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SME CREDIT RISK MODELLING IN SOUTH AFRICA: A CASE STUDY

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ABSTRACT

This paper examined the funding conundrum by assessing the success rate of applications of small and medium sized enterprises (SME) for commercial bank funding. A quantitative group analysis was done on the overdraft obtained from one of the leading financial institutions in South Africa to determine the drivers of default. The SME scorecard was developed using logistic regression on credit applications over a seven-year observation period to analyse the default experience as part of credit risk management. The robustness, stability and relevance of an application scorecard is enhanced by the reject inference process and inclusion of bureau information. Small businesses operating in the service sector and having a long-standing rapport with the bank can easily access commercial bank funding. SMEs in the construction industry with a high number of credit enquiries are unlikely to survive the stringent conditions of the bank lending criteria. It is the prerogative of the principal business owner to honour their financial obligations across the credit industry if commercial bank funding is desired. Their credit quality, as reflected in the bureau information, forms the fulcrum of the SME application scorecard. The model developed in this study can be used as a tool to reduce defaults and serious delinquencies in boarding new applicants. Furthermore, the model can be applied to determine risk tendency and monitor the performance of SME credit portfolios.

1. INTRODUCTION

Most financing options for small and medium sized enterprises (SME) are limited to inception stages of a business cycle, contributing to seed and initial growth funding. From inception, small businesses are largely funded through personal savings, family, friends, donations, business angels, retained earnings, etc. (Chimucheka & Rungani, 2013). As businesses develop, a wider spectrum of funding is sought to finance operations and rapid growth, one of which is commercial bank loans. However, SME accessibility to commercial funding is limited (Laurens, 2012). Lack of adequate funding is the main operating and growth constraint of SMEs (Berger & Udell, 1998). As SMEs form an integral aspect of most economies globally, it is crucial to investigate this constraint and suggest ways to mitigate this challenge. Given that vast research on SME funding in South Africa is based on cross-sectional data, it is difficult to make a causality claim when establishing the link between SME specific attributes and access to finance (Makina et al., 2015). This study therefore seeks to utilise longitudinal data to perform regression analysis to shed more light on factors affecting the success rate of SMEs in accessing commercial funding.

This paper investigates the determinants or drivers of the success rate of SME access to commercial funding in South Africa. This is done by using an advanced statistical model, making use of a wealth of historic information. To the best of our knowledge, inadequate funding of SMEs from financial institutions in South Africa is a result of a myriad of factors which include: comprehensive enforcement of regulatory requirements, lack of collateral, information asymmetry, moral hazards, lack of sound track records on credit performance, a technological division between lenders and borrowers and lack of financial records. Investigating the financing conundrum of South African SMEs through tracking groups of SME loan applications forms the fulcrum of this study. The main aim of this study is to investigate the success rate of SME application for commercial funding using data obtained from one of the leading financial institutions in South Africa. The research objective is: *To identify drivers of default and determine how the model is affected by introducing bureau data.*

2. STYLISED FACTS ABOUT THE SME SECTOR IN SOUTH AFRICA

The South African government recognizes the importance of the SME sector as evidenced by the establishment of the Ministry of Small Business Development in 2014 responsible for the facilitation, promotion and development of SMEs

(SEDA, 2016). This was set up to implement policies, strategies and programs earmarked to create an enabling environment for SME growth and development. This department operates under various responsible institutions or agencies. The Small Enterprise Development Agency (SEDA) implements SME business strategy. This agency is also involved in the development and implementation of policies and standards as well as integration of government-funded SMEs across the three tiers of government (SEDA, 2016).

The Small Enterprise Finance Agency (SEFA) merged with the South African Micro-Finance Apex Fund (SAMAF) and Khula Enterprise Finance Limited to cater for SMEs with funding requirements for less than or equal to R3 million (SEDA, 2016) through the provision of revolving loans, term loans, bridging finance among other governmental financial support streams. Technical support is provided through the National Youth Development Agency (NYDA) targeted at young South Africans of between the ages of 14 and 35. The National Empowerment Fund (NEF) was also established to provide non-financial support to black-owned SMEs. Despite the unmerited government intervention and support, individual SME growth remained inhibited by various challenges at various scales depending on the size and scope. Commercial lenders are less likely to lend start-ups and informal businesses, which form the greatest proportion of SMEs. In the Gauteng province SMEs are more likely to get funding compared to those in Mpumalanga and Northern Cape provinces. This is mainly due to the predominantly rural nature of the latter provinces and a lack of access to physical infrastructure, and a widening gap in the technological division. Skills shortages, permit delays and high levels of crime are some of the obstacles hampering SME growth across the country (SEDA, 2016).

The SME segment is considered an integral aspect of the economy in South Africa. The Department of Trade and Industry (DTI) developed and published the National Small Business Act (President's Office, 1996). The public and private sectors define SMEs across several economic industries for ease of funding and other forms of support. DTI is a government department which is known to promote structural transformation and economic development. In the Small Business Act (President's Office, 1996), revenue, gross asset value and size, with maximum thresholds of R40 million, R18million and 200 employees respectively segment SMEs.

3. THEORETICAL FRAMEWORK

3.1. Background

Njoku & Odii (1991) used linear regression to model the actual outstanding debt and they identified loan volume, years in business and experience, major occupation, years of formal education, household size, loan period, business size and business output as drivers. On the other hand, Valluri, Raju & Patil (2021) modelled loan churn. They used different classical statistical models and machine learning models, such as logistic regression (LR), linear discriminant analysis (LDA), decision trees (DT) and random forests (RF). They found value in pre-selecting variables. They concluded that the RF classification measures report the strongest performance by using all the variables. Similar methodologies were applied by Fantazzini & Figini (2009) in comparison with a standard logit model which was observed to perform better timeless sample compared to RFs. De Noni, Lorenzon & Orsi (2007) developed a qualitative and quantitative risk model to measure and manage credit risk in SMEs. The model was designed with the ability to encapsulate expert judgement which is not necessarily captured by quantitative methodologies. It is perceived that SMEs' knowledge of credit criteria is somewhat low as commercial banks are not very transparent in this area. Authors argued that the length of operating a business has a significant influence on the evaluation of credit risk factors with more experienced SMEs in operation for over 10 years having a more intense perception of the significance of credit risk (Dvorský, Schönfeld, Kotásková & Petráková, 2018).

3.2. Credit Scoring

Statistical models to evaluate the creditworthiness of applicants can enhance regulatory and legislative requirements. The applications undergo a credit scoring process where ratings are assigned to reflect the ability and willingness of borrowers to repay debt timely and in full. Credit scoring forms the cornerstone of credit risk management by offering a systematic way of assessing the credit quality of obligors and this, in the past led to better credit granting decisions (Wendel & Harvey, 2006). Credit scoring can be divided into two main pillars: the front end (acquisition) and the back end (existing customer). The front end deals with through the door customers where the application scorecard contributes to the credit lending decision process. The application scorecard becomes an important aspect for business acquisitions. The back end process uses the behavioral scorecard to determine the risk levels of existing customers and inform credit risk management and collection strategies (Beck, 2013). To enhance the business acquisition process for lenders, an application scorecard

is extensively discussed in this paper. Financial service providers develop scorecards using historic data with an assumption that the historic trends are like future experiences.

3.3. Credit Rationing

Credit rationing is a market imperfection phenomenon where lenders limit the supply of credit to borrowers demanding funds, even if the latter are willing to pay higher interest rates (Mutezo, 2015). Credit rationing occurs due to information and control limitations in the financial markets. This event reflects failure of price mechanisms which in turn miscarries market equilibrium. SME credit industry suffers credit rationing when SMEs fail to provide sufficient collateral to hedge against potential credit losses by the lenders.

4. MATERIALS AND METHODS

4.1. Data Sources

Research data was obtained from one of the leading financial institutions in South Africa. From the main data warehouse, the application, behavioural and performance information on SMEs were extracted and insights were drawn from the empirical data. Bureau data, macroeconomic information and credit industry data were sourced from external institutions like Experian and Moody's for each month of observation.

4.2. Population, Sampling Approach and Sample Size

For the SME application scorecard model development, groups of applications received in each month under observation were tracked to determine the behaviour of applicants over time. In order to check the performance of the models and to ensure that no over/under-fitting occurs, an independent holdout validation data set was set aside from the complete data set. The full data set was randomly split using simple random sampling into a training and a validation data set in the ratio 80:20 respectively. This ratio was exercised in the works of Marimo & Chimedza (2017), Vrigazova (2021) and Visser et al. (2000). The model was developed on the training data set and the performance of the model tested on the independent validation set. The total number of overdraft (OD) applications submitted to the bank by SME applicants during the seven-year period determined the sample size. This study considers applications only up to January 2018 to allow for at least 18 months (February 2018 to July 2019) performance of the loans. Figure 1 shows the population flow of SME loan applications.

