a longer time period, it is realistic to expect a change in costs, the emergence of the nonlinear components, a change in the sale price, and so forth.

Assuming a possibility of a change in the listed key variables the traditional break-even point method relies on leads us to the designing of complex, i.e. modified forms of the break-even point, in which case the break-even point models that include (Schweitzer & Trossmann, 1998, 55-56):

- change in fixed costs,
- change in variable costs,
- change in the sale price, and
- the nonlinear structure of income and costs.

The listed models originate from the modern economic theories - behavioral and situational theories - which assume the existence of uncertainty and risk in business doing. Uncertainty and risk mean that an enterprise's environment is variable, i.e. in designing a break-even point model, a change in the key indicators that the concept of the break-even point relies on must be assumed. This leads to modifications related to a change in fixed and variable costs, the sale price, the product range, the cost structure, and so on. In the continuation of the paper, the most complex form of the model modification - the nonlinear break-even point model - is explained.

The break-even point model assuming the nonlinearity of the cost function and the income function

The traditional break-even point model assumes the existence of the linear course of the development of the total income and costs. This assumption can also be applied to contemporary business conditions, though with the assumption of a relatively stable environment and the observation of values in the short term. In this case, when functions are linear, it is relatively easy to design the break-even point, i.e. it is relatively easy to forecast its development in the future. However, if the existence of the nonlinear course of the development of the cost function and the income function is assumed, the calculation of the break-even point for the enterprise becomes more complex, although the theoretical calculation principle remains the same: the break-even point is still the point at which the curves of costs and income intersect. Complexity is reflected in the fact that an enterprise may have problems in planning the break-even point given the fact that it can hardly forecast the development of total costs and the total income due to the nonlinearity of their constituent components.

Thus, if it is assumed that total costs consist of both absolutely fixed and proportionally variable costs and progressively and digressively variable and relatively fixed costs, the result will be the nonlinear course of the development of total costs. However, the nonlinearity of the income function is not a rare

phenomenon, either. Enterprises often make a price differentiation for a known client or approve such a client a quantity discount. Besides, in order to gain competitive advantages as a form of a competitive struggle, companies often resort to the so-called price competition.

Enterprises strive to eliminate competition, prevent new competitors from entering the market, increase or maintain their market share by lowering the prices for their products. Lowering prices is also frequently related to the so-called product life-cycle. The products that have been on the market for a long time and are no longer attractive to buyers are sold at lower prices. A sale at low prices is also very frequent in the situation when an enterprise changes its product range, i.e. when it removes some products from it or wants to sell, i.e. get rid of the surplus stocks or slow-selling stocks from the warehouse. A sale of products at lower prices is frequent in the enterprises that are trying to penetrate a market, i.e. in those striving to gain as great a market share as possible or attract customers to buy their product which is brand new on the market or which has a characteristic (functional, design-related, etc.) distinguishing it from those launched by the competition. In this case, we speak about lowering the sale price. Besides, an enterprise may decide to increase the price for such products if it believes that its products are characterized by the top performance, i.e. if they offer customers a better way to satisfy their needs compared to the competition. In the same vein, the companies that sell luxury products intentionally launch products at higher prices due to the profile of the customers who are willing to pay more if a product will raise their status and become a status symbol (luxury cars - a Porsche; bags - a Louis Vuitton; diamond jewelry).

The enterprises that do not have competitors (monopolies) or manufacture specific products unique on the market opt for higher prices for their products. Naturally, the management of an enterprise may increase their prices in order to increase the total income independent of the enterprise's position based on market research and the business strategy. In any case, regardless of whether companies decide to increase or decrease prices for their products, the aim of an upward or downward price correction should be achieving an increase in the total sales income and gaining the target profit. However, the management of the enterprise are never sure that the correction of their prices will achieve the said goal. A price decrease may result in a loss, the same as a price increase may lead to a decline in the sale of a product and lower income.

Naturally, all these options and results make the exact graphic presentation and forecasting of the break-even point more difficult. The income function may decline and grow, i.e. it may behave in different ways, depending on the business policy, decisions on decreasing or increasing prices and the different ways in which the market and customers respond to these changes. In the same manner, the cost function can have a relatively unpredictable course of development.

However, if we assume that the function of total costs undergoes the three known zones, namely the digression, optimality and progression zones, respectively (Bogetić, 1995), on the one hand, and that a decrease in the total income, i.e. the fact that digression accompanies a higher degree of realization (which is the most frequent case in practice due to lower demand, i.e. market saturation with products), on the other, the lower and upper break-even points can be presented by means in Figure 2.

The Figure 2 shows a decline in income and a nonlinear increase in costs at a higher degree of the capacity utilization. However, business decisions and operations in the enterprise may be closely mutually related and affect each other. Their mutual dependence may result in significant corrections in the break-even point model since they may affect the components of the total income and total costs, respectively, in different ways. The described changes of the income and the cost components over time testify to pronounced issues in the calculation of the exact break-even point in enterprises in contemporary business conditions.

We can conclude that there is not one single production volume where total costs and the total income become equal; there are rather two volumes,

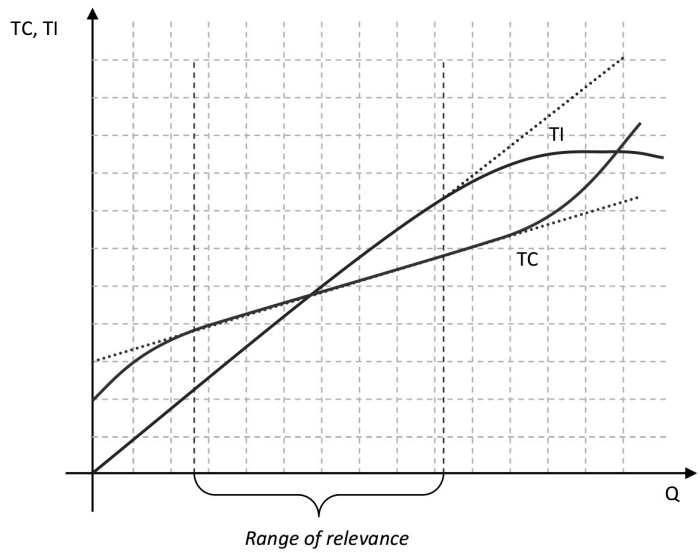


Figure 2 The break-even point with the nonlinear course of the development of the total income and costs

Source: Dvorski i Luža, 2007, 189

instead, and the accurately defined production range where business doing is economical - between the two described intersections of the functions.

The most favorable situation for an enterprise occurs both when the lower break-even point is achieved at the lowest possible degree of the capacity utilization and when the span between the two break-even points is great. This situation implies a high degree of business certainty and leaves enough room for the management to make business decisions on production, sale, sale prices, etc.

If an enterprise operates between the two break-even points, it achieves a positive financial result. Operation at a degree of the capacity utilization higher than the upper break-even point and lower than the lower break-even point implies a loss.

In the former case, the loss results from the high fixed costs that cannot be covered with the income from realized production, whereas in the latter, it results from the progression of the (variable and relatively fixed) costs that exceed the level of the gained income.

Beside these break-even points, the third such point, the so-called optimum point, is described in the literature. This point is found between the lower and the upper break-even points, and represents the situation when unit average and marginal costs become equal, and the unit financial result is maximum (Majcen, 1971, 116-146).

Assumptions about the application of modern break-even point models

When discussing assumptions about a successful cost classification, theoretician J. Dean (1952, 200-203) attempts to answer the questions as to how to successfully analyze different factors and simplify calculations with the smallest possible errors and deviations. He creates the conditions for constructing modern variants of analysis using the break-even point based on dynamic factors and uncertainty factors.

A successful analysis of the break-even point and the cost classification itself requires appropriate answers to the following questions (Martinović, 2013, 111-119):

- How to select the observation period?

- Which factors should be taken into account during the analysis?

Selection of the observation period

That the selected observation period should not be longer than one year has already been indicated. Apart from that, when selecting the observation period, the following should be taken into consideration (Dean, 1952, 200):

- the selected period should best reflect the necessary stability in the cost behavior and the level of the cost fluctuation;
- accounting data must be comparable during the period of the analysis;
- there must be independent fluctuations in demand and the production volume in order to allow a broad area for the observation of both types of costs and the volume;
- the number of such selected units of analysis (statistical units in the sample) - most often months - must be such that the same allow for conducting a valid statistical analysis.

Thus, these requirements refer to the need for the selection of a sufficiently long observation period, in which the relationship between the production volume and costs would be relatively stable, i.e. the one in which the occurrence of the extraordinary circumstances causing the emergence of unusual, unplanned costs would be minimized. These requirements are, naturally, aimed at establishing the standard values of costs and their nature, excluding various deviations in the cost behavior, so as to allow their classification aimed at achieving more successful management.

Essential factors and the type of the estimate contained in data

Upon defining the cost observation period, one question should be posed: what should be estimated, i.e. which factors should be taken into account when monitoring costs?

Indeed, as has already been indicated, it is necessary to profile the obtained data in order to eliminate different kinds of deviations. J. Dean (1952) discusses different kinds of corrections in raw data. However, a certain caution is necessary in the very procedure of singling out costs and their elimination, since it may happen that such an elimination includes the values significant for a certain phenomenon or signalizing some future phenomena and events.

In this respect, J. Dean (1952, 200) says: "*The attempt to fully remove causes of data distortion in the costs-production relationship is expensive and time-consuming. Therefore, shortcuts using the same basic statistical method for bridging some of the described distortions are mostly welcome in developing the analysis using the break-even point. However, it is still dangerous to make small cuts without knowing where it leads. It is necessary to understand the steps - corrections that must be simplified or eliminated.*"

A number of problems and difficulties may arise when correcting raw (collected) data. We will list the common (Dean, 1952, 201):

- determining the basis for valuation, i.e. the basis for a cost estimate,
- selecting the costs included in the analysis,
- correcting cost and price values,
- estimating the time gap between recording - information on costs, and the output which contains costs, and
- estimating special and nonrecurring data.

The determination of the basis for a cost valuation/estimate implies a periodical review and correction of the cost estimate and monitoring. When an enterprise operates in a turbulent environment, it is necessary that the estimate of the cost level and the course of development in the future and future prices should be included in the break-even point analysis. Managers should construct several kinds and variants of analysis using the break-even point, based on both the present and planned data and projections of the development of the sale and purchase prices.

The selection of the costs that will be included in the analysis. The traditional break-even point model implies the inclusion of the costs of the absolutely fixed and proportionally variable character in the analysis, i.e. the linearization of the nonlinear components. Modern break-even point models imply the inclusion of the nonlinear components in the analysis as well. However, since the break-even point can be defined in different ways and for different purposes, the selection of costs is made based on the desired goal. Different purposes require different concepts of costs and different graphs of the break-even point. The greatest flexibility in modifying a graph so that it can serve its purpose will be achieved if components are analyzed individually, so that they can be combined according to the need - the purpose and needs of the concept, and included in the construction of different analyses using the break-even point. A problem may arise when individual types of costs are included in the analysis, particularly those that have a semi-variable character and a dominantly fixed character. In this case, it would be desirable to break down such individual types of costs and relate them to the given activity, the cost driver. Thus, it would be useful to determine the part of each individual cost that has a dominantly fixed or a dominantly variable character, not necessarily according to the production volume, but rather according to the level of the given activity. It is generally believed that it would be desirable to construct several individual break-even points for each managerial unit and only include in the analysis the costs that are controllable at that managerial level. If the income function is included, only the profit gained and controllable at that level should be taken into account.

The correction of the changes in the cost price (costs) made in the past. In the analysis using the break-down point, a problem may include the effects of a change in the purchase price of production elements - the object of labor and labor itself - on the total costs or individual cost components. One of the possible solutions would be to relate such costs to the measures of the activities expressed in physical measurement units or in the base monetary values. However, there is a problem in the situation when individual cost types are expressed in several different measurement units. The best cost correction would resort to the monitoring of individual cost components and the factors affecting them as the basis for determining which prices affect which factors. Automatically, a change in corresponding prices would directly affect the corresponding cost components. Thus, a correction should be made in each cost component for a change in the related price. These corrections are aimed at allowing for a comparison of all costs expressed in the monetary units of the same value, e.g. in dollars in 2018.

A late estimate - the estimate of the time gap between the moment of manufacturing the final products, the cost center and obtaining data about costs. In this case, it is necessary to synchronize costs with the belonging production volume.

Theoreticians believe that this problem in both the cost analysis itself and the break-even point analysis is not paid due attention to (Markovski, 1983, 228-230). It is particularly important to bear in mind the time synchronization of production and costs in situations when:

- there is a longer time period of observation when it is essential to determine the individual characteristics and types of costs;
- the length of the production cycle is compared with the length of the period of cost recording;
- (the break-even point analysis) uses input or output indices.

Nonrecurring costs - one-time costs - The next problem in cost analysis and conducting a realistic analysis using the break-even point is the emergence of unplanned, extraordinary costs. One-time costs disturb data on costs and make them an unrealistic basis for the projection of relationship costs - the production volume. It would be best to use estimates and previous experiences as the basis for their elimination from the mass of total costs. However, the problem is in their connection with other costs, as well as the dilemma related to their "one-timeness ". Indeed, the costs that were incurred extraordinarily and are unplanned can be treated as the costs incurred occasionally, or only in extraordinary circumstances. However, the

question arises if this is really the case, i.e. whether an enterprise will face certain types of unplanned costs more often in the future. Thus, their nonrecurrence and unrepeatability are questionable, and their one-timeness and unrepeatability become questionable. Besides, determining untypical data itself may also be a problem, particularly so in the enterprises where each period seems untypical (Martinović, 2008).

"*Learning costs and error costs should be eliminated using historical data. However, it is difficult to do in practice. Each period seems untypical. At times, the use of scatter diagrams with the sound knowledge of the facts that occurred over a month may result in singling out untypical data. However, this procedure is risky and may lead to extremely subjective conclusions*" (Dean, 1952, 203).

AN EXAMPLE FROM BUSINESS PRACTICE

The research into the application of the traditional and modern break-even point models was conducted on a sample of 100 manufacturing enterprises in Bosnia and Herzegovina through verbal surveying and in-depth interviews. The questionnaire consisted of 25 survey questions, grouped into the five areas examining the role of the break-even point in an enterprise, the way of organizing and designing the analysis using the break-even point, the implementation obstacles in conducting the analysis, the areas of the application of the break-even point, and the dynamic and stochastic aspects of the analysis and its application in solving complex business problems. The large enterprises accounted for 18% of the sample, whereas the small accounted for 43%. The other enterprises belonged to the category of medium-sized enterprises. The survey included 66 enterprises from the Federation of Bosnia and Herzegovina and 34 enterprises from the Republic of Srpska. The obtained results were processed by applying the descriptive statistics methods.

Research results

Of all the surveyed enterprises, 57% regularly applied the analysis using the break-even point, whereas 25% of them applied it occasionally. The frequency of conducting the analysis using the break-even point in Bosnian and Herzegovinian enterprises (as per industry) is shown in Table 1 (Martinović, Veselinović i Mangafić, 2019).

The enterprises that applied the analysis using the break-even point occasionally (25% of the respondents) or regularly (57% of the respondents) highlighted the following essential or extremely essential purposes, namely: the role of the break-even point in the business performance analysis (54%); making a decision on the cost-effectiveness of introducing new products (46%); the replacement of the existing products with new ones (51%); phasing out the production of certain products (44%); making investment decisions (56%); determining liquidity (49%); and the planning and control of the existing results (48%).

The research has confirmed the assumption that managers are aware of the concept of the break-even point and its potentials. Irrespective of the geographical distribution and the industry, the majority of the enterprises apply the break-even point as a useful instrument for determining the necessary quantity and the value of the realized products needed to cover incurred costs.

The research has confirmed the research hypothesis H1.

A successful application of the break-even point model depends on a number of assumptions; therefore, the theoretical section of the paper highlights the issue of a proper cost classification (the modalities of separating costs), as well as the awareness of the existence and frequency of the nonlinearity of revenues and costs.

In this respect, the hypotheses H2 and H3 were tested.

The tabular presentation of the respondents' replies pertaining to the listed hypotheses, i.e. to the frequency of costs classification, problems at classifying costs and the way to classify costs, is given below (Tables 2, 3 and 4).

Table 1 The frequency of conducting the analysis using the break-even point

Do you conduct the analysis using the break-even point in your enterprise?	Yes	Occasionally	No	Total
Textile industry	8 (53%)	4 (27%)	3 (20%)	15 (100%)
Furniture production	8 (50%)	7 (44%)	1 (6%)	16 (100%)
Production of milk and dairy products	4 (50%)	2 (25%)	2 (25%)	8 (100%)
Mineral water production	2 (100%)	0 (0%)	0 (0%)	2 (100%)
Bread and pastry production	12 (67%)	2 (11%)	4 (22%)	18 (100%)
Production of builders' joinery	2 (75%)	1 (25%)	0 (0%)	3 (100%)
Production of builders' joinery and elements	6 (86%)	1 (14%)	0 (0%)	7 (100%)
Building material production	2 (67%)	1 (33%)	0 (0%)	3 (100%)
Production of nonalcoholic beverages	3 (75%)	1 (25%)	0(0%)	4 (100%)
Production of concrete products	3 (50%)	1 (17%)	2 (33%)	6 (100%)
Wood-processing industry	2 (40%)	0 (0%)	3 (60%)	5 (100%)
Other manufacturing industries	5 (38%)	5 (38%)	3 (24%)	13 (100%)
Total:	57 (57%)	25 (25%)	18 (18%)	100 (100%)

Source: Author

The research results (Table 2) revealed that over one-half of the respondents (55%) had noticed the need to classify costs for the purpose of their easier monitoring, i.e. for the needs of constructing the break-even point. As many as 80% of the respondents (Table 3) pointed out the fact that they faced the problem of cost classification, particularly so when costs are mixed (nonlinear, semi-variable), and if there are mixed costs in the production of several types of products. With respect to cost classification methods (Table 4), the bookkeeping method - i.e. using bookkeeping data and records to classify costs - prevails. The methods of experience-based estimation and the mathematical-statistical method and specialized software were used to a lesser extent.