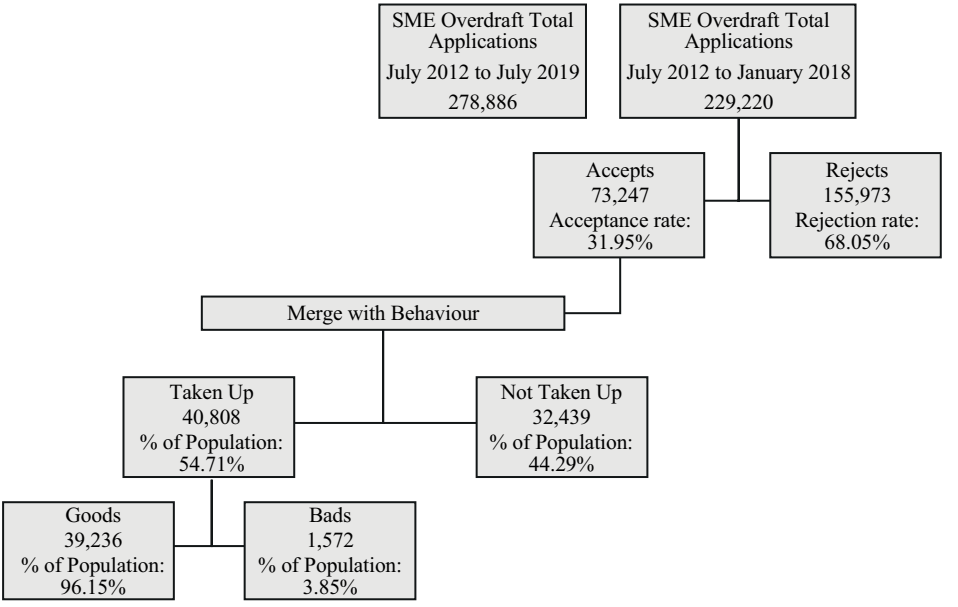

Figure 1: Population Flow

Source: Authors' calculation

It also shows how the data was prepared for the scorecard model development. Of the 73,247 approved applications, 44.29 percent were not taken up by the SMEs. This is mainly due to the cold scoring technique used by the lender to grow the business. Cold scoring is a process whereby potential clients are identified using propensity score models and other internal processes. The lender generates the applications on behalf of the customers. It is the prerogative of the SMEs to take up or decline the offer. The statistics herein show that almost half of the applicants do not take up the offers; this is probably because they do not need the credit facility offered at the time. On average, about 3.85 percent of SMEs default on loans within the first 18 months of their OD credit facility.

Table 1 shows the volumes allocated in each case.

Table 1: Sample Design

Sample	Category	Number of Observations
Development	Accepts	32647
	Rejects	58275
Validation	Accepts	8161
	Rejects	14569

Source: Authors' calculation

4.3. SME Application Scorecard

The relevant information was extracted from the data warehouse of the institution in scope. This entails information on SMEs which submitted applications during the observation period for an overdraft facility. The raw dataset consists of standard variables which cannot be used in modelling but are crucial as identifiers and important indicators for the purposes of segmentation. Standard variables include, ID number, observation month and account number. Sensitive information such as ID number and account number were masked to comply with issues of confidentiality in the business environment and the Protection of Personal Information (POPI) Act (POPI, 2013).

4.3.1. Measuring Default Status

The South African banking industry adheres to the international banking regulations recommended by the Basel Committee on Banking Supervision (BCBS) through the Basel Accords. For the local banks to sustain adequate capital reserves, the Basel Accords are enforced by the South African Reserve Bank (SARB) to ensure sustainability in the event of economic strain. This study therefore follows the default definition as defined in the Basel Accords, Bank for International Settlements (Laurens, 2012) as follows:

"A default is considered to have occurred with regard to a particular borrower when either or both of the two following events have taken place.

- The bank considers that the obligor is unlikely to repay his/her credit obligations to the bank in full.
- The obligor is more than 90 days past the due date on any credit obligation to the banking group."

This definition of default was used to derive the default status, the dependent or response variable in the application scorecard model building process.

4.3.2. Definition of Variables

Independent variables were extracted from the application tables found in the data warehouse. For the previously accepted applications, the repayment behaviour was tracked in order to establish a link between application variables and default. Additional variables were derived from the readily available raw data if they were deemed to be predictive of loan performance. The choice of variables was mostly driven by available variables some of which were supported by Valluri, Raju & Patil (2021), Njoku & Odii (1991) and Pasha & Negese (2014).

Table 2: Potential Risk Drivers

Variable	Description	Rationale for Consideration
Default Status	A derived binary target variable indicating whether an account defaulted within the outcome period	Binary target variable
Time since last transaction	The time that has elapsed (in months) since the applicants' last credit transaction on their main account with the lender	The higher the number of months since an applicant's last credit transaction, the greater the likelihood of the applicant not having sufficient funds to meet debt obligations and thus the higher the risk of default.
Sector	The industry under which the applicant operates is indicated by this variable	Certain industries tend to be riskier than others and will be allocated comparatively lower scorecard points.
Number of Credit Enquiries	The number of enquiries made by the principal business owner in the last 12 months	Applicants who have made a large number of enquiries in a short period are considered risky and will be allocated low scorecard points.
Time since payment profile	The time that has elapsed (in days) since the principal business owner opened a payment profile	Applicants who acquired their latest payment profile further in the past tend to be less risk than those who have acquired it more recently.
Worst Arrears Recent	The Worst Arrears in the Last 6 Months by the principal business owner	The worse the arrears level in the past 6 months the greater the risk of default and the lower the scorecard points to be allocated.
Worst Arrears Ever	This variable reflects the worst arrears level in the entire credit history of the principal business owner.	The worse the arrears levels in the principal business owner's credit history, the greater the risk of default and thus, the lower scorecard points to be allocated.
Guinness Rating	This variable is based on a set of matrices including Turnover, Time with the lender and time in business.	Applicants who have a low Guinness Rating tend to have a high default risk and will be allocated low scorecard points.
Time with Lender	The period of time (in months) an applicant has been a client of the lender	Applicants who have been the lender's clients for a longer time period are perceived to have a low default risk.
Excess	Business Entity Excess Indicator	Business entities which have never been in excess are perceived to have a low default risk and will be awarded high scorecard points.
Worst Excess	Principal business owner Worst Excess	Principal business owners who have never been in excess are perceived to have a low default risk and will be awarded high scorecard points
Worst Report	This variable represents the principal business owner's worst credit bureau report	The worse the principal's credit bureau report, the higher the risk of default and thus, the lower the scorecard points to be allocated.

Source: Authors' creation

4.3.3. Logistic Regression

The lending criteria in OD largely depend on customer attributes such as the business sector in which the customer operates, its size, growth stage, affordability and creditworthiness as defined by the scorecard rating. The variables consist of demographics, customer relationships with the bank and external information such as credit bureau data. A performance period was driven by the data used for the determination of the default event which will be modelled using logistic regression as follows:

The above logistic regression model was fitted with an expectation to produce:

- the main drivers of default,
- a probability model to be applied at the point of application, and
- a tool used to translate into scorecard points, depending on probability level.

4.3.4. Reject Inference

To achieve stability and robustness of the estimates, as well as to avoid bias in the scorecard, the application scorecard should take into account all applications received by the lender within the outcome period, regardless of whether the application was accepted or rejected. However, the performance information is only available for the accepted and taken-up applications only. If the objective is to measure the impact of the scorecard on all applications, there is need to assign an 'inferred' performance to the rejected applications in the training sample. Reject inference is thus, a process whereby the performance of the rejected applications is inferred or estimated. Furthermore, it is important to note that, not all approved loans get taken-up. To mitigate this complication, the reject inference is applied in two stages:

1. Assign each reject a probability of taken-up if rendered accepted.
2. Assign each reject a probability of good if estimated to be a Taken Up (TU).

5. RESULTS: APPLICATION SCORECARD MODEL DEVELOPMENT

The application scorecard can be used to decide whether to extend credit to applicants with an aim to reduce defaults and serious delinquencies on new applicants. In addition, the model can also be used to allocate capital, determine risk tendency and monitor the performance of the portfolio in scope.

Risk characteristics under the Basel Accords should be calculated and used in conjunction with the scorecard for risk management purposes (BCBS, 2017).

5.1. Reject Inference

– *Stage 1: Infer Non-Taken Up Applications*

The first stage in reject inference is to assign the Non-Taken-Up (NTU) records within the rejected population. All the accepted applications from the training sample were used to infer the TU and NTU probabilities to the rejected records. The application score of the principal business owner was used as a proxy for the credit performance of each SME across its loans. This score was used to fit a relationship between TU and NTU applications. As shown in Figure 2, an inverse relationship between the application score and the TU rate is observed, that is, a higher score results in a lower TU rate. This relationship is intuitive because if offered a loan, the worse performing applicants (lower score) are likely to take up the offer compared to the low risk (high score) applicants.

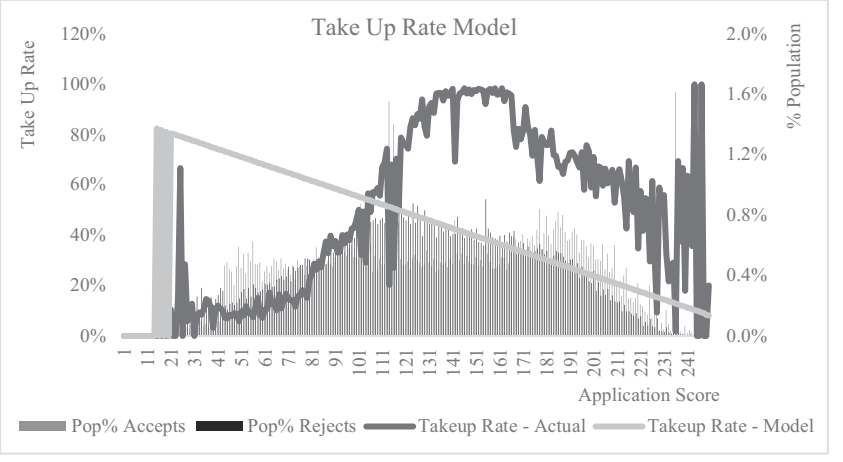

Figure 2: Take up Rate

Source: Authors' calculation

– *Stage 2: Infer Reject Good and Bad Applications*

The second stage in reject inference is to assign the probability of good to rejects if they are estimated to have taken up the loan. This is based on the Known Good Bad (KGB) model (Zeng & Zhao, 2014) built on the subpopulation with known performance (accepted and taken up). The model is based on fitting the application score at outcome point to obtain a relationship between good and bad

accounts. The purpose is to predict the probability of TU account being good or bad at outcome. Logistic regression was applied to develop the KGB model. With the reject inference completed, the application scorecard can be developed on a full spectrum of applications received.

5.2. Reject Inference Validity

In application scorecard development, the Good: Bad Odds ratio for accepts and inferred rejects usually fall in the range from 2 to 6. The known to inferred ratio of 2.03 given in Table 3 is an indication that the reject inference results are satisfactory.

Table 3: Ratio of Known Odds to Inferred Odds

Sample		Number of Observations	Badrate	Odds Ratio
Accepts	Goods	31389	3.85%	24.95151033
	Bads	1258		
	Total	32647		
Rejects	Goods	53889	7.53%	12.28662295
	Bads	4386		
	Total	58275		
Development (Accepts + Rejects)	Goods	85278	6.21%	15.10952864
	Bads	5644		
	Total	90922		
Known to Inferred Odds Ratio			2.03078669	

Source: Authors' calculation

5.3. Model Fitting: Internal and Bureau Variables

Significant parameter estimates (at 5%) were selected and shown in Table 4. The Wald test was used to select significant variables by picking only variables with a *p-values* less than . The rest of the variables were dropped as they had no predictive power. The selected variables were consistent with the findings of Valluri, Raju & Patil (2021), Njoku & Odii (1991), Marimo and Chimedza (2017) and Pasha & Negese (2014), in cases where similar variables were studied.

The global tests show that the model with significant covariates is significantly different from a null model. Variables selected are significant drivers of the default rate in the SME credit industry.

Table 4: Model 1 - Internal and Bureau Variables

Parameter	Estimate	Standard Error	Wald χ^2	Odds Ratio	Z- Statistics	P-Value
Intercept	2.7155	0.0146	34676.980	15.112	186.2176	<.0001
Excess	-0.5027	0.0438	131.8428	1.653	11.48228	<.0001
Credit Enquiries	-0.9213	0.0377	596.2210	2.513	24.41764	<.0001
Time since Last Transaction	-0.7320	0.0583	157.54960	2.079	12.55188	<.0001
Time with Lender	-0.6970	0.0310	505.7309	2.008	22.48846	<.0001
Sector	-0.7426	0.0521	202.7845	2.101	14.24024	<.0001
Worst Bureau Report	-0.6899	0.0497	192.3296	1.994	13.86829	<.0001
Likelihood Ratio			2611.2488			<.0001
Score			2650.6101			<.0001
Wald			2495.5706			<.0001
N	90922					

Source: Authors' calculation

5.4. Model Fitting: Internal Variables Only

Table 5 shows the model built on internal variables only is significant, both at global level and at individual parameters. Thus, the model is significantly different from a null model.

Table 5: Model 2 - Internal Variables Only

Parameter	Estimate	Standard Error	Wald χ^2	Odds Ratio	Z- Statistics	P-Value
Intercept	2.717	0.0144	35810.95	15.135	189.2378	<.0001
Excess	-0.5425	0.0434	156.2004	1.720	12.49802	<.0001
Time since Last Transaction	-0.6847	0.0579	140.0839	1.983	11.8357	<.0001
Time with Lender	-0.8261	0.0305	735.7736	2.284	27.12515	<.0001
Sector	-0.8053	0.0518	241.2156	2.237	15.53112	<.0001
Likelihood Ratio			1856.5968			<.0001
Score			1864.4482			<.0001
Wald			1786.9986			<.0001
N			90922			

Source: Authors' calculation

Model 1 and Model 2 were compared to determine the benefit of inclusion/ exclusion of bureau information in the SME Application Scorecard.

5.5. Final Model Selection

The two models described in the preceding sections were compared using various statistical measures. Both models were applied to the sample for validation to

determine the suitability of the model. Satisfactory results were observed in both cases. In hindsight, the benefit of including/excluding rejected applications in the models was determined.

Table 6 provides measures of the discriminatory power of the models. An 18 percent increase in the Gini Statistic (GS) is realised when the Bureau information is added as part of the covariates. A benefit of 2.07 percent in discriminatory power is realised if the scorecard model development includes the reject inference process.

Table 6: Final Model Selection Criteria

AUC	Development Sample		Validation Sample		% Increase in AUC Development	% Increase in AUC Validation
By Scorecard	Accepts & Rejects	Accepts Only	Accepts & Rejects	Accepts Only		
Bureau & Internal Fields-Model 1	38.4	37.6	38.6	37.5	2.07%	2.96%
Internal Fields Only-Model 2	32.6	30.8	32.3	29.7	5.76%	8.69%
% increase in Gini	18.0%	22.2%	19.3%	25.9%		

Source: Authors' calculation

Similar trends were observed in the validation sample. Furthermore, the Receiver Operating Curve (ROC) confirms that Model 1 exhibits a better discriminatory power than Model 2 as it lies closer to the top left quadrant of the plot as shown in Figure 3.

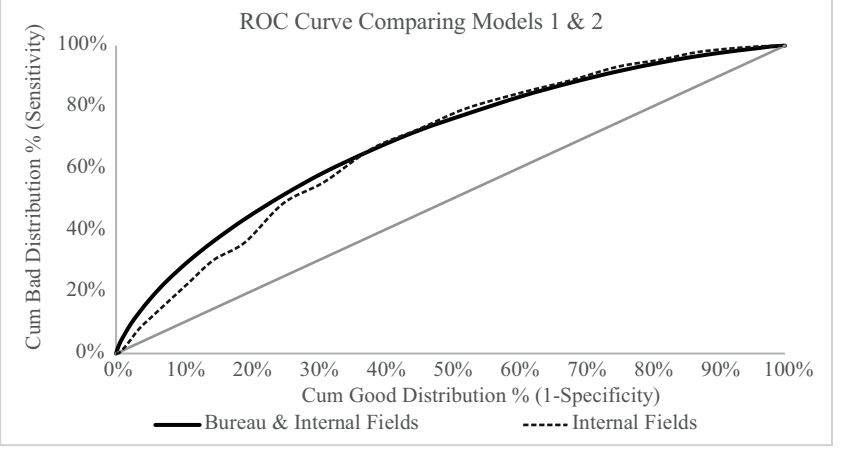

Figure 3: ROC Curves

Source: Authors' calculation

5.6. Scorecard Points

Model 1 (Internal + Bureau Fields) was finally selected as the best model for application in the development of the SME scorecard. The model was fitted to the training data set to obtain probabilities of default. These probabilities were then converted into scorecard points per variable per category within each variable. Scorecard points were linked to the probabilities returned by the model in each case. The intuitiveness of scorecard points, badrate and Weight of Evidence (WoE) for every variable in scope is provided below.

5.7. Final Variable Statistics

1. *Credit Enquiries*

The variable Credit Enquiries is a bureau field detailing the number of enquiries made by the applicant in the past twelve months, and these are shown in Table 7.

Table 7: Credit Enquiries

Credit Enquiries	Scorecard Points	WoE	Goods	Bads	Badrate
01 : Low to <= 1	41	0.6118	13365.72404	479.7830401	3.47%
02 : > 1 to <= 3	18	0.2644	28089.19044	1427.123515	4.84%
05 : > 3 to <= 9	-1	-0.0162	25733.06009	1730.913592	6.30%
11 : > 9 to <= 12	-29	-0.4354	5921.000083	605.6545366	9.28%
12 : > 12 to High	-37	-0.5533	12168.92992	1400.507112	10.32%

Source: Authors' calculation

It satisfied the univariate analysis criteria as shown in Figure 4. The population in each group exceeded five percent. The badrate, WoE and the scorecard point curves are intuitive and monotonic. The larger the number of enquiries, the more uncertain and riskier the applicant is. The badrate increases with an increase in the number of enquiries. Risky applicants have been allocated the lowest scorecard points. This analysis was conducted for the final six variables and the results were satisfactory.