Tables 5 and 6 provide a tabular presentation of the respondents' replies pertaining to the listed hypotheses, i.e. to the existence of the awareness of the nonlinearity of revenues and costs, and problems when estimating future revenues and costs arising from their nonlinearity.

With respect to the managers' views of the nonlinearity of income and costs, the majority of the respondents (70%) believe that the nonlinearity of income and costs is very frequent. Besides, the percentage of the respondents (22%) who believe that income nonlinearity is more frequent than cost nonlinearity (14%) is slightly higher.

Although the majority of the respondents believe that nonlinearity is very frequent, as many as 43% of the respondents believe that they can accurately estimate future income and costs both for a short and for a long period of time. Due to business uncertainty, 47% of the respondents believe that an accurate estimate of future income and costs is only possible only for the short term, whereas 6% of the respondents believe that such an accurate estimate is not possible at all.

The research results have revealed that managers have problems when classifying costs and estimating future revenues and costs and their (non)linearity (H3), and that there is the awareness of finding modalities for a proper cost classification and estimation of revenues and costs, at least for the short term (H2).

The research study has shown that, in practice, enterprises can lesser and lesser rely on plan and deterministic data. Entering actual, current data in the break-even point analysis contributes to the accuracy and flexibility of the model, although it also makes the process of collecting and processing

Table 2 The frequency of cost classification

Do you classify costs into fixed and variable?	Yes	Occasionally	No	Does not know / does not want to respond	Total
	55%	30%	11%	4%	100%

Source: Author

Table 3 Problems at cost classification

Do you face problems at cost classification?	Yes, they are difficult to classify	Yes, it is difficult to classify costs in the case of mixed costs	Yes, in the case of shared costs for several products	No	Does not know	Total
	24%	31%	25%	5%	15%	100%

Source: Author

Table 4 The ways to classify costs

In what way do you classify costs?	Yes	No	Total
Through observation and estimation, based on experience	29%	71%	100%
By applying the bookkeeping method	51%	49%	100%
By applying a mathematical-statistical method	22%	78%	100%

Source: Author

information more difficult. Indeed, a successful break-even point analysis requires the monitoring of changes in production (the depth and breadth of the product range), demand, the sale price, the level and structure of production costs and market risks, and the inclusion of the same in the analysis. This implies the use of dynamic and stochastic break-even point models.

The application of dynamic and stochastic models requires the knowledge of the complex mathematical-statistical procedures aimed at quantifying uncertainty and risk, specialized software and the accounting-information system that will ensure accurate and timely information and allow for an objective determination and estimation of the cost and income components (Martinović *et al*, 2019). The implementation of the described prerequisites in business practice is an additional challenge for the management of Bosnian and Herzegovinian enterprises.

Implications, research potentials and limitations of the research study

The research study carried out on one hundred manufacturing enterprises in Bosnia and Herzegovina was aimed at presenting familiarity with the concept of the break-even point, its assumptions and the level of its implementation in Bosnian and Herzegovinian enterprises. The value of the paper also includes the fact that it is one of few recent studies of the concept of the break-even point and its applicability in the business practice of manufacturing enterprises in Bosnia and Herzegovina.

Both the empirical and the theoretical sections of the paper pay particular attention to the potentials of the traditional break-even point model, as well as to the possibilities of the elaboration and practical use of the contemporary models based on the estimates of the nonlinearity of revenues and costs. Although the paper highlights the deficiencies and rigidity of

Table 5 The nonlinearity of costs and income

Nonlinearity of the total income and costs is frequent?	Yes	Income nonlinearity is more frequent than cost nonlinearity	Cost nonlinearity is more frequent than income nonlinearity	Nonlinearity is not frequent	No	Does not know	Total
	34%	22%	14%	8%	4%	18%	100%

Source: Author

Table 6 The estimation of future costs and income

Do you estimate future income and costs and the break-even point?	Yes, although for a shorter period due to business risks and uncertainty	Yes, for both short and long periods	No, due to significant risks	Does not know/ does not want to respond	Total
	47%	43%	6%	4%	100%

Source: Author

the classical concept of the break-even point, it also highlights its advantages. It is its simplicity that makes it valuable as an instrument for efficient, fast and simple decision-making. This was also demonstrated by the research done in the surveyed Bosnian and Herzegovinian enterprises. Most of those enterprises (regardless of their size and industry) use the model in its simplest, traditional form either as a separate or as an accessory instrument.

The advantage of the research study is related to the research methodology - a combination of the questionnaire and the in-depth interview, which allowed for a detailed explanation of the questions and responses and the clarification of possible uncertainties between the interviewer and the interviewee.

Certainly, the limitations of the research study need to be pointed out, namely reflecting in a relatively small number of the participants and the size of the enterprises (small and medium-sized enterprises prevail). Besides, the research study only focused on manufacturing enterprises in order to obtain the natural (quantitative) indicators of the break-even point. Finally, the focus was on testing a part of the assumptions about the application of the analysis using the break-even point (primarily the issues of cost classification), as well as familiarity with the primarily traditional break-even point model in business practice. For the purpose of interpreting the results, the simplest methods of descriptive statistics were used.

In terms of future studies, future studies should be aimed at expanding the sample to a greater number of enterprises and focusing on assumptions about the application of complex, contemporary, dynamic and stochastic methods of analysis. The analysis using the break-even point obviously shows its reach and limitations when enterprises do business in an unpredictable and changing environment. In such conditions, only contemporary models can satisfy the enterprises' requirements. Besides, a future research study should include research into the sustainability and reality of a number of assumptions about the application of the break-even point in the conditions of the nonexistence of perfect competition, change in market conditions (supply, demand, prices, competitors' activity) and a change in the product range and the production capacity. A comprehensive observation of all these factors and their synergy, as well as their impact on the determination of the break-even point, is a very demanding and challenging task for future research to do.

CONCLUSION

The concept of the break-even point is a well-known instrument of classical economic theory in the literature on microeconomics. Although it is a concept that was present in the economic literature as early as in the late 19th century, it is applied in business practice even today. By all means, in the present business environment characterized by uncertainty and risk, the break-even point model must be modified and adjusted to contemporary business conditions. Modifications imply the inclusion (in the model) of assumptions about a change in the key variables - both fixed and variable costs, the sale price, the total income, the contribution of coverage, and so forth or, as a result of the described changes, the existence of the nonlinear course of the development of the functions of the total income and total costs. In order to design a correct and accurate break-even point model which will illustrate the actual relations and values of such key variables, it is necessary to make a proper estimate and selection of costs, select the relevant key variables observation period and include all the essential analysis factors in the calculation. These activities will very frequently result in dynamic and stochastic break-even point models as the only relevant forms of the break-even point analysis in the conditions of risk and uncertainty.

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THE IMPORTANCE OF SOCIODEMOGRAPHIC CHARACTERISTICS AND PERSONALITY DIMENSIONS FOR COMMUNICATION SATISFACTION

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The subject matter of this research study is the importance of the sociodemographic characteristics and the personality dimensions of employees for communication satisfaction. This study is aimed at determining the significant influences and correlations between the main constructs within the research study conducted on a sample of 119 employees. The obtained results have shown that, except for the gender structure of the respondents, the other examined sociodemographic characteristics have an influence on certain dimensions of communication satisfaction. Correlations were also identified between certain personality dimensions and the dimensions of communication satisfaction. The research results have numerous practical implications. The quality of the interpersonal relationships between highly-educated employees and their supervisors needs to be improved by providing a greater autonomy and complex working tasks. It is also necessary to improve the bottom-up communication process for the purpose of enabling subordinates to express their ideas without barriers. Finally, it is recommended that employees with a high level of the personality dimensions 'Openness to new experiences' and 'Extraversion' should be in the positions in which they could achieve the best results.

Keywords: communication satisfaction, personality dimensions, 'Big Five theory', sociodemographic characteristics, employees

JEL Classification: J0, M54, M50

INTRODUCTION

The success of modern participative management requires good organizational communication within different levels (Swearingen, 2017). Changes in the attitudes of the management mainly manifested in raising the importance of interpersonal relationships and communication as important factors for successful teamwork ultimately provide positive repercussions for the organizational environment (Lee, Park & Lee, 2015). In contemporary business conditions, starting from top management and

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moving on to employees in subordinate positions, the human aspect of an organization must improve their communication skills in order to meet the current, as well as future, business challenges (Sievert, Rademacher & Weber, 2016; Barbour, Gill & Barge, 2018). Numerous researchers have focused on identifying the impact of organizational communication on employees' job satisfaction, organizational commitment, productivity, knowledge management, a knowledge share, innovations and overall business performances (Loebbecke, van Fenema & Powell, 2016; Mäntymäki, Riemer, 2016; Solaja, Idowu & James, 2016; Mehra & Nickerson, 2019). Taking into consideration relationships in everyday life and also those within an organization, relationships between people depend on individuals' skills and their ability to communicate with others. Numerous organizational problems might arise as a consequence of inappropriate communication between people, which could cause further problems related to the implementation of organizational plans (Ramdhani, Ramdhani & Ainissyifa, 2017; Swearingen, 2017). Communication is also an essential aspect in the establishment of a connection between an organization and its environment since only through exchanging information might managers become aware of customers' needs, governmental regulations, the availability of business suppliers or the overall community's need (Pearson, 2017). The importance of organizational communication could also be manifested through its two main functions: providing the basic information to employees, which are necessary for specifying their business tasks, and simultaneously also enabling employees to interact with their colleagues within a concrete business environment (including their co-workers and their supervisors) in order to meet interpersonal needs and provide their involvement in joint activities (Karanges, Johnston, Beatson & Lings, 2015).

There are different studies regarding the organizational communication, focused on researching the importance of communication satisfaction and its impact on employees' job satisfaction, productivity, or their organizational commitment (Steele & Plenty, 2015; Jalalkamali, Ali, Hyun & Nikbin, 2016; Vermeir, Blot, Degroote, Vandijck, Mariman, Vanacker & Vogelaers, 2018). Besides, there is an increased interest of numerous researchers in the ways in which trust can be established between the management and employees, especially when analyzing the personality dimensions of successful managers and the impact of those dimensions on the establishment of the aforementioned trust are in question (Schnackenberg & Tomlinson, 2016; Bstieler, Hemmert & Barczak, 2017).

In respect of that, this research study was focused on the relationships between the dimensions of communication satisfaction and the 'Big Five' theory of personality, as well as the influence of employees' demographic variables on the dimensions of communication satisfaction. This research study was conducted in the Electrical Power Production of Serbia (EPS) company, which is a large organization about to face major changes in its organizational structure, including possible job losses in the near future and the process of transition to other entrepreneurial sectors. In many European countries, especially so in those in transition, the problem of the restructuring of industrial (especially mining) areas is very pronounced. Hence, economic development planners are increasingly considering the possibility of accelerating the development of the service sector, especially tourism. The awareness of a future transformation is intensively present amongst the employees of this organization, and the obtained results were analyzed against that environment, which might particularly reflect on the communication satisfaction of the employees with higher education, who are often employed in managerial positions and who expect to be well-informed about upcoming changes. This is important, taking into account the fact that the success of the implementation of changes often depends on highly-educated employees.

ORGANIZATIONAL COMMUNICATION

Communication, both internal and external, plays an important multidimensional role in the organizational environment. With respect to that, successful communication provides the clarity of business

tasks, a reduction in the sense of uncertainty among employees, which is especially important during the implementation of the organizational restructuring process, and it could also facilitate the process of solving conflict situations. It might also increase employees' sense of organizational commitment and their trust in supervisors and co-workers, reduce the sense of the existence of a distance between subordinates and supervisors, ensure a higher degree of readiness to accept changes and obtain feedback on the quality of performed business tasks and proposals for changes. Besides, it might also reduce the cultural distance in international cooperation (Men, 2015; Jacobs, Yu & Chavez, 2016; Král & Králová, 2016; Malhotra & Ackfeldt, 2016; Solaja, Idowu & James, 2016). Organizational communication also plays an important role in raising employees' motivation by allowing them to express their feelings (Posey, Roberts & Lowry, 2015; Ramadanty & Martinus, 2016). Its role is particularly evident in the fact that working in a collective is the basic source of social interaction for the majority of employees. Organizational communication is also important for the overall decision-making process due to the fact that communication provides information necessary for making various decisions (Claeys & Coombs, 2019).

There is no doubt that, in modern management approaches, communication is more important comparing to the era of classical management. Perhaps more than any other organizational activity, organizational communication used to focus on formal 'top-down' communication in the past (Banks, Pollack & Seers, 2016). Informal communications, primarily related to interpersonal horizontal communications, were considered as an obstacle to effective organization. Nowadays, this is no longer the case and the informal aspect of communication is considered as significant and unavoidable for achieving employees' satisfaction (Ruben & Gigliotti, 2017). Directive (authoritarian) and controlled communication is still directed from the management towards employees, although certain upstream mechanisms, such as 'boxes for suggestions' or 'complaint systems', are increasingly implemented in the organizational environment (Král & Králová, 2016; Ruben & Gigliotti, 2017). The main goals of communication are expanded, from those suggesting that communication should only provide a transfer of instructions on business tasks to the creation of the communication that ensures that employees feel needed and satisfied within their business environment. Nowadays, organizational communication is not only a medium for speaking with employees, but also a medium through which managers listen to what employees have to say (Ramadanty & Martinus, 2016; Claeys & Coombs, 2019). As has already been mentioned, communication with employees is extremely important during the time of organizational changes. Employees might be afraid of the consequences of such changes; they might be wondering whether they will retain their jobs and their current positions, or not, and what their future will look like. Given the fact that uncertainty in the organizational environment might reduce employees' productivity, it is important to communicate with them regarding the ongoing and future changes (Král & Králová, 2016).

COMMUNICATION SATISFACTION

Research related to communication effectiveness usually considers the level of employees' communication satisfaction and constitutes an important aspect of a wider research area of organizational communication, which is researched by different authors with various established criteria for its measurement (Chan & Lai, 2017). M. L. Hecht (1978) provided the following definition of communication satisfaction: '*Communication satisfaction is a socioemotional consequence arising from the communication interactions*'. Numerous studies were focused on researching the correlation between communication satisfaction and job satisfaction (Steele & Plenty, 2015; Jacobs *et al,* 2016; Raina & Roebuck, 2016). The impacts of employees' communication satisfaction on their productivity, job performances and organizational commitment are also important issues, addressed by different authors (Gray & Laidlaw, 2004; Loebbecke *et al,* 2016; Solaja *et al*, 2016; Mehra & Nickerson, 2019).

Various questionnaires were formed in order to measure the level of communication satisfaction within an organization. One of the basic questionnaires was that given by C. W. Downs and M. D. Hazen (1977). J. Gray and H. Laidlaw (2004) pointed to a comprehensive bibliography in the field of measuring communication satisfaction, pointing out some of the most commonly observed dimensions of communication satisfaction: *organizational integration*, which includes employees' satisfaction with information about their direct business environment and also refers to departmental divisions and personal information; *the communication climate*, which - covers the extent to which communication within an organization motivates its employees to focus their efforts on the achievement of the main organizational goals and also the level at which employees consider communication within the organization to be appropriate; *the media quality*, which implies obtaining employees' satisfaction with respect to the overall process of conveying information: whether meetings are well-organized or not, whether written documentation is clear enough or not and whether the amount of information is appropriate or not; *communication with co-workers*, which includes the extent to which employees provide feedback to their superiors and the extent to which they initiate communication with their superiors, too; *personal feedback*, which implies obtaining employees' satisfaction related to feedback on their performances; *communication with supervisors*, which includes employees' satisfaction with the supervisor's openness to new ideas, his/her ability to listen to and care for his/her employees, and the extent to which the supervisor helps them in solving the problems in the workplace; *the organizational perspective*, which implies the extent to which employees receive information from the legal and the economic environments, including information on changes within the organization comprising employees' awareness of organizational policies and further plans (Down & Hazen, 1977; Gray & Lidlaw, 2004; Dibb & Fisk, 2005; Hadžić and Nedeljković, 2009; Simoes, Chan & Lai, 2017).

PERSONALITY DIMENSIONS ACCORDING TO 'BIG FIVE' THEORY

Since business communication takes place between individuals often characterized by different personality dimensions, it is important to determine how each of the 'Big Five' personality dimensions might affect their behavior within the organization. This is important primarily because of the fact that each 'Big Five' personality dimension might shape the openness/shyness of employees for communication, together with the other aspects of business behavior. The aforementioned 'Big Five' personality dimensions theory provides us with the personality dimensions termed as: Extraversion, Agreeableness, Conscientiousness, Openness to New Experiences, and Neuroticism (Digman, 1990; Costa & McCrae, 1992; Judge & Zapata, 2015; Ngek, 2015; Marchand & Vandenberghe, 2016; Kaczmarek & Kaczmarek-Kurczak, 2017; Anwar, Shah, Khan & Khattak, 2018).