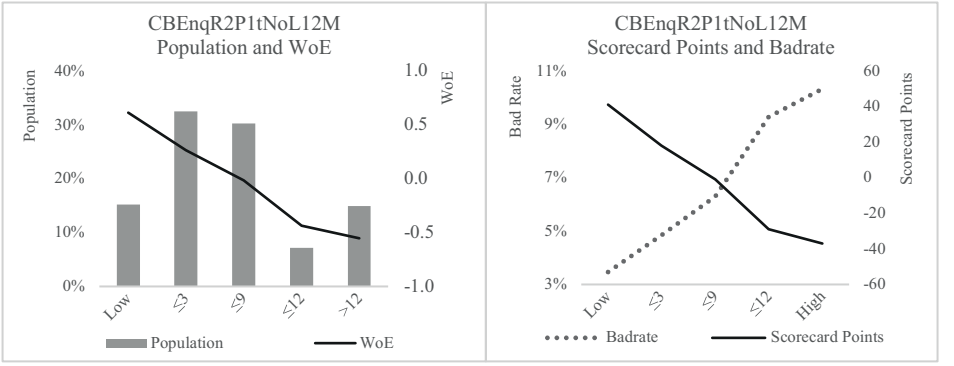

Figure 4: Credit Enquiries

Source: Authors' calculation

2. *Time since Last Transaction*

From Table 8, the higher the number of months since the applicant's last credit transaction is, the greater the likelihood of the applicant not having sufficient funds to meet debt obligations is and thus, the higher the risk of default is. Therefore, the worst scorecard points allocation falls in the highest bracket of this variable.

Table 8: Time since Last Transaction

Time since Last Transaction (months)	Scorecard Points	WoE	Goods	Bads	Badrate
0	16	0.2957	14383.31677	708.2523992	4.69%
00: Missing	-3	-0.0543	13879.35187	969.8282712	6.53%
03 : > 0 to <= 5	7	0.136	38048.75622	2198.078426	5.46%
08 : > 5 to <= 10	-12	-0.2207	8968.773373	740.1437171	7.62%
10 : > 10 to <= 25	-20	-0.3771	7150.569308	690.0311119	8.80%
13 : > 25 to High	-31	-0.5833	2847.13702	337.6478697	10.60%

Source: Authors' calculation

3. *Time with Lender*

Applicants who have been clients of the lender for a longer time period are perceived to have a low default risk and have therefore been allocated with the highest scorecard points as shown in Table 9.

Table 9: Time with Lender

Time with Lender (months)	Scorecard Points	WoE	Goods	Bads	Badrate
1:00 New to Bank	6	0.117	11255.50475	662.6782406	5.56%
02 : > 0 to <= 12	-48	-0.9461	4417.26264	753.01663	14.56%
03 : > 12 to <= 18	-35	-0.6935	3383.392057	447.9991329	11.69%
04 : > 18 to <= 24	-25	-0.5003	3025.404126	330.2269838	9.84%
05 : > 24 to <= 33	-20	-0.4016	3836.680936	379.4216338	9.00%
06 : > 33 to <= 54	-10	-0.1891	7740.215539	618.9333206	7.40%
08 : > 54 to <= 63	-6	-0.1149	3114.742058	231.2523917	6.91%
09 : > 63 to <= 75	3	0.0687	4366.76174	269.8152901	5.82%
10 : > 75 to <= 84	8	0.1635	3381.998157	190.0766928	5.32%
11 : > 84 to <= 93	11	0.2145	3332.768537	177.9909928	5.07%
12 : > 93 to <= 138	14	0.2876	15351.55696	762.0391878	4.73%
16 : > 138 to <= 153	17	0.3315	4098.585437	194.7132633	4.54%
17 : > 153 to <= 270	29	0.5847	14499.19024	534.7366452	3.56%
21 : > 270 to High	47	0.9259	3473.841391	91.08138948	2.55%

Source: Authors' calculation

4. *Excess Levels*

At the point of application, customers are allocated excess levels as seen in Table 10. Business entities which have never been in excess are perceived to have a low default risk and have been awarded the highest scorecard points.

Table 10: Excess Levels

Excess	Scorecard Points	WoE	Goods	Bads	Badrate
01: High	-18	-0.4858	5946.34370	639.720802	9.71%
06: Medium	-9	-0.2454	39080.1601	3305.75989	7.80%
03: Low	16	0.4439	37921.0940	1610.06386	4.07%
05: Never	20	0.5561	2330.30662	88.43723469	3.66%

Source: Authors' calculation

5. *Sector*

Of the non-missing categories, the services sector has been observed to be the best performing with the least bad rate as shown Table 11. The construction industry has been the riskiest and therefore allocated comparatively the lowest scorecard points.

Table 11: Sector

Sector	Scorecard Points	WoE	Goods	Bads	Badrate
01: Missing	113	2.1039	5.765305757	0.046544243	0.80%
02: Retail	6	0.1142	39248.31299	2317.178511	5.57%
03: Construction	-17	-0.3248	19488.07644	1784.704503	8.39%
04: Transport	-14	-0.2592	5922.884616	507.9624441	7.90%
05: Trade	-5	-0.0922	5562.503692	403.698418	6.77%
06: Services	56	1.0488	3535.99568	81.99309005	2.27%
07: Manufacturing	18	0.329	11514.36585	548.3982848	4.55%

Source: Authors' calculation

6. *Worst Bureau Report*

In Table 12 it is observed that the worse the principal's credit bureau report is, the higher the risk of default is and thus, the lower the scorecard points allocated are.

Table 12: Worst Bureau Report

WrstCBReport	Scorecard Points	WoE	Goods	Bads	Badrate
01: C (Worst)	-51	-1.0295	31.84074861	5.899801386	15.63%
02: D	-3	-0.0694	3976.712801	282.1089394	6.62%
03: F	36	0.7191	727.4598513	23.45613871	3.12%
04: N	6	0.1158	66224.36464	3903.819676	5.57%
05: O	-27	-0.5364	8032.360169	909.009951	10.17%
06: S	-19	-0.373	5232.890076	502.9072244	8.77%
07: X (Best)	71	1.4232	1052.276276	16.78006413	1.57%

Source: Authors' calculation

5.8. Scoring Alignment Parameters

The scorecard is aligned to:

- A score of 500 has Good: Bad odds of 5:1
- 50 points double the odds

These parameters were chosen in order to reflect the portfolio bad rate at the reference score. In this case, the development/training sample odds ratio is 15.11 as shown in Table 13. In order for a score of 500 to represent this and a bad rate of 6.21%, the following function is used to determine the Reference Odds (RO):

$$Reference\ Odds = \frac{1}{Odds\ Ratio_{Development}} - 1 = \frac{1}{0.1511} - 1 \approx 5$$

Table 13: Scorecard Alignment Parameters

Alignment Parameter	Value
Bad Rate (Accepts + Rejects)	6.21%
Reference odds	15
Reference Score	500
Points to double odds	50

Source: Authors' calculation

Table 14 demonstrates the relationship between the theoretical Odds, Log (Odds) and bad rate for the alignment parameters.

Table 14: The SME Application Scorecard

Scaling: 500 = 5:1 with 50 points to double the odds

Score	Goods (G)	Bads (B)	Odds (G/B)	Log(Odds)	Bad Rate (B/G+B)
250	0.5	1	0.46875	-0.758	68.09%
300	0.9	1	0.9375	-0.065	51.61%
350	1.9	1	1.875	0.629	34.78%
400	3.8	1	3.75	1.322	21.05%
450	7.5	1	7.5	2.015	11.76%
500	15.0	1	15	2.708	6.21%
550	30.0	1	30	3.401	3.23%
600	60.0	1	60	4.094	1.64%
650	120.0	1	120	4.787	0.83%
700	240.0	1	240	5.481	0.41%
750	480.0	1	480	6.174	0.21%
800	960.0	1	960	6.867	0.10%
850	1920.0	1	1920	7.560	0.05%

Source: Authors' calculation

5.9. SME Scorecard Implementation

At the point of loan application, the client profile gets scored according to the respective scorecard points allocation of the six variables above. A constant of 500 discussed in the preceding section gets added to the total score of applicants

obtained from each of the six drivers of risk. Table 13 shows the alignment parameters linking the total score of individual applications to the scorecard. The scorecard rejects any applications with scores less than 500 and accepts applications scoring 500 points or more.

6. DISCUSSIONS AND CONCLUSIONS

Drawing on knowledge from the developed world, this study adopted a similar approach by developing an application scorecard tailored to SMEs in an emerging market context, but from a single money lending financial institution. The application scorecard developed in this study is set to enable the lenders to quantify the risk associated with SME loan applicants and offer improvements on objective decision-making processes and reduce transaction costs as seen in the developed world, as highlighted in literature (Wendel & Harvey, 2006).

Given that the application scorecard is developed for use on through the door applicants, it was imperative to design a model that reflects the riskiness of SME borrowers. Therefore, to achieve stability and robustness of the estimates and to avoid bias in the scorecard, the development of the application scorecard considered all applications received by the lender, regardless of whether the application was accepted or rejected. Of the accepted applications, some were not taken up due to the issues of cold scoring. The taken up/non taken up model was developed to determine the likelihood of the rejected applications to take up the loan should it have been accepted. Furthermore, a Known Good Bad (KGB) model was developed to assign inferred performance to the rejected applications through the reject inference process. The KGB model tracked the performance of the accepted and taken up population from the point of application to at least eighteen months in performance. This was done to generate the target variable and to assign weights to all the data including accepts and rejects used for the development of the scorecard. The SME application scorecard developed herein can be used to decide whether to extend credit to SMEs with an aim to reduce defaults and serious delinquencies on new applicants. In addition, the model can also be used to allocate capital, determine risk tendency and monitor the performance of SME credit portfolios.

For future research, it is worthwhile incorporating various dimensions of product offerings, secured and unsecured lending, amortising and revolving products, to obtain a more holistic view of the behaviour of SME customers within the bank. Credit bureau institutions such as TransUnion and Experian have access to credit information from various banking and non-banking financial service institutions.

It would be valuable for these bureau to develop application scorecard tailored to the SME credit market in emerging and frontier markets by consolidating this information to improve debt management, risk control and cost effectiveness.

Conflict of interests

The authors declare there is no conflict of interest.

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МОДЕЛИРАЊЕ КРЕДИТНОГ РИЗИКА МАЛИХ И СРЕДЊИХ ПРЕДУЗЕЋА У ЈУЖНОЈ АФРИЦИ: СТУДИЈА СЛУЧАЈА

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САЖЕТАК

Овај рад је испитао загонетку финансирања процјеном стопе успјешности захтјева малих и средњих предузећа (МСП) за финансирањем код комерцијалних банака. Урађена је квантитативна кохортна анализа о прекорачењу, добијена од једне од водећих финансијских институција у Јужној Африци како би се утврдили покретачи неплаћања. Картица резултата за МСП је развијена коришћењем логистичке регресије на кредитним захтјевима током седмогодишњег периода посматрања у циљу анализирања неиспуњења обавеза као дио управљања кредитним ризиком. Робусност, стабилност и релевантност картице са резултатима апликације је побољшана процесом закључивања одбијања и укључивањем информација бироа. Мала предузећа са пословањем у сектору услуга која имају дугогодишње односе са банком, могу лако приступити изворима финансирања комерцијалних банака. Мала и средња предузећа у грађевинској индустрији са великим бројем кредитних упита показују малу вјероватноћу издржавања строгих услова и критеријума банкарских кредита. Прерогатив главног власника предузећа јесте да поштује своје финансијске обавезе у кредитној индустрији ако жели да се финансира кредитима комерцијалне банке. Њихов кредитни квалитет, што се огледа у информацијама бироа, чини упориште апликација за МСП. Модел развијен у овој студији може се користити као алат за смањење неизвршених обавеза и озбиљних деликвенција приликом прихватања нових кандидата. Штавише, модел се може примијенити за одређивање тенденције ризика и праћење перформанси кредитног портфолија МСП.

Кључне ријечи: *картица резултата МСП, потрошачки кредит, закључак о одбијању, бодовање кредита.*

THE OPEN BALKAN AS A DEVELOPMENT DETERMINANT OF THE WESTERN BALKAN COUNTRIES

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ABSTRACT

The paper starts from the concept of the *Open Balkan* as a community of countries in the Western Balkans, aimed at strengthening their economic cooperation and development for faster integration in the European Union. Significant attention is paid to the analysis of the interdependence of (in)stability of the state and the economic development of small countries. The position of the *Open Balkan* and its members is also analysed on the basis of the selected global composite indices. An important subject of the analysis is also the condition of institutional capacities of the members of the *Open Balkan* and their institutional cooperation from the perspective of faster progress towards the European integration. Two main hypotheses have been tested in the paper: (H1) CEEs countries are not a homogeneous group of countries; and (H2) The Western Balkans is a relatively homogeneous regional integration. To test the convergence hypothesis between 16 Central and Eastern European countries (CEEs), annual data from World Bank's database on the value of real gross domestic product per capita (in constant dollars 2017, PPP) in the period 2000-2026 were used (projected values for the period until 2026). We employed the method developed by Phillips & Sul (2007) that allows identification of clusters of convergence on the basis of an algorithm that is data-driven and thereby avoids a priori classification of the data into subgroups. Based on the results obtained, it can be concluded that Serbia is the "locomotive" of the Western Balkans and that all countries in this area should join the regional initiative for cooperation, the *Open Balkan*.

1. INTRODUCTION

Examples of the integration processes of the countries that are geographically close, e.g. the Benelux countries (Korauš et al., 2018), the Nordic countries (Stie & Trondal, 2020), the Baltic countries (Musiał & Šime, 2021), the Visegrad countries (Kajánek, 2022), which are in line with European values and the Schengen Agreement (Felbermayr et al., 2018) could be a good guide for successful regional cooperation in the Western Balkans. Regional initiatives could contribute to the socio-economic development of the Western Balkans. These initiatives are aimed at strengthening political and economic cooperation between the Western Balkans countries. Unlike the previous regional initiatives, which were focused on securing peace and strengthening security and stability in the region (e.g. the South-East European Cooperation Process initiated in 1996 and the Stability Pact for Southeast Europe launched in 1999), the recent initiatives (such as *the Regional Economic Area*, *Open Balkan* and *Common Regional Market*) are focused on strengthening cooperation and economic development of the Western Balkan countries.[1] Further, recent initiatives aim to ensure faster implementation of the EU rules and procedures and the integration of the Western Balkans into the European single market. The regional cooperation between six Western Balkan countries (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Kosovo* and Serbia) was officially formed by the Berlin Process, launched in 2014.

The Regional Economic Area Initiative was launched in July 2017 at the Berlin Process summit held in Trieste. The aim of this initiative is to make the Western Balkans more attractive for investment and trade and to speed up its integration into the European Union. The implementation of the adopted Multi-Annual Action Plan for a Regional Economic Area (MAP REA) refers to four areas (*trade*, *investment*, *skills and mobility* and *digital integration*) and should enable unobstructed flow of goods, services, capital and highly skilled labour within the Western Balkans. The initiative was supported by six Western Balkan countries and the following activities were accomplished: the signed Regional Roaming Agreement, the adopted regional investment reform agenda and the established Declaration on Recognition of Higher Education Qualifications in the Western Balkans and the Framework for the Liberalization of Trade in Services within the Western Balkans.

The Mini Schengen Initiative was launched in 2019 by signing a declaration of intent to form "mini-Schengen", a concept of the community of states in the Western Balkans, in order to improve economic integration and to create

1 See more: Griessler (2020).

a common market based on the free movement of people, goods, services and capital and on the uniform border crossing procedures. Members of the Mini Schengen are Albania, North Macedonia and Serbia. The invitation to join was also sent to Bosnia and Herzegovina and Montenegro. In July 2021, the regional initiative Mini Schengen was renamed the *Open Balkan*.

As a continuation of the initiative for establishing the Regional Economic Area, an Action Plan for the Common Regional Market for the period 2021-2024 was adopted at the Berlin Process summit held in Sofia in November 2020. This document includes Mini Schengen proposals on four freedoms (free movement of goods, services, capital and people). The following key objectives of the establishment of the *Common Regional Market* were identified: improving the competitiveness of the economies of the Western Balkans; formation of a regional digital, investment, industrial and innovation area harmonized with the rules and standards of the European Union; and providing support for the faster integration of the Western Balkans into the European single market. In order to achieve these objectives, the activities that need to be implemented by 2024 were defined in four key areas: *regional trade area*, *regional investment area*, *regional digital area* and *regional industrial and innovation area*. The contribution of the summit held in Sofia also lies in the adoption of the Green Agenda for the Western Balkans. The activities that need to be undertaken within the five pillars[2], envisaged by the European Green Deal, were presented in this agenda.