Extraversion: An individual characterized by a high degree of extraversion is socially active and such a person usually has many friends, feels good in a group environment and is very popular in it. Such a person seeks new experiences, as well as complex and diverse business tasks. In the organizational context, an individual with a high degree of extraversion is friendly-oriented in communication with others, sometimes relying on other people without even sufficiently knowing them (Kaczmarek & Kaczmarek-Kurczak, 2017).

Agreeableness is determined by several subdimensions, such as being considerate and gentle towards others; it is also characterized by a lack of dominance over others, conflict avoidance and willingness to forgive. Such a person is sensitive and altruistic to other people, but also expects to be treated in the same way by others. People with a high degree of this personality dimension are good team members, due to the fact that they interact with each other in order to bring harmony into teamwork. However, such individuals are often not successful as leaders as they prefer to work in the 'background'. In general, they keep their opinions to themselves so as to avoid possible conflicts (Judge & Zapata, 2015).

Conscientiousness implies adhering to the rules, perfectionism, a systematic approach to the planning and execution of business tasks. A high level of the Conscientiousness personality dimension in a business environment implies a person focused on business tasks and their timely implementation and consistent throughout the implementation of established rules, which largely determines the overall communication of such a person with other team members (Anwar *et al*, 2018).

Openness to new experiences implies independence, intellectual efficiency, intellectual curiosity. An individual with a high degree of openness to new experiences is original, creative and curious, with the expressed belief that changes would lead to achieving a better situation within the organizational environment. When analyzing a situation, such a person chooses to form a global picture of it and does not insist on the details that are not crucial, which is also conveyed in the manner of the overall communication of such a person within the organization (Ngek, 2015).

Neuroticism: An individual with a high degree of neuroticism is difficult to fit in with other team members in their teamwork, because such a person does not have an optimistic approach to business tasks and obviously lacks the belief in the possibility of their successful realization, on the one hand, whereas on the other, this individual could also consider that a minor failure might become a serious obstacle to further work, which hinders the communication of these individuals within the organization. Another important subdimension of the negative affective personality is the time necessary for such a person to recover from stress. An individual with a high degree of neuroticism is characterized by a long recovery time from the moment of the occurrence of a stress and such a person is prone to the pessimistic interpretation of conflict situations (Marchand & Vandenberghe, 2016).

In addition to the personality dimensions, communication within an organization could also be influenced by the different sociodemographic characteristics of its employees (Janssen, Ruiter & Waters, 2018). In respect of that, it is important to do research into the degree to which all these different factors influence communication satisfaction within an organization.

RESEARCH METHODOLOGY

The sample consists of 119 employees of "Electrical Power Production of Serbia" (EPS). The male respondents represent the majority of the sample (62%) in comparison with the female respondents (38%). According to the respondents' age, the majority of them are between 41 and 50 years of age (41.18%). The sample also includes 24.37% of the respondents between 50 and 65 years of age and 23.53% of those between 31 and 40 years of age, whereas the minority of the respondents belong to the group of the youngest, namely those of up to 30 years of age (10.92%). According to the respondents' working tenure, the sample includes 25.21% of the respondents with a work tenure ranging from 21 to 25 years, 21.01% of those with a work tenure between 16 and 20 years, together with 20.16% of the respondents exceeding a business experience of 25 years. A slightly lower percentage of the respondents have up to 5 years of the working tenure (17.65%) and between 6 and 10 years of the working tenure (14.29%), whereas the minority of the respondents have a working tenure between 11 and 15 years (1.68%). The majority of the respondents received a university (four-year) education degree (52.10%) and 32.77% of them have a high-school education degree, whereas the minority of the respondents belong to the category of those with a college (two-year) higher education degree (11.77%). According to the respondents' job positions, 77.31% of them are employed in subordinate positions, whereas 22.69% of them work in supervisory positions. The respondents participated in the research study on a voluntary basis. They were informed that the results would only be used for a scientific purpose.

The data were collected based on the survey research distributed by the coauthors in the period between April and June 2018, all in cooperation with the managers and the psychologist employed in the

Kolubara Basin (a branch of the Electrical Power Production of Serbia). The respondents were informed that the research study was anonymous and that they would answer the questions on the standard-method basis, i.e. with the pen and paper. The collected data were analyzed by SPSS 17.0, based on the descriptive statistics, a correlation analysis and the analysis of the variance.

The following hypothesys will be tested in the paper:

H1: There is a significant difference in the dimensions of communication satisfaction based on the respondents' demographic characteristics.

H2: There is a significant correlation between the personality dimensions according to the 'Big Five' theory and the dimensions of communication satisfaction.

The research study was conducted based on a questionnaire divided into three parts. The first part consisted of the items related to the respondents' demographic characteristics (the gender, age, the education degree, the working tenure, the job position). The second part contained the items from the standardized questionnaire formed for the purpose of analyzing communication satisfaction (Down & Hazen, 1977) that was used to measure the seven dimensions of communication satisfaction (Communication Climate, Communication with Supervisors, Organizational Integration, Media Quality, Communication with Co-Workers, Personal Feedback, Organizational Perspective). The third group of questions was focused on the five personality dimensions: Extraversion, Neuroticism, Conscientiousness, Agreeableness and Openness to New Experiences. These personality dimensions were measured by means of the scale established by P. J. Howard and J. M. Howard (2000), which included 25 items.

RESULTS

According to the research results presented in Table 1, it could be noticed that, in the case of the personality dimensions, the employees gave the highest grade (6.22) to the Conscientiousness personality dimension, whereas the lowest grade (4.25) was recorded for the Neuroticism personality dimension.

Table 1 The descriptive statistics for the dimensions of personality and communication satisfaction (N = 119)

Dimension	Mean value	Standard deviation	α coefficient
Neuroticism	4.25	1.30	0.72
Extraversion	5.72	1.22	0.78
Openness for new experiences	5.57	1.02	0.82
Agreeableness	5.81	1.15	0.75
Conscientiousness	6.22	0.90	0.81
Personal feedback	4.58	2.34	0.94
Organizational integration	5.14	1.74	0.89
Communication climate	3.11	1.88	0.92
Organizational perspective	4.39	4.10	0.90
Media quality	5.26	3.39	0.96
Communication with supervisors	6.64	2.29	0.92
Communication with co-workers	7.05	4.70	0.89

Source: Authors

In the case of the dimensions of communication satisfaction, based on the research results also presented in Table 1, the highest grade (7.05) was evidently achieved for the Communication with Co-Workers dimension of communication satisfaction, whereas the lowest (3.11) grade was recorded for the Communication Climate dimension of communication satisfaction.

The influence of the employees' demographic characteristics on the dimensions of communication satisfaction was tested based on the ANOVA

test. According to the research results shown in Table 2, a significant difference was recorded for the Organizational Integration dimension of communication satisfaction according to the employees' age ($F = 3.02$; $p = .033$), whereas according to the respondents' age, no significant differences were found for the other dimensions of communication satisfaction.

Table 2 Organizational integration and the respondents' age

Age	Organizational integration			
	Mean value	Standard deviation	*F*	*P*
Up to 30	5.36	2.52	3.02	.033
31-40	5.40	1.74		
41-50	5.43	1.52		
50-65	4.32	1.48		

Source: Authors

The research results did not point to significant differences in the dimensions of communication satisfaction according to the respondents' gender and working tenure. However, according to the respondents' education degree, significant differences were found for the following dimensions of communication satisfaction: Organizational Perspective ($F = 5.58$; $p = .005$), Media Quality ($F = 8.33$; $p = .001$) and Communication with Supervisors ($F = 3.80$; $p = .025$), whereas the research results did not point to any significant differences for the other dimensions of communication satisfaction based on the respondents' education degree. The results are accounted for in Table 3. It should be emphasized that the respondents with primary school were excluded from the statistical analysis due to a small number of the respondents who belonged to this group (only four of them).

The research results indicated a significant difference in the Communication with Co-Workers dimension of communication satisfaction ($F = 4.64$; $p = .033$) according to the respondents' job position, which can be seen in Table 4. On the other hand, the research

Table 3 The dimensions of communication satisfaction and the respondents' education degree

Education degree	Organizational perspective			
	Mean Value	Standard deviation	*F*	*P*
High-school	4.98	1.97	5.58	.005
College (two-year studies)	5.29	2.02		
University (four-year studies)	3.87	1.88		
Education degree	Media quality			
	Mean Value	Standard deviation	*F*	*P*
High-school	5.89	1.92	8.33	.001
College (two-year studies)	6.15	1.54		
University (four-year studies)	4.65	1.61		
Education degree	Communication with supervisors			
	Mean Value	Standard deviation	*F*	*P*
High-school	7.08	2.52	3.80	.025
College (two-year studies)	7.63	1.99		
University (four-year studies)	6.12	2.28		

Source: Authors

results did not point to any significant differences in the other dimensions of communication satisfaction, based on the respondents' job position.

Table 4 Communication with co-workers and the respondents' job position

Job position	Mean Value	Standard deviation	*F*	*p*
Subordinates	6.82	2.26	4.64	.033
Supervisors	7.83	1.63		

Source: Authors

Based on the presented research results, hypothesys H1 is partly confirmed. The research results have shown that there is a significant correlation between the respondents' demographic variables and the specific dimensions of their communication satisfaction.

Besides, the research results have shown is the existence of a significant correlation between the following variables: Extraversion and Communication with Supervisors, as well as between Openness to New Experiences and Communication with Supervisors. Also, it can be noted that there is a significant correlation between Extraversion and Communication with Co-Workers, as well as between Extraversion and Media Quality, which is possible to see in Table 5.

According to presented research results, hypothesys H2 is partly confirmed. The research results have shown that there is a significant correlation between the specific personality dimensions according to the 'Big Five' theory, on the one hand, and the specific dimensions of communication satisfaction, on the other.

DISCUSSION

The research results pointing to the fact that there is a significant difference in the assessment of the Organizational Integration dimension of communication satisfaction according to the respondents' age between the second group (from 30 to 40 years of age) and the fourth group (from 50 to 65 years of age), as well as between the third (from 40 to 50 years of age) and the fourth groups of the respondents (over 50 years of age). One of the items for measuring the respondents' communication satisfaction with respect to Organizational Integration was oriented towards determining the degree of the respondents' awareness of their business tasks and role in the overall activities of the organization. The fourth group of the employees gave a significantly lower score for the aforementioned dimension comparing to the second and the third groups of the respondents.

Table 5 The correlation between the dimensions of personality and communication satisfaction

Dimensions	Communication with supervisors	Communication with co-workers	Communication climate	Organizational integration	Media quality	Organizational perspective	Personal feedback
Extraversion	0.27**	0.20*	0.12	0.17	0.19*	0.18	0.18
Neuroticism	-0.02	-0.14	0.18	-0.10	0.05	0.13	0.05
Openness to new experiences	0.19*	0.16	0.01	0.15	0.08	0.12	0.15
Agreeableness	0.78	0.08	-0.02	0.09	0.11	0.11	0.10
Conscientiousness	0.83	0.13	-0.04	0.09	0.09	0.09	0.04

* Correlation is significant at the .05 level (2-tailed) ** Correlation is significant at the .01 level (2-tailed)

Source: Authors

One of possible explanations might relate to the fact that it is not necessary to provide more information on Organizational Integration for the oldest employees. Bearing in mind their age and business experience, the employees from the aforementioned category could gain an insight into Organizational Integration even with less information.

The research results pointed to a significant difference in the assessment of the Organizational Perspective dimension of communication satisfaction according to the employees' education degree between the second (a high-school degree) and the fourth (a university education degree) groups, as well as between the third group (a college education degree) and the fourth group of the respondents (a university education degree). The lowest grade for Organizational Perspective (3.87) was given by the respondents with a university education degree, only to be followed by those holding a high-school education degree (4.98), whereas the highest grade was recorded for the group of the respondents who hold a college education degree (5.29). One of possible explanations for the obtained result could relate to the fact that the management of the researched organization estimate that the employees with a high-school education degree who are typically entrusted with less complex business tasks and whose activities are not so exposed to the necessity for changes and innovations do not need more information in order to successfully complete their business tasks, so these employees could consider that they are relatively well-informed.

On the other hand, the employees with a higher education degree mainly work on complex business tasks, which fact increases their need for having a broader insight into the overall activities of the organization, which might be one of the main reasons for their need for a better Organizational Perspective, which resulted in their lower satisfaction with this dimension.

The obtained results are indicative of the fact that the employees with higher education also cherish higher expectations with respect to this dimension of communication satisfaction, which results in their lower evaluation of Organizational Perspective. Furthermore, the research results point to the fact that there is a significant difference in the assessment of the Media Quality dimension of communication satisfaction between the second and the fourth, as well as the third and the fourth, groups of the respondents. The highest grade (6.15) was given by the employees holding a college education degree, only to be followed by those with a high-school education degree (5.89), whereas the lowest grades were given by the respondents holding a university education degree (4.65). The explanation is similar to the previous dimension of communication satisfaction. Furthermore, there are significant differences in the assessment of the Communication with Supervisors dimension of communication satisfaction between the second and the fourth groups, as well as the third and the fourth groups of the respondents, whereas the order is the same as in the previous two results. The highest grade (7.63) was given by the employees with a college education degree, only to be followed by the grade (7.08) of the employees with a high-school education degree, whereas the lowest grade was given by those holding a university education degree (6.12). The need for self-fulfillment, together with the complexity of business tasks and involvement in teamwork, increases the need of the employees with a higher education degree for a better communication with their supervisors, so their expectations in relation to the high quality of communication with their supervisors are also higher. The employees with a high-school and college education degrees demonstrate a lower need for communication with their supervisors, because their Communication with Supervisors is predominantly 'top-down' oriented, which is considered as an 'acceptable' form of communication amongst these employees. Hence, their level of expectations for the two-way orientation of Communication with Supervisors is lower, whereas their satisfaction with communication with superiors is higher, which is opposite in comparison with the category of the employees with a university education degree.

The research results also pointed to a significant difference in the assessment of Communication with Co-Workers dimension of communication satisfaction

according to the respondents' job position. The employees in the managerial positions expressed significantly greater satisfaction with Communication with Co-Workers comparing to the employees in the subordinate positions, which might indicate that the communication of the managers with their employees is mainly 'top-down oriented. This means that it is the manager who is often the initiator of organizational communication where he/she has a dominant role, which also means that the manager is he who determines the topic and flow of a conversation, which creates a sense of a communication success for the manager, and potentially also the impression of almost one-way communication for the subordinates who communicate with the manager, due to the fact that the manager does not show any particular interest in the employee's reaction to the forwarded message. This kind of communication is not unusual in transitional society, such as Serbia, which is still influenced by traditional authoritarianism. Subordinates are not ready to accept this form of communication as appropriate; therefore, it is understandable that their communication satisfaction is significantly lower comparing to that of their managers.

A Positive correlation between the Extraversion personality dimension and the Communication with Supervisors, Communication with Co-Workers and Media Quality dimensions of communication satisfaction is understandable since an extrovert is open up to cooperation with the supervisor and co-workers. Due to the fact that an individual with a high level of Extraversion is prone to seeking complex and various business tasks, it is clear why this dimension of the employee's personality is positively correlated with the Communication with Supervisors who are able to recognize and adequately reward the employees who are ready to face complex business tasks. An extrovert is also socially and friendly oriented towards other people (Kaczmarek & Kaczmarek-Kurczak, 2017). Bearing in mind these main characteristics of an extrovert, such a positive correlation with Communication with Co-Workers is understandable. A significant positive correlation was also recorded between the Openness to New Experiences personality dimension and Communication with Supervisors. An individual with a high degree of Openness to New Experiences is creative and believes that change may improve a general organizational situation. In the organizational context, this personality dimension is appropriate for all the jobs that require a non-standard mindset and a creative approach to problem solving. An open-minded employee will probably be well-received by the supervisor. If these employees' creative approach to problem solving is noticed and adequately rewarded by the supervisor, there is a clear positive correlation between the Openness to New Experiences personality dimension and the Communication with Supervisors dimension of communication satisfaction.

CONCLUSION

The importance of doing research in communication satisfaction is especially pronounced in a time of rapid changes, which is one of the consequences of modern trends in technology, politics and the economy. The obtained results have shown that the existence of significant differences between employees' demographic variables and the specific dimensions of communication satisfaction. The research results could not only contribute to the organizations that are the subject-matter of this research study, but also to all organizations of a similar business profile, especially in countries in transition. The obtained results could also serve as the basis for the development of industrial tourism, which could reduce the negative outcomes caused by transition and different organizational changes throughout the restructuring process.

The fact that the employees with a high education degree gave a low grade for satisfaction with respect to Organizational Perspective should encourage the management to improve this form of communication, which could be of particular importance in the period of conducting organizational transformations. This involves the establishment of quality communication channels at an interpersonal level (relationships between the employees), as well as an adequate

distribution of information to all employees through organizing regular meetings and other communication methods within the organization. The establishment of an open Communication Climate that would improve interpersonal communication channels would also increase the employees' satisfaction in respect of communication media, while it would also significantly improve the employees' development programs, which should be established in order to remove the barriers to achieving organizational effectiveness.

Supervisors should analyze the reasons for the relatively low satisfaction with communication with them expressed by the employees holding a higher education degree due to the fact that communication between supervisors and employees with a higher education degree might be critical in the period of an ongoing upcoming transformation process. As the reasons for such an assessment could be various, starting from the feeling of insufficient involvement in the decision-making process, via the absence of information on business performances, to insufficient assistance in resolving potential conflicts or business tasks, especially in teamwork, it is necessary for the top management and direct supervisors to engage themselves in overcoming the possible problems that could be particularly pronounced in a period of changes. A good relationship with the supervisor is an important factor for increasing employees' readiness for changes, which is one of the most important prerequisites for a successful implementation of changes.

In order to fully understand the reasons for the distribution of the Media Quality assessment according to the respondents' education degree, where the employees with the highest level of education are least satisfied with Media Quality, it would be necessary to analyze the quality of the communication channels in detail (whether meetings are organized at the level of different sectors where employees could be informed about problems, results and future transformations, or not; what quality organizational leaflets are and which information is presented in them, e.g. whether those pieces of information are in the domain of economic-legal or engineering problems). Employees with a higher education degree are usually responsible for administrative and financial business tasks and significant changes are being made in this field in Serbia, which is the main reason why more information in this field is given in organizational leaflets comparing to the information provided in the field of technical innovations. As the researched organization belongs in the mining sector, it is possible that the engineering staff might find they are not sufficiently informed about the issues that they are mostly interested in. Therefore, the main task of the management is to identify the real reasons for the low assessment of Media Quality by the employees with a higher education degree, on the one hand, and take appropriate measures so as to increase the rating of this factor of communication satisfaction, on the other.

The research results provided an indication of communication satisfaction within the researched organization, but such research should only be the first step towards the improvement of communication satisfaction among the employees. Communication satisfaction surveys should be conducted within the organization involving the human resources management team in order to identify the main barriers to improving communication by conducting a research study of the employees' attitudes towards the quality of their communication with the supervisor. This could be achieved through an open interview, considering the possibilities of improving organizational communication, especially by applying modern information and communication technologies and making proposals for the changes in the organizational structure that would lead to the creation of new communication channels or the redefining of the role of the existing ones.

The research results have revealed that the influence of certain dimensions of personality on certain aspects of communication satisfaction is undoubted. This correlation is certainly influenced by the specificity of the workplace and, therefore, it would be useful for the

management, in consultation with psychologists, on the occasion of selecting candidates and recruiting or selecting supervisors and subordinates with respect to the alignment of their personality dimensions with the characteristics of a specific workplace. For example, extraverted employees would express a high level of business performances within the positions that require frequent communication with other employees, supervisors, as well as customers buying products or services. Besides, employees with the expressed personality dimension of Extraversion are excellent team members due to the fact that they are characterized by the predominance of empathy and sociability. Therefore, when forming teams, the management of the organization should provide an opportunity for the employees with the pronounced Extraversion personality dimension to be part of a team in accordance with their knowledge. According to the research results, there is a significant correlation between the employees' Openness for New Experiences personality dimension and their satisfaction with Communication with Supervisors, which further implies that managers should provide adequate working conditions for employees when they recognize a pronounced level of this personality dimension, which will contribute to the full realization of innovation and the intellectual curiosity of these employees.

The results of this type of research within different business sectors could make a significant contribution to gaining in efficiency in managing organizational changes, improving business performances and increasing employees' organizational commitment, which would undoubtedly affect the overall efficiency of the economy.

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BEHAVIORAL PORTFOLIO THEORY AND BEHAVIORAL ASSET PRICING MODEL AS AN ALTERNATIVE TO STANDARD FINANCE CONCEPTS

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The growing gap between standard finance theory and practice has made way for the emergence of new theories and the development of new asset-pricing models. Behavioral economists have seized this opportunity to promote their ideas and thus develop behavioral finance theory, as an antithesis to standard finance theory; behavioral portfolio theory, as an antithesis to modern portfolio theory, and a behavioral asset-pricing model, as an antithesis to standard financial asset-pricing models. The paper aims to illustrate these new theoretical frameworks, given the absence of research at the national level relating to behavioral portfolio theory and the behavioral asset-pricing model. The objective is to explain the key features of behavioral portfolio theory and the behavioral asset-pricing model by means of conducting a comparative analysis of the mentioned theory and its model and standard financial concepts and models. By using a qualitative research methodology, the author concludes that, by incorporating psychological factors, behavioral portfolio theory and the behavioral asset-pricing model complement conventional financial concepts and bring finance theory closer to reality. It is, however, still too early and exaggerated to a certain extent to speak about the superiority of these new theoretical frameworks in relation to modern portfolio theory and conventional asset-pricing models, which is also the main finding of the research study.

Keywords: behavioral finance, psychological factors, mental account, utilitarian benefits, expressive benefits, emotional benefits

JEL Classification: G40, G41

INTRODUCTION

Behavioral finance is a new approach to the finance field (Brajković & Peša, 2015), which examines the role, importance and impact of psychological factors on the behavior and decision-making of investors, portfolio managers, financial experts and other market participants (Muradoglu & Harvey, 2012; Bakar & Yi, 2016). Unlike standard finance theory, which builds on the concept of perfect rationality, behavioral finance is based on a much more realistic concept of bounded rationality, introduced in economic theory by H. A. Simon (1955).

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The behavioral finance postulate is the assertion that investors have cognitive biases which, in fact, are imperfections in their perceptions of reality (Blanco, 2017), resulting in systematic errors in judgment and irrational decisions. Behavioral finance seeks to understand investors, their behavior and decision-making processes. In this regard, a normal investor is assumed to be an ordinary man, who is not always perfectly informed and who, under the influence of cognitive biases and misleading emotions, does not always make rational decisions. According to W. F. M. De Bondt, Y. G. Muradoglu, H. Shefrin and S. K. Staikouras (2008), if members of the academic community are to understand financial institutions and actors, and if economic policy makers and actors are to make wise decisions, they must take into account the true nature of people, their imperfections and bounded rationality.

Acquired knowledge in the field of behavioral finance should assist financial decision-makers in identifying and understanding their own mistakes, learning from such mistakes and, most importantly, avoiding making the same mistakes in the future (Muradoglu & Harvey, 2012; De Bondt, Mayoral & Vallelado, 2013). Behavioral economists point out the fact that financial theory has been significantly improved with the emergence of behavioral finance, which has "shed light" on financial decision-making processes.

With this in mind, Behavioral Portfolio Theory (BPT) and the Behavioral Asset-Pricing Model (BAPM), as the building blocks of behavioral finance, are the subject matter of the research study presented in this paper. By incorporating psychological elements and side-stepping too restrictive assumptions inherent in standard finance theories and models, the BPT and BAPM seek to explain the actual process of financial decision-making and asset-pricing. The mentioned models are the topic of a number of studies written by foreign authors (Hirshleifer, 2001 Shefrin, 2008; Rengifo, Trendafilov & Trifan, 2014; Statman, 2014; Pfiffelmann, Roger & Bourachnikova, 2016; Chandra & Thenmozhi, 2017; Statman, 2017a; Statman, 2017b; Barberis, 2018). These models, however, have not yet been sufficiently researched by authors in Serbia, which is the motivation lying behind carrying out an adequate qualitative analysis.

The main aim of the research study is to illustrate these relatively recent, still unexplored, theoretical frameworks in the domestic scientific literature, which have been developed as an alternative to standard finance theory. The objective is to inform the investment public in the country on behavioral finance and related advancements in the knowledge of it, which can be very useful to investors, portfolio managers and other market participants. The purpose of studying the BPT and BAPM is to examine this new approach and the original point of view introduced by behavioral finance in the finance field, which, in a way, makes finance theory complete.

The expected outcome of the research is to improve the understanding of the psychology-based portfolio theory and asset-pricing model, including a useful identification and an outline of the key differences between the BPT and Modern Portfolio Theory (MPT), i.e. BAPM and standard financial asset-pricing models.

In accordance with the defined subject matter, the aim and the expected outcome of the research study, the initial hypothesis reads as follows:

H: Behavioral portfolio theory and the behavioral asset-pricing model bring financial theory closer to reality by incorporating the concepts of mental accounting, bounded rationality, expressive and emotional benefits and arbitrage limitations.

A qualitative research methodology is applied in the paper, which allows for the theoretical verification of the initial hypothesis and the formulation of valid conclusions on the analyzed topics, based on the study of the relevant literature.

Given the defined subject matter and aim of the research, as well as the initial hypothesis, the introductory considerations are followed by prospect theory, as well as Security-Potential/Aspiration (SP/A) theory, which are presented in the paper as the foundations of the BPT development. This section is then followed by the analysis of the key features of the BPT. For the purposes of an easier understanding and/or comprehension, these features

are described by conducting a comparative analysis of the BPT features and the features of the MPT. After concluding this section of the paper, BAPM is explained as a model developed as an alternative to conventional asset-pricing models, with an emphasis on the influence of psychological factors on investment decisions and asset-pricing. Finally, the positions on the confirmation of the initial hypothesis are summarized, the research limitations are outlined and the topics important for future research are analyzed in the last Conclusion section of the paper.

PROSPECT THEORY AND SP/A THEORY AS THE FOUNDATION OF BEHAVIORAL PORTFOLIO THEORY DEVELOPMENT

As a part of behavioral finance, behavioral portfolio theory has been developed as an alternative to standard finance theory, i.e. the MPT. Behavioral economists Hersh Shefrin and Meir Statman are considered to be the creators of the BPT. The publication of their paper "Behavioral Portfolio Theory" in the scientific journal "The Journal of Financial and Quantitative Analysis" in June 2000 marked the birth of this new theoretical framework (Shefrin & Statman, 2000).

H. Shefrin and M. Statman (2000) indicate the fact that two theories of choice under uncertainty, namely prospect theory, formulated by D. Kahneman and A. Tversky (1979), and SP/A theory, developed by L. L. Lopes (1987), served as the foundation of the development of the BPT.

Prospect theory is a descriptive theory of how people make decisions under uncertainty. It is characterized by an asymmetric attitude towards risk. According to prospect theory, there is a difference in terms of the investor's attitude towards risk of gains and risk of losses. An investor reacts differently to equally risky situations, depending on whether such risks are in the gain zone or in the loss zone. In the loss zone, the investor is risk-seeking; however, the same person is risk-averse in the gain zone. Therefore, investors are not solely characterized as risk-seeking or risk-averse; their attitude towards risk varies, depending on a specific situation, i.e. the zone of risk.

The assertion that investors tend to accept risk in the loss zone and avoid risk in the gain zone was corroborated by the findings of the research studies conducted by the creators of prospect theory, D. Kahneman and A. Tversky (1979). The research study included two groups of respondents. The first group, consisting of 70 respondents, were asked to choose between Option A and Option B, where the option A offered a 50:50 chance of a $1,000 gain or a 0 gain, whereas the option B offered a sure gain of $500. The large majority of the respondents (84%), chose the option B, thus demonstrating risk aversion tendencies in the gain zone. The second group, consisting of 68 respondents, were offered a choice between Option C and Option D, where the option C offered a 50:50 chance of a $1,000 loss and a 0 loss, whereas the option D implied a sure loss of $500. The majority of the respondents in this group (69%), chose the option C, thus showing risk-seeking tendencies in the loss zone.

The investor's risk-seeking preferences in the loss zone actually are the only way for him to avoid a loss and turn it into a profit, whereas risk aversion in the gain zone is the best way to keep the achieved gains and secure them. In terms of the loss zone, investors are willing to expose themselves to a risk of additional losses in an effort to completely avoid a loss. On the other hand, in the gain zone, investors are unwilling to risk too much in order to increase their gains. Therefore, a typical prospect theory value function is convex below the reference point represented by the origin and concave above it, thus resembling the letter "S" (Figure 1). For example, in the loss zone, investors invest money in lottery tickets, while in the gain zone they buy insurance policies. It is important to note that the value function is steeper in the loss zone than in the gain zone, which is indicative of the fact that investors feel losses more strongly than gains.

In brief, individuals are willing to gamble in the loss zone, but at the same time, they are quite unwilling to do so in the gain zone. It is important to note that, in this context, gains and losses do not imply a

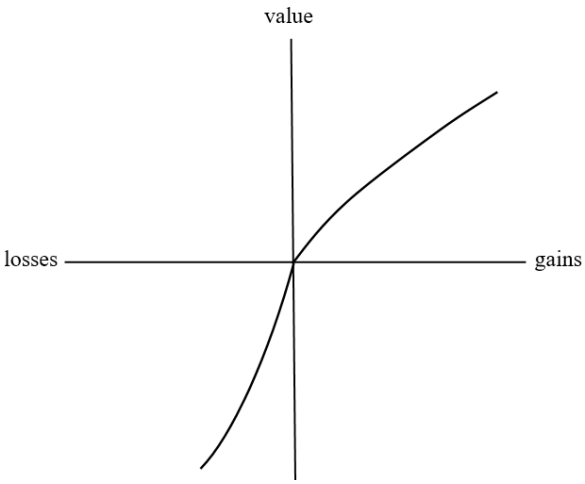

Figure 1 A hypothetical value function

Source: Kahneman & Tversky, 1979, 279

negative and a positive return, i.e. reducing and/or increasing wealth; these terms refer to wealth below the reference point and wealth above the reference point. The reference point differs from one investor to another, and is determined based on their past experience, underlying their beliefs, i.e. a cognitive bias (anchoring), available information, forecasts. Therefore, it stands to reason that any changes in terms of the reference point affect change in the investor's attitude towards risk, and thus change in the investor's decision. If, due to changes in the reference point, a former loss is perceived as a gain, the investor's risk-seeking behavior will change into risk aversion and they will opt for a less risky investment decision. If, however, due to changes in the reference point, a former gain is perceived as a loss, the investor's tendency to avert risk will be replaced with risk-seeking, thus making them go for an investment decision which carries more risks.

Finally, it should be noted that this theory is an alternative to classical expected utility theory, which is the basis of traditional economic theory, and that it furthermore implies that all investors are risk-averse, for the reason of which fact the utility function is concave for all wealth levels. In contrast to expected utility theory - a normative theory prescribing the rules that every rational and thoroughly informed individual should follow when making a decision, on the one hand, prospect theory is a descriptive theory, on the other, because it describes how individuals make decisions in a real-life business environment (Cupic, 2015, 221). Prospect theory is essentially a critique of utility theory. Pursuant to prospect theory, an individual, based on a specific reference point, considers every available option as an independent and unique event when deciding and makes a decision based on the losses or gains that will be the result of this decision, instead of focusing on maximizing total wealth (Todorović, 2011, 277). Therefore, in terms of prospect theory, the utility function for all wealth levels, which is a feature of classical expected utility theory, is replaced with the value function (of possible outcomes) based on the reference point.

Another theory of choice under uncertainty which was also used as the basis for the BPT development is SP/A theory, initially proposed by L. L. Lopes (1987) and further developed by L. L. Lopes and G. C. Oden (1999). In contrast to the viewpoint of conventional finance theory, which sees people as perfectly rational economic beings, L. L. Lopes (1987) is of the opinion that our everyday decisions, including investment ones, are affected by our emotions, such as fear and hope, as well as our aspirations. Fear governs our concern for security, whereas hope governs our concern for the potential for, i.e. a possibility of, wealth maximization. In this regard, the three basic elements of SP/A theory are: S - security, i.e. our aspiration to escape poverty; P - the potential, i.e. our desire to reach greater wealth, and A - aspiration, i.e. our striving to achieve a set goal.

As well as prospect theory, SP/A theory belongs to the corpus of descriptive decision theories, because it does not prescribe rules, but rather describes the decision-making process. However, in contrast to prospect theory, which focuses on cognition, i.e. on the cognitive aspects of decision-making, such as framing effects in decision-making relating to the gain or loss zone, SP/A theory emphasizes emotions, i.e. the emotional aspects of decision-making under uncertainty. By stressing the impact of our emotions, SP/A theory provides a general framework for decision-making. According to H. Shefrin (2016), SP/A

theory strives to equalize interaction between the key emotions, i.e. fear, hope and aspiration.

Furthermore, in contrast to prospect theory, SP/A theory applies two criteria regarding the decision-making process: SP - safety-potential, and A - aspiration, or decision-makers' ambition. These criteria are independent of each other and often conflicted, because they frequently advocate different decisions. The manner in which this type of conflict will be resolved depends on whether the decision-maker gives greater importance to the first or to the second criterion, i.e. whether he/she favors fear and hope over ambition, or vice versa.

Highlighting the impact of emotions (primarily fear and hope), the creator of the theory, L. L. Lopes (1987), points out the fact that, as far as people are concerned, one of the mentioned emotions does not necessarily dominate over the other (fear over hope, or hope over fear), thus considering people to be "cautiously optimistic". Under the influence of fear, investors overestimate the likelihood of the worst outcomes, whereas under the influence of hope, they overestimate the likelihood of the best outcomes. Therefore, under the influence of fear, investors buy risk-free securities in order to achieve security and avoid poverty, whereas under the influence of hope, they invest in highly risky assets so as to maximize their wealth.

Accordingly, one of the significant implications of SP/A theory, one of the major pillars of the BPT, assumes that, while creating their investment portfolios, investors tend to combine very secure and very risky assets, thereby creating the key to understanding the investment portfolio as a collection of different sub-portfolios, i.e. a layered investment pyramid.

According to H. Shefrin (2008), SP/A theory holds many advantages compared to prospect theory and is a more solid basis for the BPT development, because it better explains the way how individuals make decisions and the existence of a mix of risk-free securities and highly-risky securities in a behavioral portfolio. Eight years later, H. Shefrin (2016) points out the fact that both theories, prospect theory (emphasizing cognition) and SP/A theory (emphasizing emotions) are equally important, as cognition and emotions are intertwined. In other words, the aforementioned theories can be considered as complementary, i.e. being the two parts of the same story about the role of psychology in the decision-making process.