As a continuation of economic cooperation within the *Open Balkan* initiative, in November 2021, the leaders of Albania, North Macedonia and Serbia signed a joint statement "The future of enlargement – a view from the region". The signatories of this statement reaffirmed their commitment to the European perspective of the Western Balkans region through: commitment to European values, rules and standards, and democratic principles; involvement of the Western Balkans in the development of trade and tax policy of the EU; significant participation of universities from the Western Balkans in the European higher education and research area; exploiting the export potential of high quality products to the EU market; involvement of the chambers of commerce in the process of implementing the Memorandum of Understanding and Cooperation on Facilitating Import, Export and Movement of Goods in the Western Balkans; development of a detailed plan for the implementation of trade facilitation measures, etc. Additionally, in December 2021, these three leaders signed agreements that cover three areas: labour market access, the interconnection of electronic identification schemes and cooperation on veterinary medicine and

2 Climate action, Circular economy, Biodiversity, Zero pollution for air, water and s*oil* and *Sustainable* food *systems* and *rural areas*.

food safety. Six signed agreements include: The Agreement on Conditions for Free Access to the Labour Market; The Agreement on Connecting Electronic Identification Schemes for Citizens, the Agreement on Cooperation in Veterinary, Phytosanitary, and Food and Feed Safety in the Western Balkans; The Agreement on Mutual Recognition of Approved Business Entities for Security and Safety (two agreements: one between Serbia and Albania and the other between North Macedonia and Albania); and the agreement related to the cooperation of accreditation bodies in Albania, North Macedonia and Serbia.

2. CHARACTERISTICS OF THE DEVELOPMENT OF THE WESTERN BALKAN COUNTRIES AND THE OPEN BALKAN INITIATIVE

A global insight into the basic characteristics of the development of the Western Balkans (5 countries + Kosovo*) in the late 2020s can be obtained by analysing the data presented in the Table 1:

Table 1: Selected macroeconomic and other indicators in the Western Balkans

INDICATORS	ALB	BiH	KOS*	NM	SER	MON
Land area (sq. km), 2020	27,400	51,200	10,887[c]	25,220	87,460	13,450
Population, total (Thousands), 2020	2,837.74	3,280.82	1,775.38	2,072.53	6,908.22	621.31
Agricultural land (% of land area), 2018	42.8	43.2	52.4[b]	50.1	39.6	19.1
External balance on goods and services (% of GDP), 2020	-14.7	-14.0	-32.2	-12.8	-8.3	-35.0
Gross fixed capital formation (% of GDP), 2020	23.0	22.0	30.0	21.0	21.00	28.0
Gross fixed capital formation, private sector (% of GDP), 2020	-	10.0[a]	20.0	16.0	16.0	20.0
Exports of goods and services (% of GDP), 2020	23.1	34.5	21.7	58.1	48.2	26.0
Gross national expenditure (% of GDP), 2019	115.0[e]	117.0	132.0	113.0	108.0	135.0
Personal remittances, received (% of GDP), 2020	9.8	9.3	18.6	3.4	7.3	12.6
Foreign direct investment, net inflows (% of GDP), 2019	7.8	2.2	3.6	4.4	8.3	7.5
ICT service imports (% of service imports), 2020	0.0[d]	0.2	-	0.7	1.0	0.5[d]
Current account balance (% of GDP), 2020	-8.8	-3.8	-7.0	-3.4	-4.1	-25.9
Military expenditure (% of GDP), 2019	1.5	0.9	1.1	1.3	2.1	2.1
Trade in services (% of GDP), 2020	26.2	9.7	23.8	23.1	24.2	28.4
Profit tax (% of commercial profits), 2019	14.1	8.4	9.3	11.0	13.0	8.3
Labour tax and contributions (% of commercial profits), 2019	18.8	13.6	5.6	0.0	20.2	13.4

INDICATORS	ALB	BiH	KOS*	NM	SER	MON
External debt stocks (% of GNI), 2020	74.2	72.1	39.3	89.9	74.4	200.6
Unemployment, total (% of total labour force) (national estimate), 2020	11.7	15.9	26.2	17.2	9.0	17.9
Unemployment, youth total (% of total labour force ages 15-24) (national estimate), 2020	27.0[e]	36.6	49.7	37.0	26.6	36.0
Gross savings (% of GDP), 2020	11.0	16.0	27.0	26.0	21.0	5.0
GNI per capita, PPP (constant 2017 international $), 2020	13,485.3[e]	14,381.6	11,062.2	15,310.8	17,665.4	18,546.1
Domestic credit to private sector (% of GDP), 2020	38.7	58.5	51.6	56.2	45.5	60.0
Inflation, consumer prices (annual %), 2020	1.6	-1.1	0.2	1.2	1.6	-0.3
Services, value added (% of GDP), 2020	48.4	55.8	47.6	57.0	51.9	58.0
Manufacturing, value added (% of GDP), 2020	6.0	13.0	13.0	13.0	13.0	4.0
Agriculture, forestry, and fishing, value added (% of GDP), 2020	19.1	6.1	7.4	9.1	6.3	7.6
GNI growth (annual %), 2020	0.9[e]	-3.7	-5.2	-4.4	1.5	-14.9
GDP per capita, PPP (constant 2017 international $), 2020	13,192	14,509	10,795	15,931	18,231	18,259
GDP per capita (constant 2015 US$), 2020	4,424.3	5,367.0	3,993.0	5,092.7	6,533.20	6,522.6
GDP growth (annual %), 2020	-4.0	-3.2	-15.3	-5.2	-0.9	-5.3

[a]2004, [b]2007, [c]2017, [d]2018, [e]2019.

Source: Created by authors, using data from (World Bank, 2021).

Considering that the initiative for regional cooperation the *Open Balkan* has been accepted by Albania, North Macedonia and Serbia so far, we will especially point out their important development features and the justification of the approach to the mentioned initiative. From data given in Table 1, it can be seen that out of the total area in North Macedonia, Albania and Serbia, agricultural land accounts for about 50%, more than 2/5 and approximately 40%, respectively. Per capita arable land is the highest in Serbia (0.37 hectares), while this indicator is approximately the same (about 0.2 hectares) in North Macedonia and Albania.

It can be seen that, in 2020, North Macedonia (58.1%) and Serbia (48.2%) had a significantly higher share of exports of goods and services in gross domestic product than Albania (23.1%). The remittances inflow share in GDP was represented mostly in Albania (9.8%), followed by Serbia (7.3%) and North Macedonia (3.4%), but in Kosovo* even 18.6%.

Serbia, with 8.3%, had the largest relative importance of inflow of foreign direct investments (expressed as their share in GDP), followed by Albania (7.8%) and North Macedonia (4.4%). The unemployment rate, both overall and of youth, is

the lowest in Serbia (9% and 26.6%, respectively), while it is slightly higher in Albania and significantly less favourable in North Macedonia. Regarding the value added (expressed as % of GDP), it is noticed that the highest representation of the primary sector is in Albania (close to 1/5), while it is almost 3 times lower in Serbia and 2 times lower in North Macedonia; the share of the manufacturing industry in Albania is more than twice as low (6%) compared to North Macedonia (13%) and Serbia (13%). When it comes to services, this indicator is much more favourable in North Macedonia and Serbia compared to Albania. The level of economic development, measured by the amount of real GDP per capita, is the highest in Serbia (around $ 6,533), followed by North Macedonia (around $ 5,092) and Albania (with more than $ 4,424). In the period of the COVID-19 pandemic (2020), GDP per capita in Serbia fell significantly (-0.4%), which is 7 times less than in Albania, or 11 times less than in North Macedonia. The share of military expenditures in GDP in Serbia is 2.2%, which is about twice as much as in Albania and North Macedonia. When it comes to external debt (as the percentage of gross national income), North Macedonia (about 89%) is in the lead compared to Serbia (about 74%) and Albania (about 74%). Gross national consumption in GDP, on the other hand, is the highest in Serbia (over 37%), followed by North Macedonia (close to 30%), while this indicator reaches more than a fifth (23.3%) in Albania.

The mentioned data, as well as the other indicators from Table 1, show that there is a justification for including Serbia, Albania and North Macedonia in the *Open Balkan* Regional Cooperation Initiative. In addition, a superficial insight into the development indicators of other Western Balkan countries (Bosnia and Herzegovina, Montenegro, Kosovo*) leads to the conclusion that they could also benefit significantly from joining the mentioned initiative for regional cooperation.[3] In fact, the entire Western Balkans could count on significant gains in terms of freedom of movement of people, goods and capital, cooperation in the field of disaster protection and ensuring lasting peace.

3. MATERIALS AND METHODS: (IN)HOMOGENEITY OF THE WESTERN BALKANS AND SUSTAINABILITY OF THE *OPEN BALKAN* INITIATIVE

Empirical testing for the presence of convergence process is based upon the literature on waste growth (Baumol, 1986; Barro & Sala-i-Martin, 1997; Bernard & Durlauf, 1995, etc.). The main approach when testing a convergence hypothesis across different economies or regions is based on the neoclassical growth model.

3–See more: Rikalović i dr. (2021).

It consists of estimating the sign of coefficient β, which typically represents responsiveness of the average growth rate to the gap between the steady-state income and the income at the beginning of the observation period. This approach was later extended to a pooled data analysis with the development of the panel data estimation methods. One side of the problem with this approach is that it tests the presence of the so-called "β" convergence which can be criticized both from the theoretical and from the empirical point of view (Phillips & Sul, 2009). Because of this, we decided to implement the novel approach (Phillips & Sul, 2007) for testing the convergence hypothesis based on a nonlinear time-varying factor model[4].