BEHAVIORAL PORTFOLIO THEORY AS A MEANS OF MODERN PORTFOLIO THEORY ENHANCEMENT

Based on the above-presented theories, namely prospect theory and SP/A theory, the BPT considers that investors are risk-averse and risk-seeking at the same time, i.e. they purchase both insurance policies and state lottery tickets. In contrast to the BPT, the alternative MPT assumes that investors are risk-averse, which is precisely why they are unwilling to invest money in buying state lottery tickets (Das, Markowitz, Scheid & Statman, 2011). If, based on the MPT concept, a rational investor is given a choice between buying lottery tickets and putting money into a diversified portfolio, he/she will opt for a diversified portfolio, since it is characterized by a lower standard deviation of the return as a measure of risk. In addition, the expected return on a state lottery ticket is negative, while the expected return of a diversified portfolio is positive.

An investor who, under the above-described circumstances, chooses to invest money in a diversified portfolio is clearly risk-averse. However, according to behavioral finance, the same investor is considered to be risk-seeking if his/her objective is to earn an amount of €100,000,000.00 in a short-term period by investing €1.00. In terms of the BPT, risk is not measured by a standard deviation of the return; it is rather measured by a shortfall probability, i.e. the probability that such a return will be below a certain target amount, the mean shortfall, or their difference. If the investor chooses to invest money in a diversified portfolio, the risk that the return will be below the target amount is higher than in the case of buying a state lottery ticket, which is why this person is considered to be a risk-seeking investor.

Therefore, it can be concluded that certain portfolios considered as low-risk portfolios in terms of the standard finance and the MPT methodologies can be assessed as high-risk portfolios based on behavioral finance and the BPT due to a high probability of failure in achieving the set goal. Likewise, portfolios assessed as high-risk portfolios according to standard finance and the MPT methodologies can be considered as low-risk in terms of behavioral finance and the BPT due to a low probability of failure in the achievement of the set goal (Statman 2014).

The main feature of the BPT is the assumption that investors do not view their portfolios as a whole, as is proposed by the MPT, but rather as separate mental account layers, where each mental account layer is associated with a particular goal and a certain attitude toward risk. Therefore, according to the BPT, investors' goals and attitudes towards risk differ across layers (Statman, 2008). According to the BPT concept, investors consider their portfolio as a collection of sub-portfolios, each of which is optimal for a given mental account (Pfiffelmann *et al*, 2016).

A BPT portfolio resembles a layered pyramid, where, starting from the base layer as the low-aspiration level, the investor's aspirations are becoming more ambitious with each successive level, as well as risk tolerance. That is to say, at the base layer of the pyramid, investors buy insurance policies and government bonds; at the middle layer of the pyramid, they purchase shares of several companies and junk bonds, whereas at the topmost layer, they opt for shares of a single company and state lottery tickets. According to H. Shefrin (2015), investors create layered portfolios in order to protect themselves against risks, simultaneously creating an opportunity to earn profit. One way to do this is to invest in put options at the lower layers of a mental account (downside protection) and to concurrently invest in call options at the upper layers of a mental account, i.e. an upside potential mental account (Das & Statman, 2013).

The BPT emphasizes investors' goals associated with respective specific mental account layers (the goal-based approach). Normal people, i.e. investors, want more than portfolios on the mean-variance efficient frontier. Their ultimate goal is to create a portfolio which will satisfy the goals defined at each layer of the portfolio pyramid (Das *et al*, 2011).

In accordance with the previously stated points, M. Statman (2014, 68) points out the fact that normal investors start the process of constructing behavioral portfolios by dividing the basic portfolio into three mental accounts as layers in the portfolio pyramid. The first mental account (the bottom layer of the pyramid) is designed so as to provide protection from poverty; the second mental account (the middle layer of the pyramid) can be used for education purposes, and the third mental account (the topmost layer of the pyramid) is designed for the purpose of maximizing the investor's wealth. The first mental account is characterized by the investor's aversion to risk, due to which fact bonds make dominant assets at the lowest layer. The second mental account is characterized by a moderate level of risk tolerance, which is the reason why a combination of stocks and bonds prevails at the middle layer. Finally, the third mental account is characterized by the investor's willingness to take more risks, which is why stocks of a small number of companies, or even of a single company, account for dominant assets at the topmost layer. According to E. W. Rengifo *et al*, (2014), investors may have a "short" position in a particular security at one layer of the pyramid and yet maintain a "long" position in the same security at another layer of the pyramid.

The assertion of the BPT that investors demonstrate both risk-aversion and risk-seeking behavior, i.e. that they purchase both insurance policies and state lottery tickets, is explained by the aforementioned mental accounting. The investor's risk-seeking preference and striving to increase wealth are reflected in one mental account, whereas risk-aversion and playing safe in order to avoid poverty are reflected in another mental account. The advantage of mental accounting reflects in the fact that it is easier for an investor to determine his/her level of risk tolerance for each mental account separately than do so for the portfolio as a whole, which requires adding up all abstract mental accounts in the investor's mind into an overall real-life account.

This is how behavioral economists have managed to solve the Friedman-Savage puzzle (Friedman & Savage, 1948), i.e. based on the mental accounting concept and its separate mental accounts (one account for prevention, i.e. playing safe, and another account for promotion, i.e. striving to achieve financial gains), they have given an answer to one of the most frequently cited puzzles in the finance literature: why do people buy both lottery tickets and insurance against losses?

In addition to quite different perceptions of risk, as well as the investment portfolio (a portfolio as a whole and as a collection of sub-portfolios), MPT rational investors and BPT normal investors are also guided by different sets of factors when constructing their desired portfolios. Rational investors construct portfolios guided by the ratio of the expected return and risk, whereas normal investors also consider their own desires, needs, biases, habits, preferences and emotions (Águila, 2009) and often employ heuristics, i.e. mental shortcuts, intuition, even guesswork. In other words, rational investors build their portfolios based on utilitarian benefits (the highest expected return and the lowest possible risk), whereas normal investors choose securities and other financial assets not only based on utilitarian, but also expressive and emotional benefits. The rational investor's goal is to maximize the utilitarian benefit reflected in wealth growth, i.e. maximizing returns for a given level of risk, whereas the normal investor seeks to maximize all the three dimensions of benefits.

According to M. Statman (2014, 66), utilitarian benefits answer the question of how the investor and his wallet benefit from a certain investment. Expressive benefits answer the question of what message a certain realized investment communicates to other people about the investor, i.e. what kind of impression the investor leaves on the people around him. Finally, emotional benefits answer the question of how the investor feels about himself/herself after a certain investment has been realized.

By purchasing shares of a socially responsible company caring about environmental protection, the normal investor realizes a utilitarian benefit in the form of increasing wealth, an expressive benefit, because it gives an impression of him as a socially responsible person, and emotional benefits by feeling satisfied and proud. In contrast to the normal investor, the rational investor can separate a reason from an emotion and can be guided by the sole goal of maximizing wealth. The rational investor is willing to invest in high-yield shares of a company producing alcoholic beverages, even though a member of his family might be fighting alcohol addiction.

According to M. Statman (2014), rational investors are able to separate their roles as investors from their roles as consumers. They invest in high-yield shares of companies producing weapons as investors, whereas they donate money for arms control campaigns as consumers. On the other hand, normal investors, even knowledgeable ones, fail to separate their roles as investors from their roles as consumers and do not invest in shares of the mentioned companies.

Since MPT and BPT investors are guided by different goals and different sets of factors when creating a desired portfolio, it is evident that the BPT's behavioral-wants frontier does not coincide with the MPT's mean-variance frontier; furthermore, the optimal BPT portfolio also differs from the optimal MPT portfolio (Figure 2).

Furthermore, MPT investors have only one efficient frontier to think of, whereas BPT investors have a number of efficient frontiers to consider - one for each mental account (Das *et al*, 2011). Therefore, rather than selecting a single and the most optimal portfolio, normal investors choose several optimal sub-portfolios - one per each layer of the portfolio pyramid. The optimal portfolio is constructed by combining optimal sub-portfolios. According to H. Shefrin and M. Statman (2000, 128), an MPT optimal portfolio is a combination of the market portfolio and risk-free securities, whereas a BPT optimal portfolio resembles a mix of bonds and state lottery tickets because it actually represents a combination of such optimal sub-portfolios.

In terms of the MPT, the optimal portfolio varies from one investor to another, depending on the investor's attitude towards risk (the level of risk tolerance);

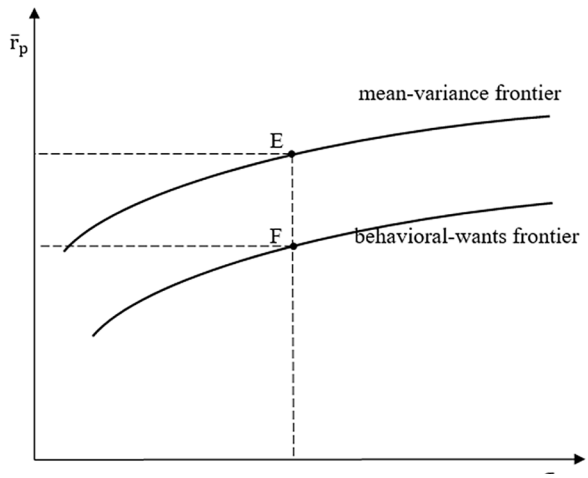

Figure 2 BPT and MPT efficient frontiers - a comparison

Source: Statman, 2017b, 44

however, in the BPT, the optimal portfolio varies across investors not only due to the different levels of risk tolerance, but also because of such investors' different desires, needs, biases, habits, preferences and emotions (social responsibility, patriotism, pride). C. T. Howard (2014) points out the fact that building an optimal MPT portfolio is emotionally difficult as it involves an exchange of emotions, heuristics and natural impulses and a focus on thoughtful analysis.

From the perspective of standard finance and the MPT, an optimal portfolio is a portfolio maximizing the investor's utilitarian benefits, i.e. the one producing the maximum expected return for a given preferred level of risk. On the other hand, from the perspective of behavioral finance and the BPT, an optimal portfolio is a portfolio which, at the given preferred level of risk, maximizes the overall benefits of an investment expressed as the sum of utilitarian, expressive and emotional benefits.

Figure 2 shows Portfolio E, which is the optimal portfolio of a rational investor who ignores expressive and emotional benefits, on the one hand, and Portfolio F, the optimal portfolio of a normal portfolio investor who equally considers all the three dimensions of benefits. Portfolio F is below Portfolio E, because the desire for the realization of expressive and emotional benefits usually results in a lower expected return for the same level of risk. Investors are willing to give up on a certain portion of such an expected return in order to achieve expressive and emotional benefits; this is precisely the reason why the optimal portfolio, as well as the BPT's efficient frontier (the behavioral-wants frontier), is positioned below that of the MPT (the mean-variance efficient frontier). Although Portfolio F does not produce the highest utilitarian benefits, it is optimal because it produces the highest overall benefits for investors considering all the three mentioned dimensions of benefits.

According to the proponents of behavioral finance, investors are willing to accept negative utilitarian benefits in exchange for immediate or potential expressive and emotional benefits. For example, they are willing to accept the negative expected return on a state lottery ticket in exchange for the hope of winning. In other words, they are willing to accept negative utilitarian benefits in exchange for immediate benefits in the form of the emotional excitement of gambling and potential expressive and emotional benefits in terms of the prestige and excitement that a lottery win might bring them.

In a similar fashion, a socially conscious investor is willing to give up on high-yielding stocks of companies engaged in providing gambling services, the production of alcohol, tobacco and weapons, in exchange for low-yielding stocks of socially responsible companies. Such willingness of investors is reflected in replacing utilitarian benefits with expressive and emotional benefits. Therefore, investors compensate for these reduced utilitarian benefits by expressive and emotional benefits. In the present case, the stocks of socially responsible and socially irresponsible companies are not considered as substitutes based on their equal levels of utilitarian benefits, but because they provide the same level of overall benefits. M. Statman (2017a) states that roses are not a substitute for chocolates by providing nutritional benefits, but they are rather a substitute for chocolates by providing expressive gratitude and emotional affection.

Despite the fact that the BPT's and MPT's optimal portfolios differ from each other, the results of recent research (Das, Markowitz, Scheid & Statman, 2010; Pfiffelmann *et al,* 2016) have shown that, eventually, the BPT and the MPT lead to selecting similar portfolios with more things in common than it was originally assumed. In a survey conducted by Pfiffelmann *et al*, (2016), the optimal BPT portfolio was on the MPT's efficient frontier in more than 70% of the cases. The research study was conducted without any limitations or restrictions: all the features (not only the selected BPT features) were taken into account and, in addition, the authors allowed for short sales and left out the assumption of the normal distribution of returns. However, the same research found that the BPT optimal portfolio always lies on the upper right part of the efficient frontier, which is characterized by a high level of risk. Therefore, in terms of standard finance, the average investor will select the BPT optimal portfolio despite the fact that it lies on the efficient frontier. The selection of such a portfolio requires a low level of risk aversion, which is not typical of the average traditional investor. More specifically, the selection of the most optimal BPT portfolio requires a level of risk aversion which is up to ten times as low as the investor's risk preferences in standard finance (Pfiffelmann *et al*, 2016).

By summarizing the above-stated points, a number of the differences between the MPT and the BPT that support the claim that the BPT evolved as an alternative and a great challenge to the MPT (Table 1) can be identified.

Bearing in mind the explained key features of both the BPT and the MPT, it can be concluded that, by incorporating psychological factors, the BPT "has gone one step further", thus upgrading and updating the MPT and standard finance. Specifically, the BPT has picked up where the MPT left off and filled the gaps in portfolio theory, thus making the circle complete. In addition to maximizing the utilitarian benefits, the BPT points to the investor's equally important goals, namely the maximization of expressive and emotional benefits. In this way, the BPT has brought portfolio theory closer to reality given the fact that, in real-life situations, investors are not solely guided by the goal of maximizing their personal wealth, but they also take into account social responsibility, conformism, and social acceptance. By introducing the mental accounting concept, the BPT has made a big step forward. Mental accounting allows the investor to accept several levels of risk tolerance instead of only one, as well as the plurality of investment goals. It has also provided an opportunity to build an optimal investment portfolio based on several optimal sub-portfolios ensuring the successful satisfaction of the investor's goals. The BPT reflects reality more realistically than the MPT does, due to the fact that it takes into consideration the true nature of people, their different desires, needs and preferences.

However, it is still too early and exaggerated to a certain extent to talk about the superiority of the BPT over the MPT, because both theories face the serious limitations identified and explained by G. Curtis (2004), which are as follows: by applying the MPT techniques, financial advisors propose portfolios to their clients, i.e. investors, which are optimal in terms of the relationship between a return and risk; however the likelihood that investors will follow the given advice is slim; on the other hand, by employing the BPT techniques, financial advisors propose the portfolios that resonate well with investors; however, such portfolios are not likely to be optimal in terms of the relationship between return and risk. As a financial advisor's client, the investor will be disappointed in both cases - in the first case, he/she will be disappointed because of his/her failing to follow the financial expert's advice; in the second case, because of his/her having followed the given advice (Curtis, 2004, 19).

THE BEHAVIORAL ASSET-PRICING MODEL AS AN ALTERNATIVE TO STANDARD FINANCIAL ASSET-PRICING MODELS

Behavioral finance theory argues that it is essential to understand the psychology of market participants in order to be able to fully understand asset-pricing and the movement of asset prices (Fakhry, 2016, 458). The expected return on securities varies not only due

Table 1 Summary of key differences between the MPT and BPT

MPT	BPT
Investors are perfectly rational people, who can separate a reason from emotions and who are guided by the sole aim of maximizing their own wealth.	Investors are normal, ordinary people, who, under the influence of a cognitive bias and misleading emotions, do not always make rational decisions and are not guided by the sole aim of maximizing personal interests.
Investors are solely characterized by risk aversion.	Investors are risk-seeking and risk-averse at the same time.
Risk is measured by a variance, i.e. a standard deviation of returns.	Risk is measured by a loss probability, i.e. failure to achieve the set goal, mean shortfall, or as the product of losses.
Investors view a portfolio as a whole and do not apply the mental accounting concept.	Investors view a portfolio as a collection of sub-portfolios, each of which is optimal for a particular mental account.
Investors have a single level of risk tolerance which is applied to a portfolio as a whole.	Investors have several levels of risk tolerance, one for each mental account.
Investors have one overall goal (maximizing returns at a preferred level of risk) which is applied to a portfolio as a whole.	Investors have several goals (avoiding poverty, education, increasing wealth), one goal per each mental account.
Investors construct their portfolios guided solely by the expected return to risk ratio.	Investors construct their portfolios guided by the expected return to risk ratio, as well as their wishes, needs, habits and emotions.
Investors have to deal with only one efficient frontier.	Investors have to deal with several efficient frontiers - one frontier per each mental account.
Investors select a single optimal portfolio.	Investors select several optimal sub-portfolios - one per each level of the portfolio pyramid.
The optimal portfolio is a combination of a market portfolio and risk-free assets.	The optimal portfolio is constructed by integrating optimal sub-portfolios and it resembles a mix of stocks and state lottery tickets.
The optimal portfolio is a portfolio maximizing the investor's utilitarian benefits.	The optimal portfolio is a portfolio maximizing the investor's overall benefits expressed as a sum of utilitarian, expressive and emotional benefits.
The optimal portfolio varies across investors, depending on their level of risk tolerance.	The optimal portfolio varies across investors not only due to different levels of risk tolerance, but also because of their different desires, needs, biases, habits, preferences and emotions.

Source: Author

to differences in the risk level that various securities carry with themselves. In addition to risks, there are numerous psychological factors which influence the investor's choice, the price of securities and, ultimately, the expected return (Hirshleifer, 2001). The psychological factors that support the selection of a particular security do increase the price of this security through increased demand and also reduce its return; vice versa, too, the psychological factors that do not support the choice of a certain security lower the price of this security through reduced demand while increasing its return.