This method of detecting panel convergence termed "*log t" regression test* is based on a clustering algorithm that can model long-run equilibria within a heterogeneous panel outside of the co-integration setup. Main advantages of the model refer to the fact that it does not impose assumptions about trend stationarity or stochastic non-stationarity. This makes the model able to detect the convergence process despite the presence of non-stationarity in the time series. Because it can distinguish asymptotic co-movement of two time series, unlike other methods such as stationarity tests, it will not reject the convergence hypothesis erroneously. In addition to this, the suggested approach allows the researcher to test for the existence of the convergence clubs in the data. So far, a common approach when dealing with the possibility of convergence clubs has been based on *a priori* dividing units of observation into individual groups on the basis of some distinguished characteristics (e.g. geographical location, level of income, OECD/non-OECD countries) and then testing for the presence of convergence within each group. Contrary to this, the method proposed by Phillips & Sul uses an algorithm to identify clusters of convergence inside the entire sample of data. The algorithm is data-driven, which avoids *a priori* classification of the data into subgroups.

A detailed explanation of the algorithm is given in the original work of Phillips & Sul (2007), and we provide only a brief description of its basic steps:

- In the first step, cyclical component of the variable X_{it} - for which convergence hypothesis is tested - is isolated and removed from the cyclical component.
- The second step consists of forming a group of k first individuals for which log (t) regression[5] satisfies the condition $t_k > -1.65$ for the subgroup $\{k,$

4 More about this method, which was also applied in the following research: Молнар & Јандрић (2019).

5 To test the null hypothesis of convergence, Phillips & Sul (2007) developed a regression *t-test*. They call the one-sided *t* – test - the log t test.

k+1}. If no group satisfies the condition, the algorithm concludes that there is no convergence of subgroups in the panel. When there is a subgroup that fulfils the former condition, the log (t) regression is repeated, so that the individuals for which the test yields the highest value are now all grouped together.

- In the third step, individuals not being in the core group are sequentially included, and another log (t) test is conducted for each of them[6].
- The fourth step practically includes performing step 3 on the remainder of the individuals who are not a part of the obtained initial convergence club[7].

To test the hypothesis of convergence between 16 Central and Eastern European (CEE) countries, we used annual data on the value of real gross domestic product per capita (in constant dollars 2017, PPP method) in the period 2000-2026. Data were taken from the World Bank database, and the projected values for the period until 2026 were taken into account.

The basic research hypotheses we depart from are the following: (H1) CEE countries are not a homogeneous group of countries; and (H2) The Western Balkans is a relatively homogeneous regional integration.

Following the methodology and algorithm described by Phillips & Sul, in the first step we present the results of the log (t) test applied to 16 analysed countries, in the period 2000–2026. For the purposes of econometric analysis, the GDP per capita series has been transformed into a logarithmic form. The log (t) estimates, obtained using the least squares method, give a slope coefficient of -0.6005, with a standard error (which is consistent even in the conditions of heteroskedasticity and autocorrelation) of 0.0020 and a t-statistic of -300.53, which is lower than the critical value of -1.65 (see Table 2). The null hypothesis of convergence in the whole sample was rejected (which confirmed our first hypothesis).

6 If the test statistic is higher than criteria *c** the selected individuals form initial convergence club. For the small *T* sample critical value c* can be set to 0 so it is highly conservative, while for the large *T* the asymptotic 5% critical value of -1.65 is recommended.

7 If the resulting t statistic of the performed log (t) regression is higher than -1.65, these individuals are representing additional convergence group. If not, steps two and three are repeated within these individuals to determine if they can be divided into smaller convergence clubs. When there is no *k* for which t_k > -1.65 for the remaining individuals in the panel, we conclude that they exhibit divergent behaviour.

Table 2: Log (t) test statistics

Variable	Coefficient	Standard error	T - statistics
log (t)	-0.6005	0.0020	-300.5376
number of observation units:16; number of periods: 27			

Source: Authors' calculations.

However, this does not mean that convergence does not exist in the form of smaller clubs. We continued to apply the previously described Phillips & Sul grouping algorithm to test for the presence of club convergence within smaller groups in the analysed sample (thus attempting to test the second research hypothesis). Table 3 shows the test statistics for log (t) regression for the initial classification of convergence clubs, as well as for the possibility of merging two clubs into one larger club.

Table 3: Convergence club classification - initial and club merger testing

			Coefficient	T - statistics
Club 1	8 countries	Hungary Poland Romania Estonia Latvia Lithuania Slovakia Slovenia	0.575	52.67
Club 2	3 countries	Bulgaria Croatia Serbia	0.228	17.546
Club 3	5 countries/ territories	Albania BiH Kosovo* Montenegro North Macedonia	(-)0.02	(-)0.408
club merger testing				
Club 1 + 2	HU, PO, RO, ES, LA, LIT, SL, SLO BUL, CRO, SER		Coefficient (-)0.3193	T - statistics (-)36.6002
Club 2 + 3	BUL, CRO, SER ALB, BiH, KOS*, MN, NM		Coefficient (-)0.3727	T - statistics (-)67.6723

Source: Authors' calculations.

According to the presented results for the initial classification, three clubs can be identified (as can be seen from Table 3): *the first* - Hungary, Poland, Romania, Estonia, Latvia, Lithuania, Slovakia and Slovenia; *the second* - Bulgaria, Croatia

and Serbia; and *third* - Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Kosovo*.

The possibility of merging the identified clubs (the first and second; the second and third) was rejected, as the corresponding t-statistics are lower than -1.65, which shows that the initial classification of clubs is also final. We believe that in this way we have confirmed the second hypothesis that the Western Balkans is a relatively homogeneous whole, since, apart from Serbia (which is in the second club together with Bulgaria and Croatia), the other 5 Western Balkan countries belong to the same (third) identified club. It could be concluded that Serbia is actually the "locomotive" of the Western Balkans and that all countries in this area should join the regional initiative for cooperation, the *Open Balkan*.

4. RESULTS: *THE OPEN BALKAN* AND SELECTED GLOBAL COMPOSITE INDICES

One of the important indicators used for international comparisons is a group of six indicators that measure the quality of governance (Worldwide governance indicators - WGI)[8]. They were designed for the needs of the World Bank project, and have been monitored since 1996 (for more than 200 countries). Each of the indicators (voice and accountability; political stability; government effectiveness; regulatory quality; rule of law and control of corruption) can be presented on a scale from 0 (worst case) to 5 (best situation)[9]. Table 4 below shows the position of the Western Balkan countries, according to each of the indicators in 2019.

Table 4: WGI, Western Balkan countries, 2019.

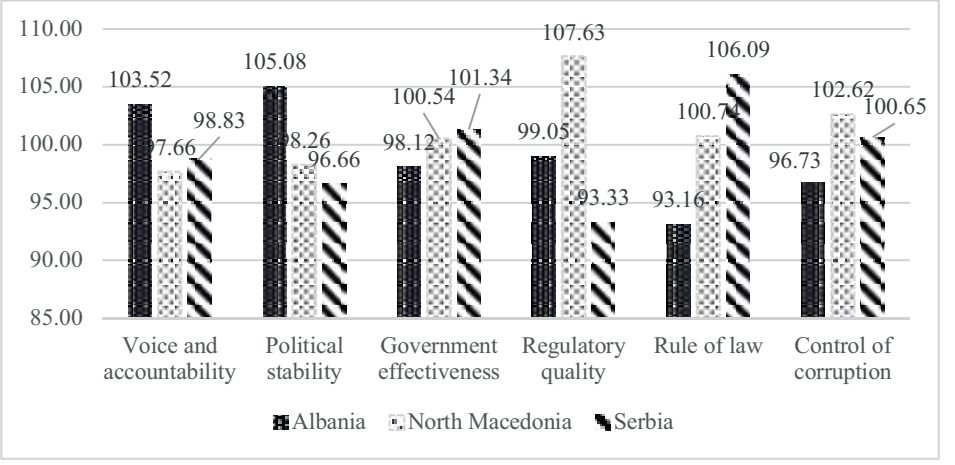
Country/ Territory	Voice and accountability	Political stability	Government effectiveness	Regulatory quality	Rule of law	Control of corruption
Albania	2.65	2.62	2.44	2.77	2.09	1.97
BiH	2.30	2.10	1.87	2.31	2.27	1.89
Kosovo*	2.37	2.11	2.15	2.15	2.11	1.94
Montenegro	2.53	2.51	2.66	2.87	2.60	2.47
North Macedonia	2.50	2.45	2.50	3.01	2.26	2.09
Serbia	2.53	2.41	2.52	2.61	2.38	2.05

Source: Authors' calculation, using data from (World Bank, 2019).

8 See more about this indicator at: World Bank (2019).

9 This is a modification that was applied in Tanasković (2018), for easier understanding and interpretation of the index. Namely, the original values of the indicators range from -2.5 to 2.5, but due to the simplicity of monitoring, they are often modified by reducing the value of 2.5 to the lowest and highest value to indicators ranging from 0 to 5.