Based on the aforementioned facts, H. Shefrin and M. Statman (1994) developed the BAPM model as an alternative to the following standard financial asset-pricing models: the capital asset-pricing model - CAPM, the Fama-French three-factor model, the Carhart four-factor model, and arbitrage pricing theory - APT.

Based on CAPM, the beta coefficient (as a measure of systemic risk) is the only factor that determines the rate of the expected return. In addition to the beta coefficient, the Fama-French three-factor model introduces equity market capitalization and the ratio

of book value to market value (the B/M ratio) as the main factors of risk, as well as the indicators of future returns. The Carhart four-factor model is an extension of the Fama-French three-factor model, including the momentum factor (inertia) as the fourth factor while, according to the APT model, the rate of the expected return depends on a number of factors; however, the model does not specify the factors in question.

With an increasing number of factors, the complexity of the model also increases, thus robbing such models of their elegance. However, as M. Statman (2008) points out, investors, portfolio managers and financial professionals do not need elegant models; they need the models that describe real people in real markets, and these are behavioral finance models. Behavioral finance offers the BAPM model, which is no less elegant than standard finance models; however, it is much closer to reality.

The creators of the BAPM model, H. Shefrin and M. Statman (1994), point out the fact that fundamental standard finance theories - the CAPM model and the Efficient Market Hypothesis (EMH), also referred to as the twin theories - can only be applied to the markets composed of rational investors and information traders. However, such markets do not exist in the real world and, hence, do not reflect reality, but an idealized concept. In real life, real markets are composed not only of information traders, but also of noise traders, who are prone to making cognitive errors and irrational decisions. Irrational optimists or pessimists make the market inefficient and cancel the validity of the CAPM model due to their actions. According to M. M. Pompian (2006, 272), in most cases, investors are unaware of their predisposition to make wrong moves and act irrationally.

In contrast to traditional economists' claim that rational investors succeed in annulling the influence of irrational investors by rationally making buying transactions, thereby cancelling the selling transactions of irrational investors, and vice versa, behavioral economists clearly stress the limitations of arbitration. In other words, while standard finance theory suggests that the impact of the irrational behavior of market participants is irrelevant because market forces will always act to bring prices back to rational levels (Lo, 2005, 21), behavioral finance theory emphasizes the influence of irrational behavior caused by the effects of various psychological factors.

By successfully incorporating psychological factors in the process of financial asset-pricing, the BAPM model has made "a step forward" compared to standard finance models (Chandra & Thenmozhi, 2017). According to D. Hirshleifer (2001), the asset-pricing models based on psychology are an opportunity to "catch up with reality". M. Statman (2014) warns that researchers are too busy finding new factors and determining statistically significant associations between these factors and the realized return to pause and think about theoretical rationales for these associations. Today, the number of the identified factors associated with stock returns continues to grow in a statistically significant manner. However, M. Statman (2014) points out the fact that theoretical rationales for such factors are as important as statistical significance. The statistical significance of associations between the factors and actual returns may be strong even when such theoretical rationales are weak, and *vice versa*. Theoretical rationales are of crucial importance, because their absence practically cancels statistical significance .

In addition to attributing different levels of importance to incompletely informed investors ("noise traders") and their irrational decisions, another important difference between the standard financial asset-pricing models and the BAPM model reflects in the fact that standard models price assets based on their utilitarian benefits, whereas the BAPM model prices assets based not only on their utilitarian benefits, but also on expressive and emotional ones. Therefore, in line with the BAPM model, assets are worthy because they bring utilitarian benefits (low risk, high returns), as well as expressive (social responsibility, patriotism) and emotional (satisfaction, pride, excitement caused by trading) benefits.

We should also keep in mind the fact that the financial asset-pricing process is also affected by cognitive errors and misleading emotions (e.g. when investors differently estimate a company's stock

value due to the information on the company size), in addition to utilitarian, expressive and emotional benefits. If a financial analyst communicates to investors that a company is a large business, this will evoke positive emotions; on the other hand, if a financial advisor informs investors that the company they are interested in is a small business, negative emotions will come to surface regardless of the fact that, according to the research findings, the shares of the companies with low market capitalization usually generate higher returns.

The conclusion is that, based on the BAPM model, the expected return on assets is determined by utilitarian benefits, expressive benefits, emotional benefits, as well as cognitive errors and misleading emotions. For example, the expected return of a company's stocks depends on risk, liquidity, social responsibility, prestige, excitement, as well as cognitive errors and misleading emotions.

A preference for stocks of a certain company based on expressive and emotional benefits means greater demand, higher prices and a smaller expected return, i.e. a lower utilitarian benefit. In this respect, it is not surprising that, for example, the shares of socially responsible companies have a lower expected return than the shares of companies in the military, alcohol and tobacco industries (Hong & Kacperczyk, 2009; Statman, 2014). To sum up, higher expressive and emotional benefits result in lower utilitarian benefits. Therefore, as is explained above, the behavioral finance optimal portfolio as a rule earns a lower expected return for the same level of risk than the standard finance optimal portfolio.

The differences in the pricing of real assets are explained by the differences in terms of utilitarian, expressive and emotional benefits. Mercedes and Dacia provide the same level of utilitarian benefits in terms of the transport of passengers from one place to another; however, Mercedes provides higher expressive benefits in the form of luxury, the style and a refined taste, as well as greater emotional benefits in the form of higher satisfaction and pride. Higher expressive and emotional benefits result in a higher price which consumers are willing to pay when buying a Mercedes. In this case, the expected price of a car is the function of its usefulness as a means of transportation and the fact that it reflects luxury, the style, a refined taste, pleasure, pride, cognitive errors and misleading emotions.

M. Statman (2017a) points out the fact that investment asset-pricing models can be compared with pricing models for meals, cars, films and every other product and service. The value of a dinner in a restaurant reflects in the fact that it brings not only utilitarian benefits (a nutritional value), but also expressive (prestige) and emotional (satisfaction, a good taste, aesthetics) ones. In this regard, it is no wonder that a restaurant meal is more expensive than a supermarket meal, although both meals have an equal nutritional value. Therefore, in terms of pricing products and services, cognitive and emotional errors must be taken into consideration; for example, consumers will perceive the same wine in different ways, depending on the bottle's price tag, i.e. the information on its price. A higher price tag on a wine bottle creates an illusion of a better quality and a better taste, and evokes a feeling of a greater pleasure; however, the same wine with a lower price tag evokes quite different reactions, i.e. an opposite sentiment. In a similar fashion, a consumer will perceive exactly the same pair of sunglasses differently, again depending on the price tag. He/she will perceive a more expensive pair as more quality eyewear than the pair with a lower price tag.

It is important to emphasize the fact that standard finance completely ignores the effect of affect in the process of financial asset-pricing, whereas the BAPM model duly recognizes its importance. According to P. Slovic, M. L. Finucane, E. Peters and D. G. MacGregor (2007), an affect is an inevitable component of human judgment and decision-making. An affect is a short-lasting positive or negative feeling or emotion that accelerates the decision-making process. The very mention of certain car, mobile phone and watch brands evokes feelings of desirability or undesirability in consumers. There is a similar situation in the case of company shares. Shares of socially and environmentally responsible companies are associated with producing a positive

affect and are a preferred choice in relation to shares of companies operating in the alcohol, military and tobacco industries.

A positive affect depresses the perception of risk in investors' eyes, whereas a negative affect intensifies the perception of overall risk. A negative affect is the source of high subjective risk, whereas low subjective risk is associated with a positive affect. In contrast to standard finance, which does not recognize the concept of subjective risk, behavioral finance includes the category of the total risk defined as objective risk plus the level of subjective risk. Thus, standard finance views risk as an objective category, whereas, according to N. Linciano (2010), behavioral finance argues that risk and uncertainty are not only mathematical and statistical concepts, but also psychological constructs. Furthermore, standard finance emphasizes the quantitative aspects of risk and assumes a positive correlation between return and risk, whereas behavioral finance focuses on the qualitative features of risk and seeks to explain the occurrence of a negative correlation between return and risk (Ricciardi, 2008).

Behavioral economists explain a possible negative correlation between return and risk as a result of the effects of subjective risk. If objective risk is relatively low, the expected return can be high, due to a negative affect, i.e. due to high subjective risk. A negative affect increases the level of risk in the eyes of investors, thereby reducing their demand for assets regardless of the fact that the price of such assets is going down and their expected return is going up. Again, if objective risk is relatively high, the expected return might be low as a result of a positive affect, i.e. low subjective risk. A positive affect reduces the level of risk in the eyes of investors and increases their preference for the assets whose price is going up, while the expected return is going down.

Therefore, according to the BAPM model, affects play an important role in the pricing of financial assets as investors prefer assets with a positive affect and avoid assets with a negative affect. When investors have positive feelings, i.e. a positive affect, they perceive financial assets as highly beneficial and risk-free, whereas, in the case of a negative affect, the same assets are perceived as offering few benefits and being risky (Linciano, 2010). Positive preferences boost asset prices, while negative preferences adversely affect the price of assets.

Another important factor affecting the process of financial decision-making and financial asset-pricing refers to mental schemas. Mental schemas are the subjective experiences that exist at the unconscious level and may affect the process of perception and reasoning. The smell of fresh donuts evoking the happy memories of childhood and the warmth of the family home triggers the activation of the mental schema that subconsciously drives us to buy the product, even if we are not hungry. In a similar fashion, due to the operation of mental schemas, investors often opt to purchase the shares of the local companies where their parents used to work or the land that was once owned by their family. In this way, the operation of mental schemas increases demand for the mentioned assets, thereby increasing their price.

The formation of mental schemas can also result in making irrational decisions. While house hunting, when faced with the choice between two houses identical in the square footage, the backyard size and the location, a prospective houseowner will opt for the house that reminds him/her of his/her family house and will be willing to pay a significantly higher amount of money for that house. Such a decision and other similar irrational decisions made by such investors are the reasons why the prices of real and financial assets do not reflect the real value of such assets.

By summarizing the abovementioned facts, numerous differences between the BAPM model and the standard financial asset-pricing models can be identified. This also supports the position that the BAPM model has been developed as an alternative and a great challenge to standard financial asset-pricing models (Table 2).

With this in mind, and having presented the main characteristics of the standard asset-pricing models and BAPM as well, it is only logical to conclude that, by taking into account the psychological factors, BAPM

Table 2 Summary of key differences between standard finance asset pricing models and BAPM

Standard finance asset pricing models	BAPM model
Expected return on assets varies due to different risk levels.	Expected return on assets varies not only due to different risk levels, but also numerous psychological factors.
The impact of the irrational behavior of market participants is irrelevant, since rational investors succeed in canceling the influence of irrational investors.	The impact of the irrational behavior of market participants is important, since rational investors fail to cancel the influence of irrational investors, which supports the position on arbitration limitations.
Assets are priced based on their utilitarian benefits.	Assets are priced not only based on their utilitarian benefits, but also based on expressive and emotional benefits.
Asset prices are not affected by cognitive errors and misleading emotions.	Asset prices are affected by cognitive errors and misleading emotions.
Affects have no impact on the pricing of financial assets.	Affects strongly affect the pricing of financial assets.
Mental schemas do not affect the pricing of financial assets.	Mental schemas strongly affect the pricing of financial assets.
Risk is an objective category and is not influenced by affects, therefore it is not psychological, but exclusively mathematical and statistical concept.	Total risk implies both objective and subjective risks, therefore, it is not exclusively mathematical and statistical concept, but also the psychological one.

Source: Author

has succeeded in matching theoretical asset-pricing to real life situations. This important step forward was made due to the fact that this psychology-based asset-pricing model recognized the limits of arbitration, thus emphasizing the significance of the impact of market participants' irrational behavior. BAPM has incorporated the utilitarian benefits (the foundation stone of standard finance) and added expressive and emotional benefits as the important determinants of the asset-pricing process; therefore, this model is rightly recognized as an upgrade to the standard financial asset-pricing models. Specifically, the BAPM model has not only included risk as an important building block of standard finance, but it has also included many psychological elements, such as a positive and a negative affect and mental schemas, thereby improving the standard financial asset-pricing models.

The above-stated facts are supportive of the conclusion on the superiority of BAPM over standard financial asset-pricing models. However, as pointed out by N. Barberis (2018), it is still too early to make any definite conclusions in this respect, because the behavioral approach to asset-pricing that rests upon psychological factors is still relatively young compared to the traditional approach that emerged three decades ago.

CONCLUSION

The summary of the key differences between the MPT and the BPT, i.e. between the standard financial asset-pricing models and BAPM, unambiguously confirm the fact that the BPT and BAPM have been developed as an alternative and a great challenge to standard finance theory. Given the fact that both the BPT and BAPM include and better understand the impact of psychological factors, these models fill the gaps in portfolio theory and asset-pricing models, thus making the circle complete. A better understanding of psychological factors allows investors to overcome cognitive errors and resist the impact of misleading emotions. This understanding of psychological elements, their role and significance, indeed improves

the efficiency of portfolio management. Furthermore, a better understanding of the impact of psychological factors and the investment decision-making process in general implies a better understanding of financial asset-pricing methods and, therefore, a more efficient allocation of assets.

In contrast to the standard finance theory and the respective models that advise investors how to make investment decisions (the normative approach), the BPT and BAPM seek to explain how individual investors actually make decisions in practice (the positive approach). In addition, unlike the theories and standard finance models which, because of the application of too restrictive assumptions and strict scientific rules fail to explain the complex financial reality, the BPT and BAPM incorporate the concept of mental accounting, bounded rationality, expressive and emotional benefits, as well as the concept of arbitration limitations, thus managing to bring financial theory closer to reality and supplement standard finance theory, which confirms the initial hypothesis stated herein. Nevertheless, it is still too early and exaggerated to a certain extent to talk about the superiority of the BPT and BAPM over the MPT and standard asset-pricing models since both the behavioral and standard approaches face significant limitations. The above-mentioned conclusions are the key findings, as well as the outcome, of the research study and as such, they are compatible with the conclusions reached by G. Curtis (2004) and N. Barberis (2018).

The contribution of this paper to theory reflects in the fact that it elaborates the first qualitative research of the BPT and BAPM in the domestic literature, thus contributing to a better understanding of these relatively young theoretical frameworks. Furthermore, the theoretical contribution of the paper reflects in the identification and summary of the key differences between the BPT and the MPT, i.e. between BAPM and standard financial asset-pricing models.

In practical terms, a better understanding and application of the BPT and BAPM can be of a great benefit to investors, portfolio managers, financial experts and other participants in the market in terms of improving investment activities, making portfolio management more efficient and performing more accurate asset-pricing and an efficient allocation of assets.

The main limitation of the paper originates from the absence of the original empirical research study and the empirical verification of the initial hypothesis. In addition, an empirical analysis aimed at comparing the postulates of and benefits from the application of the BPT and BAPM with those of standard finance theory and models was not carried out. The Carrying out an appropriate empirical research study calls for a comprehensive quantitative analysis going beyond the content of this research study and also constitutes a recommendation for future research in this field.

For example, future research in this field could explore the possible optimal solution that would reconcile the conflicting viewpoints of traditional and behavioral economists, which could be achieved by applying an eclectic approach in order to create a synergy between the available knowledge and combine the best elements of behavioral and standard finance.

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THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES BY ENTERPRISES IN THE EUROPEAN UNION MEMBER COUNTRIES

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The paper analyzes the use of information and communication technologies (ICT) in enterprises in the European Union member states. The objectives of the analysis were to examine the level reached in the application of ICT in European enterprises and explore the differences in ICT usage that exist between the EU member states. The analysis is based on the Eurostat data on ICT usage in enterprises in the European Union countries (EU-28) for the years 2018 and 2017. The following indicators of ICT usage were analyzed: fixed broadband access, the speed of the internet connections, the presence of the Internet (enterprises having a website), the use of social media, the use of cloud computing services, e-commerce indicators (the share of the enterprises making e-sales and the share of e-commerce in the total turnover) and the indicators of e-business integration - the share of the enterprises using enterprise resource planning (ERP), customer relationship management (CRM) and the supply chain management (SCM) software applications. A comparative analysis of the EU countries by the value of these indicators was carried out. The main focus in the analysis was to identify the factors that influence the difference in the value of the ICT indicators between the countries. The analysis has shown that the regional position, the geographic characteristics, the size of the country and the level of its economic development are the factors that influence these differences.

Keywords: information and communication technology, e-commerce, e-business integration indicators, enterprises, European Union

JEL Classification: O330, L86

INTRODUCTION

Despite the great attention being paid to the implementation and development of information and communication technology (ICT) in the EU countries and the importance given to it in the public, the media and science, there are still IT-related topics, even entire fields, which are insufficiently dealt with. This is especially true when it comes to its usage in enterprises. This paper deals with one of these, not yet sufficiently researched topic, and analyzes the level

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achieved in the use of information and communication technologies in enterprises in European countries. Although there is a general opinion that, due to their economic development, the EU countries have come a long way in implementing ICT, there are still significant differences between them in this respect. The aim of the study was to analyze the achieved level in the use of ICT in enterprises in the EU countries, explore the differences and identify the factors that influence the use of ICT in enterprises. Of course, Europe, i.e. European institutions, primarily the European Commission and Eurostat, deal with these issues; in their analyses, however, they mainly focus on the member states individually. The subject matter of this paper is the identification of regularities, synthesizing the findings regarding the factors that influence the use of ICT in enterprises in general, rather than an analysis of only one individual country or a single group of countries within the European Union.

As the EU member states significantly differ in their characteristics (in terms of their population, surface area, geographic position, historical and cultural heritage, the structure of their economies, the achieved level of social and economic development, the level of technical and technological development, and so on), the research study rests on the hypothesis that the differences between the member states, which reflect on all the aspects of their economic and social life, have an impact on the adoption and application of information and communication technologies. The question that arises is: What are the differences, i.e. what are the characteristics of the countries that influence the use of ICT, in particular the use of ICT in enterprises? In order to answer this question, the statistical indicators of the use of information and communication technologies in enterprises collected and published by EUROSTAT are observed, and a comparative analysis among the countries based on the value of these indicators was carried out.

At the beginning of this paper, a review of the literature dealing with the usage of ICT in enterprises in the European Union is provided. Then, Eurostat's methodology used to collect the data and calculate the indicators of ICT usage in enterprises is presented in brief. The central part of the paper is dedicated to the description of the analysis of the selected indicators and the comparative analysis between the countries in order to point out the factors that influence the differences in the value of the indicators between the countries. In the conclusion, the main results of the analysis are summarized. Finally, the appendix provides the tables showing the ranking of the EU member states by the indicator values.

LITERATURE REVIEW

That the studies dealing with the economic aspects of the ICT implementation focus on a relatively small number of topics was observed as early as in 2015 (Roztocki & Weistroffer, 2015). To date, not much has changed; so, studies mostly deal with the following topics: the impact of ICT on the way enterprises do business and their efficiency and competitiveness growth (Real, Leal & Roldán, 2006), the impact of ICT on economic growth and development (Stankic, Jovanovic Gavrilovic & Soldic Aleksic, 2018), the economy and society as a whole (Roztocki, Soja & Weistroffer, 2019). If, as in (Bouwman, van der Hooff, van der Wijngaert & van Dijk, 2005), adoption, implementation, application and effects are analyzed when ICT usage in organizations is concerned, studies could be said to be dealing mainly with the effects of ICT on enterprises' operations, while ICT implementation and application in enterprises are insufficiently addressed, as is evidenced by a small number of papers. The adoption of advanced IC technology, such as cloud computing and big data analytics, has been in the focus of researchers' attention lately (for the most important characteristics and concepts of big data, see Chroneos-Krasavac, Soldic-Aleksic & Petkovic, 2016).

Regarding the studies dealing with ICT usage in the EU countries, the most important source of data is the European Commission. Each year, the European Commission releases the European Digital Progress Report (EDPR) for all the EU countries, which includes a digital profile of each country (Country Profile). In

that document, the progress of the EU member states in digitalization is evaluated. The evaluation uses the value of the Digital Economy and Society Index (DESI) for the country, combined with a qualitative analysis (European Commission, 2017). The Digital Economy and Society Index (DESI) is a composite index published by the European Commission, which quantifies progress in digitization (European Commission, 2019). Qualitative analysis includes an analysis of country-specific conditions and policies. The evaluation of the ICT implementation level for each country avoids value judgments (e.g. developed/ underdeveloped), dividing countries into medium-, high- and low-performing countries. For example, the countries that are DESI-rated at the average level are medium-performing countries; those being above the average are referred to as high-performing, whereas those below the average are low-performing countries. One major part of the Digital Progress Report, entitled the Digitalization of Enterprises, refers to the use of ICT in enterprises.

The Digital Progress Report is very detailed and contains a lot of data. The European Commission also publishes a large number of analyses and studies dealing with ICT application in European economies. On the other hand, there is not enough scientific work done in this field. Considering the expertise of the European Commission's reports and the abundance of published data, one might think that it is sufficient for the European Commission alone to deal with data, statistics and analyses. Apart from that expert perspective, however, there is a lack of the research initiative that is not solely related to European institutions. There is still plenty of room for research and every new aspect of the analysis and a different point of view could be helpful and give new insights.

Several studies dealing with ICT usage in enterprises in European countries have made efforts to rank the countries according to the level of the implementation achieved and identify the factors influencing the process of ICT adoption. J. Becker, A. Becker, P. Sulikowski and T. Zdziebko, (2018) rank the countries of Central Europe, the members of the European Union (Austria, the Czech Republic, Germany, Hungary, Slovakia, and Slovenia) according to ICT usage in enterprises using the analytic network process (ANP). The survey shows that, among these countries, Slovenia and Austria are the 2017 leaders in ICT usage in enterprises. A. Zečević and J. Radović-Stojanović (2018), analyze the use of ICT in enterprises in Slovenia, Croatia, The Republic of Serbia, Bosnia and Herzegovina, Macedonia, and Montenegro. Investment in and the development of the information and communication infrastructure are identified as the factors influencing ICT usage in enterprises in these countries. The study concludes that the EU member states, namely Slovenia and Croatia, are leading in ICT usage in their enterprises, especially so in the adoption of advanced technology, i.e. cloud computing and e-commerce. The use of information and communication technologies in Serbian enterprises in comparison with the European average is presented in (Stankić & Stojković, 2017).

The United Nations (UN), which ranks countries on the basis of the ICT Development Index (IDI), a composite index based on the 11 ICT indicators, also addresses the level of ICT implementation and country ranking. Based on the 2017 IDI Index, the best-ranked members of the European Union are Denmark, the United Kingdom, and the Netherlands (United Nations, 2018). J. Soldić-Aleksić and R. Stankić (2015), point to the Networked Readiness Index (NRI), a composite index calculated and published by the World Economic Forum. According to the Global Information Technology Report published by the organization, six European countries (Finland, Sweden, Norway, the Netherlands, Switzerland, and the United Kingdom) are among the 10 best-ranked countries by the NRI index value (World Economic Forum, 2016). The NRI structure is complex, as it consists of the 54 indicators of ICT application in the economy and society. Regarding the classification of the European countries by the success of ICT implementation on the basis of this index, it is regional, with the South, Central, and Eastern European countries seen to be lagging behind the countries of Northern and Central Europe.

DATA SOURCES AND METHODOLOGY

Eurostat's data on ICT usage in enterprises are a result of the statistical survey called "Usage of information-communication technology (ICT) in enterprises". The survey has been conducted once a year since 2002 in all EU Member States. It collects data on the use of ICT in enterprises, the use of the Internet, e-business, and the other relevant aspects of ICT usage in enterprises. The results are published within the Digital Economy and Society statistical area on the Eurostat website. The results are published in Eurostat's publications, as well as in Eurostat's database.

The methodological basis of the survey is the Methodological Manual for Information Society Statistics (Eurostat, 2018). The Methodological Manual defines the observation units, the research objective, the research time period, the target population, the variables to be covered, the indicators to be calculated, the aggregates to be obtained, the sampling system, the concepts, the nomenclatures, and all the other elements of the statistical survey. The common survey methodology has contributed to the comparability of the data obtained from all the EU countries. The survey based on this methodology is also being conducted in the other European states that are not the EU members.

The observation units, i.e. reporting units, in the survey are enterprises with 10 or more employees - small (10-49), medium (50-249), and large enterprises (enterprises with more than 250 employees). The survey is conducted on the basis of a questionnaire containing the questions grouped by several modules, these modules being: Computer Application, ICT Experts and Skills, Internet Access and Usage, Use of Cloud Computing Services, E-Commerce, Electronic Invoicing, Big Data Analytics. In the latest version of the methodology, the survey has been expanded with the following modules: Using a 3-D Printer and Using Robotics. The questionnaire is filled out in enterprises by phone or sent by e-mail. The data collected through the survey are submitted to the national statistical offices to process them, store them in a database, and publish them in official publications.

In this paper, fixed broadband access in enterprises, the speed of internet connections, the presence of the Internet (enterprises having a web site), the use of social media, the use of cloud computing services, e-commerce indicators (the share of the enterprises that make e-sales and the share of e-commerce in the total turnover) and the indicators of e-business integration (the share of the enterprises that use Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and the Supply Chain Management (SCM) software applications are analyzed. EUROSTAT collects numerous data and calculates a number of the other indicators of the usage of information and communication technologies in enterprises, and the indicators observed in this paper are chosen because they are the indicators that EUROSTAT itself singles out as representative and most commonly used in its analyses. Relying on the EUROSTAT indicators, a comparative analysis of the values of the selected indicators by country, on the one hand, and the characteristics of the countries, on the other, is carried out in order to identify the regularities, group the countries with the indicator values at approximately the same level and identify the factors that influence the usage of ICT in enterprises.

ICT USAGE INDICATORS IN THE EUROPEAN UNION ENTERPRISES - EMPIRICAL DATA AND ANALYSIS

In this paper, the data on the usage of ICT in enterprises in the European Union member states were used. The data were downloaded from the Eurostat Database. The analysis relies on the 2018 data, and where the 2018 data have not been published yet, the latest available data, i.e. the 2017 data, were used.

In 2018, 92% of the enterprises in European Union used fixed broadband Internet access. A share of 90% was reached in 2012, and has not changed much since then, ranging from 92% to 93% from year to year (Figure 1). The share of the enterprises using a fixed broadband Internet connection is the indicator of the development of the information infrastructure,

and ranges from 81% of the enterprises in Latvia to 100% in Denmark. Belgium (96%), the Netherlands (99%) and Luxembourg (97%) have a high share of enterprises, whereas the major European economies, i.e. Germany (93%), France (94%), Italy (91%), and Spain (91%) recorded an average share. The countries with the share of enterprises using a fixed broadband connection below 90% are Romania (82%), Hungary (83%), Bulgaria (84%), Poland (87%), Slovakia (89%), the Czech Republic (89%), and Greece (84%). With the exception of Greece, these are Central and Eastern European countries. Greece is a coastal country, with a long, rugged coastline and a large number of islands and peninsulas, which dictates certain specific features regarding the development of the IT infrastructure. As the paper will show, there are also the other indicators that are common to individual coastal and island countries.

The basic form of the Internet presence pertains to enterprises having a website. Enterprises use their website to describe their goods or services, show prices, introduce customers to products, include links to social networks, enable online orders and track such orders. In 2018, 77% of the enterprises in the European Union had their own website, and since 2012, that share has increased by 6% (Figure 1). The following countries have demonstrated a share of the enterprises having their own website higher than 90%: Sweden (92%), Finland (96%), Denmark (96%), as well as the Benelux countries - Belgium (84%), the Netherlands (94%) and Luxembourg (83%). The large, developed European economies, such as Germany (87%) and the United Kingdom (82%), as well as the Czech Republic (83%), have a high share of the enterprises with their own website, whereas France (69%), Italy (71%) and Spain (76%) have shown a share of the enterprises that have a website of their own below the European average. The lowest share of the enterprises having a website of their own is found in Latvia (63%), Romania (44%), Bulgaria (51%) and Hungary (66%).

Another important indicator of the infrastructure development is the speed of the Internet connection. In 2018, 20% of the EU-28 enterprises had an Internet connection speed ranging from 2 to 10 Mb/s, 24% of the enterprises were within the range from 10 to 30 Mb/s, and 25% of the enterprises were within the range from 30 to 100 Mb/s, with a connection speed greater than 100 Mb/s in 18% of the enterprises (Figure 2). The share of the enterprises that use a slower Internet connection has been declining for the past five years, while the share of the enterprises that use a higher connection speed has been increasing. This trend is present in most countries, regardless of the enterprise structure in terms of the connection speed.

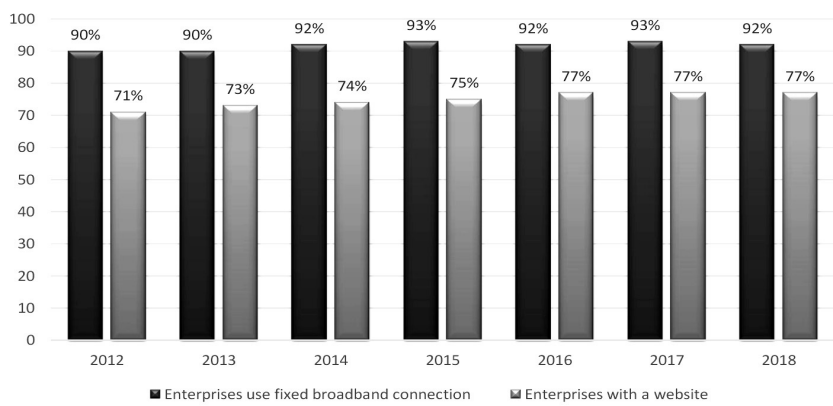

Figure 1 The enterprises using a broadband internet connection and the enterprises having a website of their own, EU-28, 2012-2018 (% of the enterprises)

Source: Authors

One of the most important aspects of using the Internet in enterprises pertains to the use of social media. The types of social media are: social networks, multimedia content sharing sites (Youtube, Flickr, Picassa), the enterprises blog (Twitter), and wiki data sources. In several European countries, more than 50% of the enterprises used social media in 2017 (Finland - 63%, Sweden - 65%, the Netherlands - 68%, Belgium - 58%, Luxembourg - 54%), whereas in the others, the share of these enterprises was around or even below 30% (Bulgaria - 34%, Romania - 35%, Hungary - 38%, Poland - 27%, the Czech Republic - 36%, Slovakia - 39%).

How social media are used by enterprises and how many enterprises use social media is best seen when using social networks. The smaller the country, the farther away from large European markets, the harder it is to reach and interact with customers on these markets, the greater is the share of the enterprises that use social networks in their operations. Thus, the largest share of the enterprises using social networks in 2017 is found in small island countries - Malta (73%), Ireland (67%), Cyprus (65%), as well as Denmark (67%), the Netherlands (66%), Sweden (63%), as well as in the United Kingdom, where the share of the enterprises using social networks is 60%. All these countries have a share of the enterprises that use social networks higher than the average of 45% for the European Union as a whole. At the same time, enterprises in large European economies, in Central European countries, do not rely that much on social networks in their business doing, for which reason the share of the enterprises using social networks in these countries is below the EU-28 average and is 39% in France, 40% in Germany, 42% in Italy, and slightly above the European average - 49%, in Spain. Enterprises in these economies have other ways to reach customers and the common European market; moreover, they make up that market (or at least most of it).

The lowest share of the enterprises using social networks in their business doing is recorded in Hungary (36%), Slovakia (35%), Bulgaria (34%), the Czech Republic (34%), Romania (34%), Latvia (29%), and Poland (26%). Again, these are Central and Eastern European countries, the former countries in the process of transition to the market economy. N. Roztocki and H. R. Weistroffer (2008), said that the social and economic characteristics of these countries and the level of economic development and business culture would reflect on the adoption and application of ICT. From the IT infrastructure, via the Internet usage and a website ownership, to communication with customers via social networks, these countries are still lagging behind developed European economies. P. Soja and P. R. Cunha (2015) summarize

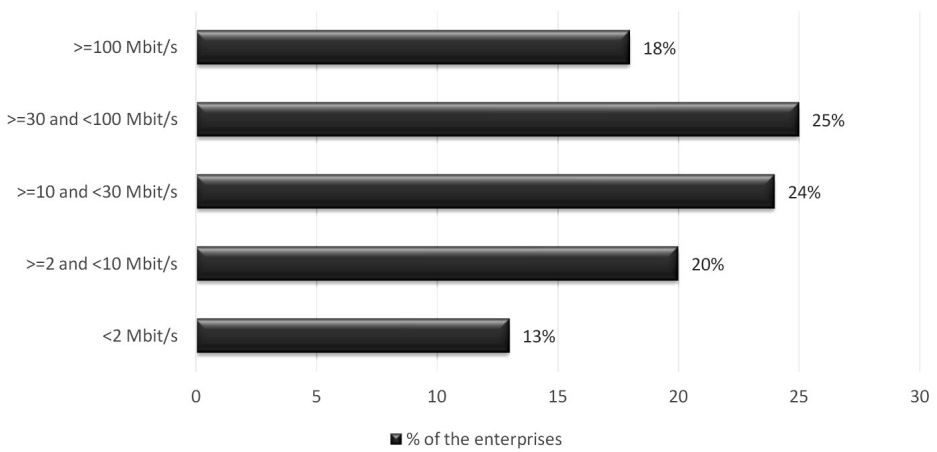

Figure 2 The Internet connection speed in the EU-28 enterprises, 2018.

Source: Authors

the characteristics of ICT implementation in these countries: a lack of a long-term strategic framework for ICT implementation, a low level of ICT usage, the need for foreign support in ICT adoption, the impact of foreign investment on ICT, an inadequate customer orientation, inadequate planning, limited resources, problems in education and the acceptance of ICT by employees.

Cloud computing services are different types of the ICT services accessed via the Internet, for example, email services, the storage of files, office software (Word, Excel), enterprise database hosting, financial or accounting software applications, the use of customer relationship management software (Customer Relationship Management - CRM), increasing the computer capacity to run enterprise software (Figure 3). At the EU-28 level in 2018, 26% of the enterprises used cloud computing services. Norway (51%), Sweden (57%) and Finland (65%) led in the use of these services, whereas Bulgaria (8%), Romania (10%) and Poland (11%) had the lowest share of the enterprises using cloud computing services. Slovakia (21%) and Hungary (18%) are slightly closer to the European average. Large European economies, France (19%), Germany (22%), Spain (22%) and Italy (23%) are below the European average, whereas small economies and island countries, such as Ireland (45% of the enterprises), Malta (37% of the enterprises) and Croatia (31%) seek to improve their IT performances by using cloud services.

As with the use of social networks, it is shown once again, and this time on the example of cloud computing, that the size of a country may not be crucial in terms of adopting new technology and the implementation of ICT (Figure 4). Small European countries are also achieving significant results in implementing ICT (Zečević & Radović-Stojanović, 2017).

Eurostat has been collecting e-commerce indicators since 2010, when the first e-commerce data in the Eurostat Database appeared. The level achieved in e-commerce development in the countries will be analyzed on the basis of the share of the enterprises selling their products online and the share of e-commerce in the total turnover of the enterprises. Online sales involve receiving orders using the methods specifically designed for receiving orders, such as Electronic Data Interchange (EDI), the website, or special applications (orders received via e-mail are not included) (Eurostat, 2018). The Internet sales indicator in the Eurostat Database is the share of the enterprises receiving electronic orders (Figure 5).

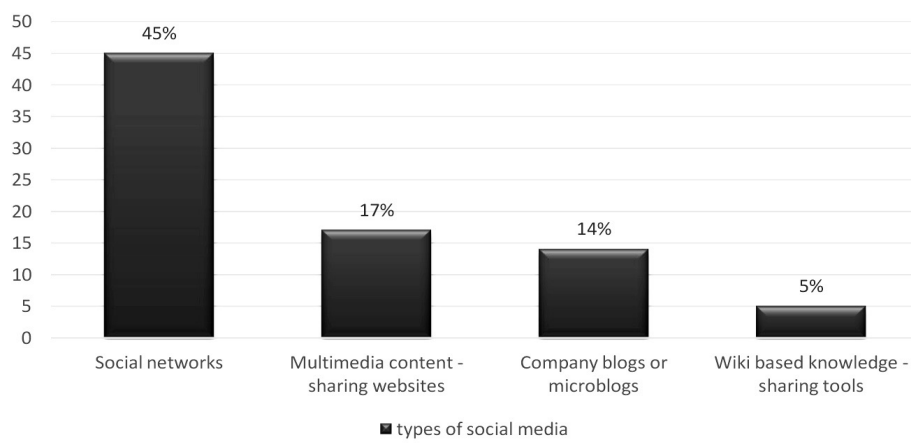

Figure 3 The use of social media in the EU-28 countries, 2017 (% of the enterprises)

Source: Authors

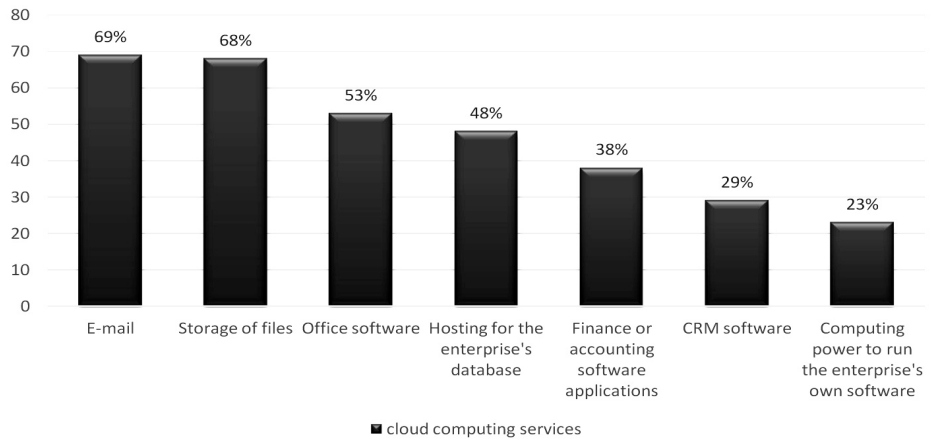

Figure 4 Cloud computing services in the European countries, EU-28, 2017 (% of the enterprises)

Source: Authors

In 2018, 20% of the enterprises in the EU-28 countries sold their products online. The share of online sales in the total turnover of the enterprises was 17%. E-commerce has grown in recent years in almost all European Union countries, with the largest share of the enterprises selling electronically being in the Scandinavian countries, i.e. in Denmark (32%), Norway (29%) and Sweden (32%), as well as in the Benelux countries, i.e. in Belgium (30%) and the Netherlands (27%), though not in Luxembourg (only 16%). E-commerce is also developed in the island countries, i.e. in Iceland (29%), Ireland (35%) and Malta (22%). As expected, Bulgaria (8%), Latvia (13%), Romania (9%), Poland (14%), Slovakia (16%), Hungary (15%), as well as Greece (12%), are below the European average. The major European economies are generally around the EU-28 average, with the exception of Italy (only 14%), so the share of the enterprises selling online in Germany is 22%, in France 19%, and in Spain 20%.

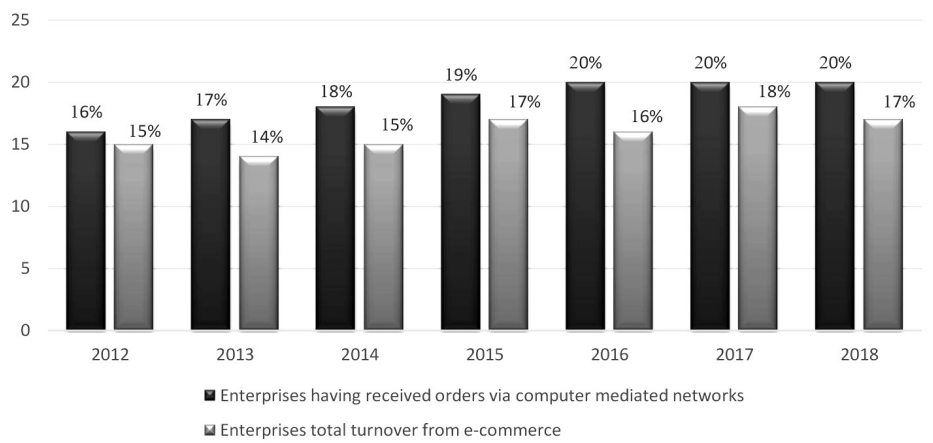

Figure 5 The share of the enterprises receiving electronic orders and the share of e-commerce in the total turnover, EU-28, 2012-2018 (% of the enterprises)

Source: Authors

In some cases, a significant share of electronic turnover (online sales) is held by the enterprises in the countries that already have a large share of the enterprises selling online, such as Sweden (24%), Denmark (23%) and Finland (21%), but it is also the case that the countries with a smaller share of the enterprises selling online make a large share of electronic turnover in the total turnover. For example, Slovakia, where only 16% of the enterprises sell electronically, has a 21% share of electronically generated turnover. On the other hand, the low share of electronically generated turnover is in the Netherlands (15%) and Luxembourg (also 15%) and in some large European economies as well, which would be expected to be quite the opposite since they already have a significant share of the enterprises selling online. For example, the share of electronically generated turnover in Germany is only 14% and in Italy 11%. The lowest share of electronically generated turnover is in Bulgaria (5%), Latvia (6%), Romania (9%) and Poland (15%).

E-business integration is monitored on the basis of the share of the enterprises using Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and the Supply Chain Management (SCM) software applications. ERP software integrates all departments and functions through a single IT system (or an integrated set of IT systems) in order to enable decision-making, encompassing all business operations (Zečević, 2015). CRM software integrates customer relationships, facilitates communication and business operations, and promotes sales through customer monitoring and supervision. SCM software manages information in the supply chain so as to improve supply and to better meet customer needs. The application of these pieces of software is an indicator of the degree of e-business integration in enterprises.

Seen at the EU-28 level in 2017, 34% of the enterprises used ERP integrated business software; CRM software applications were used by 33% of the enterprises, and 18% of the enterprises created prerequisites for integrating with customers and managing the supply chain through the SCM software application. Considering that the Eurostat Database has only the 2017 data on CRM and SCM, Figure 6 only shows the share of the enterprises that use ERP software in the 2012-2017 period.

The use of ERP software is expected to highlight large, developed European economies, namely Germany (38%), France (38%), Italy (37%), Spain (46% of the enterprises), and ERP software is now used for e-business integration in some smaller countries as well, such as Greece (37%) and Slovakia (31%), which

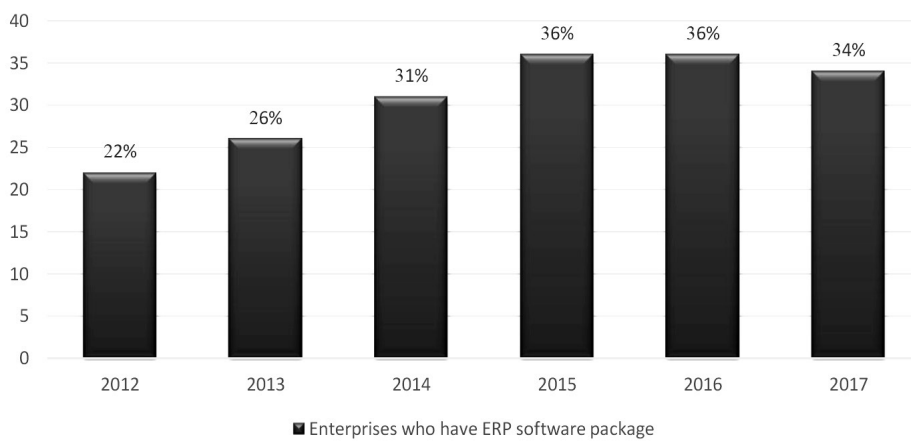

Figure 6 Using ERP software, EU-28, 2012-2017 (% of the enterprises)

Source: Authors

do not stand out by the value of the other indicators observed. Hungary (14%), Romania (17%), Bulgaria (23%), Poland (26%), as well as Iceland (14%), have a slightly lower share of the businesses using ERP software. In terms of using CRM software, Germany (46% of the enterprises) and Austria (43%), as well as the Benelux countries - Belgium (42%), Netherlands (46%) and Luxembourg (39%) - are in the lead, whereas Romania (13%), Latvia (15%), Hungary (13%), Bulgaria and the Czech Republic (18%) have only just begun to introduce CRM software. The case is similar with the use of SCM software, with Germany (30%), Belgium (26%), Finland (22%), Lithuania (28%) being ahead, whereas Hungary (9%), Romania (7%) and Latvia (6%) are lagging behind in terms of SCM software.

CONCLUSION

The study has confirmed the research hypothesis - that the differences between the member states have an impact on the level achieved in the adoption and implementation of information and communication technologies in enterprises in the EU countries. Comparing the values of ICT usage indicators, on the one hand, and the characteristics of the countries, on the other, the four factors that influence the usage of ICT in enterprises have been identified, namely: the regional position, the geographic characteristics, the size of the country and the level of the economic development achieved. The regional position of the countries determines the proximity of large markets and influences how companies communicate with customers. The geographic characteristics of the country may be an incentive for a better adoption and application of information technology in enterprises. The regional position and the geographic characteristics, however, may be the limiting factors in some cases, when the development of the ICT infrastructure is concerned. The size of the country is also important, but not as might be expected, in the sense that large, developed economies achieve the best performance in the implementation of ICT. On the contrary, small and dynamic European economies seek for development opportunities in ICT and often outperform large, developed economies by the value of ICT usage indicators. The level of the achieved economic development is an important factor because of the amount of investment in information technology, the development of information business culture and the willingness of enterprises to adopt information and communication technology. The level of development also influences the adoption of advanced information technology, such as cloud computing and e-business integration in enterprises. Additional research is needed to specify the impact of these four factors and for the possible identification of the other factors that affect the use of information and communication technologies in enterprises.

The regional grouping of the countries encountered in the literature (east/west, north/south) largely reflects a country's specifics and differences between countries, but the same needs to be more profiled and should be complemented by an analysis of the geographic characteristics of the countries. Therefore, there is still plenty of room for research, as regional generalizations are often not enough to make differences between the countries. The regional grouping of the countries needs to be further deepened by their geographic features and the level of the development achieved. A narrow classification of the countries is possible according to specific geographic features (e.g. island countries) or according to how they share the common economic history (Central and Eastern European countries, former transition countries) and economic and political interests (the Benelux countries, the Scandinavian countries). A more detailed analysis is needed to fully explore and appreciate the geographic specifics of the countries.

The level of the economic development of the countries is related to the development of the IT infrastructure and investment in ICT. The IT infrastructure is the basis of every ICT usage, so the countries with the low indicators of the infrastructure development often have the other indicators of ICT usage at a low level. However, some countries are still struggling to overcome their limitations in the infrastructure

development. This is, for example, the case with some island countries, whose enterprises manage to communicate with customers through ICT and successfully integrate ICT into their businesses. This is also the case in some Central and Eastern European countries, whose enterprises, despite their modest infrastructure capacity, strive to keep their connection speeds above the average and use what they have at their disposal. In some cases, the infrastructure development constraints cannot be overcome, so the low value of the advanced technology indicators - the use of cloud computing and e-commerce services - is observed in the countries with lower IT infrastructure development indicators.

The Benelux countries, i.e. Belgium, the Netherlands and Luxembourg, have adopted new e-commerce-based business and customer communication models and are leading the way in almost all the indicators. The situation is similar with the Scandinavian countries, which are above the European average in almost all of the observed indicators. Enterprises in small EU countries and the island countries are particularly leading in the use of social media, while in the Central and Eastern European countries the use of social networks and social media has not yet become an integral part of business. Regarding the use of ERP, SCM, and CRM software in enterprises, their use is still uneven across countries. These are technological solutions and ways of communication with customers that those enterprises have just started adopting both in the small and in the large European economies.

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APPENDIX

Table 1 The indicators of ICT implementation in enterprises (% of the enterprises), EU-28, 2017-2018

country/ indicator	Enterprises use DSL or another fixed broadband connection (2018)	Enterprises with a website (2018)	Enterprises using social media (2017)	Enterprises using social networks (2017)	Buying cloud computing services (2018)	Enterprises having received orders via computer mediated networks (2018)	Enterprises' total turnover from e-commerce (2018)	Enterprises which have ERP software package	Enterprises using CRM (2017)	Enterprises using SCM (2017)
Austrija	90	88	53	51	23	18	14	40	43	16
Belgija	96	84	58	57	40	30	32	54	42	26
Bugarska	84	51	34	34	8	8	5	23	18	17
Češka	97	83	36	34	26	25	29	28	18	12
Danska	100	96	68	67	56	32	23	40	36	23
Estonija	98	78	40	39	34	20	15	28	23	15
Finska	97	96	63	61	65	24	21	39	37	22
Francuska	94	69	41	39	19	19	22	38	27	13
Grčka	84	65	50	49	13	12	4	37	18	10
Holandija	99	94	68	66	48	27	15	48	46	19
Hrvatska	92	73	45	41	31	18	12	26	19	19
Irska	93	79	68	67	45	35	35	28	31	12
Italija	91	71	44	42	23	14	11	37	29	11
Kipar	94	71	67	65	27	14	4	35	42	17
Letonija	81	63	30	29	15	13	6	25	15	6
Litvanija	96	78	50	47	23	22	13	47	33	28
Luksemburg	97	83	54	52	25	16	15	41	39	18
Mađarska	83	66	38	36	18	15	23	14	13	9
Malta	94	82	73	73	37	22	:	29	24	11
Nemačka	93	87	45	40	22	22	14	38	46	30
Poljska	87	67	27	26	11	14	15	26	23	21
Portugalija	96	63	46	45	25	19	18	40	24	17
Rumunija	82	44	35	34	10	9	9	17	13	7
Slovačka	89	76	39	35	21	16	21	31	22	15
Slovenija	99	84	47	45	26	25	17	30	25	15
Španija	91	76	51	49	22	20	17	46	34	17
Švedska	93	92	65	63	57	32	24	31	34	13
Ujedinjeno Kraljevstvo	93	82	63	60	42	22	19	19	31	12

Source: Authors

Table 2 The ranking of the enterprises by the value of ICT usage indicators in the enterprises, EU-28, 2017-2018

	Enterprises use DSL or another fixed broadband connection (2018)	Enterprises with a website (2018)	Enterprises using social media (2017)	Enterprises using social networks (2017)	Buying cloud computing services (2018)	Enterprises having received orders via computer mediated networks (2018)	Enterprises' total turnover from e-commerce (2018)	Enterprises which have ERP software package	Enterprises using CRM (2017)	Enterprises using SCM (2017)
Austrija	21	5	11	11	18	18	19	7	3	14
Belgija	8	7	9	9	7	4	2	1	4	3
Bugarska	24	27	26	26	28	28	25	25	23	10
Češka	5	9	24	24	12	6	3	19	24	20
Danska	1	1	2	2	3	2	5	6	8	4
Estonija	4	14	21	21	9	13	14	20	19	15
Finska	7	2	7	7	1	8	9	9	7	5
Francuska	11	21	20	20	22	15	7	11	15	18
Grčka	25	24	13	13	25	26	26	12	25	25
Holandija	2	3	4	4	4	5	16	2	2	8
Hrvatska	18	18	18	18	10	17	21	22	22	7
Irska	15	13	3	3	5	1	1	21	12	21
Italija	20	19	19	19	16	22	22	13	14	23
Kipar	12	20	5	5	11	23	27	14	5	12
Letonija	28	25	27	27	24	25	24	24	26	28
Litvanija	9	15	14	14	17	10	20	3	11	2
Luksemburg	6	10	10	10	14	19	15	5	6	9
Mađarska	26	23	23	23	23	21	6	28	27	26
Malta	13	11	1	1	8	11	28	18	17	24
Nemačka	14	6	17	17	19	9	18	10	1	1
Poljska	23	22	28	28	26	24	17	23	20	6
Portugalija	10	26	16	16	15	16	11	8	18	13
Rumunija	27	28	25	25	27	27	23	27	28	27
Slovačka	22	17	22	22	21	20	8	15	21	17
Slovenija	3	8	15	15	13	7	13	17	16	16
Španija	19	16	12	12	20	14	12	4	9	11
Švedska	16	4	6	6	2	3	4	16	10	19
Ujedinjeno Kraljevstvo	17	12	8	8	6	12	10	26	13	22

Source: Authors

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