Based on the previous table, it can be argued that the area of Kosovo* in 2019 achieved lower values than the average for the Region in all 6 dimensions. In the area of voice and accountability, Albania holds the best position in the Region, while BiH holds the worst; regarding political stability, the most favourable situation is in Albania and the worst in Kosovo* and BiH; government effectiveness is the highest in Montenegro and the lowest in BiH; regulatory quality is the best in North Macedonia and the worst in Kosovo*; in terms of the rule of law, the best situation is in Montenegro and the worst in Albania. Graph 1 below presents the relative position of the *Open Balkan* countries (Albania, North Macedonia, and Serbia) compared to the region.



Graph 1: WGI, relative position of the *Open Balkan* countries, 2019 (*Open Balkan* = 100)
Source: Authors' analysis

Freedom House measures the level of democratic governance in 29 countries in Central Europe and Central Asia in its annual report "Nations in Transit"[10]. Democracy assessment includes separate assessments in 7 categories/areas that largely represent the institutional basis of liberal democracy: democratic governance at the national level, electoral process, civil society, independence of media, democratic governance at the local level, judicial framework and independence, as well as corruption.

The assessment of democracy, which represents the average for these 7 categories, ranges from 1 (the lowest level of democracy) to 7 (the highest level of democracy). Countries can be classified into one of the following five

10 See more: Freedom House (2022a).

categories depending on the level of assessment: consolidated democracies (score 5.01 to 7), semi-consolidated democracies (score 4.01 to 5), transitional or hybrid regimes (score 3.01 to 4), semi-consolidated authoritarian regimes (score from 2.01 to 3) and consolidated authoritarian regimes (score from 1 to 2).

Since 2020, *Freedom House* has introduced the "percentage of democracy" indicator, which translates the democracy score from 0 to 100, with 0 representing the lowest and 100 the highest level of democracy.

Table 5: Level of Democracy, Western Balkans, 2021

Country/Territory	**Total score**	**Status**	**Democracy Percentage**	**Democracy Score**
Kosovo*	36	**transitional or hybrid regime**	35.71	3.14
North Macedonia	47		47.02	3.82
Bosnia and Herzegovina	39		39.29	3.36
Albania	46		45.83	3.75
Serbia	48		48.21	3.89
Montenegro	47		47.02	3.82

Source: Created by authors, using data from (Freedom House, 2022).

It turns out that Kosovo* has the lowest percentage (35.71) and reach (3.14) of democracy in the Western Balkans. In 2021, Serbia had the highest level of democracy, followed by Montenegro, North Macedonia and Albania. Besides Kosovo*, the situation in the field of democracy is also worrying in BiH.

The Global Peace Index has been published since 2007 by the Institute for Economics and Peace, which develops the measurement methodology and quantifies the economic benefits of peacetime situations[11]. This index shows the degree of peace/tranquility achieved in a country, taking into account developments in three areas: 1) existing domestic and international conflicts, 2) social security and safety, and 3) militarization[12]. The lower the score is, the more peaceful the country is.

11 For more details see: Rikalović et al. (2019).

12 The first area concerns the assessment of the extent to which a country is involved in internal and external conflicts, as well as the evaluation of its role in these conflicts and the duration of its involvement in these conflicts. The second area is the assessment of the degree of harmony/discord within the state. The third domain refers to the valorization of the connection between the level of militarization of society and the availability of weapons and the achieved degree of peace/tranquility in one country, both domestically and internationally. The Global Peace Index is a composite indicator that includes 23 indicators classified into the three areas mentioned above (Institute for Economics and Peace, 2018, p. 79). All ratings of these indicators are normalized on a scale from 1 to 5. During the construction of this index in 2007, a group of independent experts assigned each of these 23 indicators an appropriate weight (from 1 to 5) in accordance with

The data from the following table (Table 6) indicate that the situation in the area of peace/tranquility in the Western Balkans improved in 2021 compared to the previous period.

Table 6: Global Peace Index, Western Balkans, 2008-2021

Country/Territory	GPI (0-5), 2008	GPI (0-5), 2017	GPI (0-5), 2018	GPI (0-5), 2021
Kosovo*	/	2.007	2.078	2.017
North Macedonia	2.119	2.133	2.058	1.744
Bosnia and Herzegovina	1.974	2.035	2.065	1.970
Albania	2.044	1.908	1.849	1.824
Serbia	2.11	1.888	1.851	1.797
Montenegro	/	1.950	1.893	1.847

Source: Created by authors, using data from (Institute for Economics and Peace, 2008, 2017, 2018, 2021).

It is noted that the situation regarding peace/tranquility in 2021 is the most unfavorable in Kosovo*, and the best is in North Macedonia. However, important improvement during the period 2008-2021 can be noticed for Serbia, North Macedonia and Albania. In the case of BiH, the value of the GPI remained at the same level in 2021 compared to 2008. Last year (2021), the state of peace and tranquility in the Region was, besides Kosovo*, more unfavorable in BiH.

Since 2012, the global anti-corruption coalition Transparency International has been monitoring and publishing data on the level of corruption. The level of corruption is measured using the Corruption Perceptions Index (CPI)[13]. Table 7 presents the values of the Corruption Perceptions Index for the observed countries, as well as the ranking of these countries in 2020.

their relative importance. The expert team consisted of: Prof. Kevin P. Clements (New Zealand), Sabina Alkire (UK), Ian Anthony (Sweden), Isabelle Arradon (Belgium), Manuela Mesa (Spain), Ekaterina Stepanova (Russia), by (Institute for Economics and Peace, 2018, p. 78).

13 More about the Corruption Perceptions Index at: Transparency International (2018). The mentioned index aggregates data and information from numerous sources which express the perception of business people and experts on the level of corruption in the public sector in a particular country. The Corruption Perceptions Index can take a value from 0 (state of complete corruption) to 100 (complete absence of corruption). So, the lower the value of this index is, the worse the situation is regarding corruption in the country.

Table 7: Corruption Perceptions Index, Western Balkans, 2020

Country/Territory	CPI (0-100), 2020	Rank 2020 (from 180 countries)	Barometer of global corruption (%)*
Montenegro	45	67	10%
Serbia	38	94	15%
Bosnia and Herzegovina	35	111	20%
Kosovo*	36	93	8%
North Macedonia	35	111	/
Albania	36	104	25%

Source: Created by authors, using data from (Transparency International, 2020).

* Percentage of public service users who have paid bribes in the last 12 months.

The previous table shows that the Corruption Perceptions Index in North Macedonia, Bosnia and Herzegovina, Albania and Kosovo* in 2020 took the value of 35-36, ranking them among the countries with the highest perceptions of corruption in the Region. The average value of this index for the entire Region in 2020 was 37.5, which indicates that the situation in Montenegro and Serbia in terms of corruption was slightly better than in the rest of the Region. However, the global corruption barometer warns that the percentage of public service users who have paid bribes in the last 12 months is worrying.

The following Table 8 presents data on the value of the Corruption Perceptions Index in the analysed countries during the period from 2012 to 2020.

Table 8: Corruption Perceptions Index, Western Balkans, 2012-2020

Country/Territory	Corruption Perceptions Index									
	2020	2019	2018	2017	2016	2015	2014	2013	2012	average 2012-2020
Montenegro	45	45	45	46	45	44	42	44	41	44.1
Serbia	38	39	39	41	42	40	41	42	39	40.1
BiH	35	36	38	38	39	38	39	42	42	38.6
Kosovo*	36	36	37	39	36	33	33	33	34	35.2
North Macedonia	35	35	37	35	37	42	45	44	43	39.2
Albania	36	35	36	38	39	36	33	31	33	35.2

Source: Created by authors, using data from (Transparency International, 2021).

Looking at the entire period, Kosovo* and Albania are characterized by the highest level of corruption perception in the Region.

The World Bank's Doing Business project follows, according to the latest methodology, eleven different elements of the business environment for which

data are collected from 190 countries/economies[14]. Table 9 presents the position of Western Balkan countries according to the Doing Business list:

Table 9: Doing Business list: global rank and ranks by individual elements of ease of doing business, Western Balkans, 2019

Country/ Territory	Global rank (for 190 economies), 2019	Starting a business	Dealing with construction permits	Getting electricity	Registering property	Getting credit	Protecting minority investors	Payi-ng taxes	Tradi-ng across borders	Enforcing contracts	Resolving insolvency
North Macedonia	10	47	13	57	46	12	7	31	29	37	30
Kosovo*	44	13	100	113	37	12	95	44	51	50	50
Serbia	48	40	11	104	55	60	83	79	23	65	49
Montenegro	50	90	75	134	76	12	57	68	47	44	43
Albania	63	50	151	140	98	44	26	122	24	98	39
BiH	89	183	167	130	99	60	72	139	37	75	37

Source: Created by authors, using data from (Doing Business, 2019).

In 2019, from the countries of the Western Balkans, North Macedonia was very highly ranked at the global list, with Kosovo* (44th), Serbia (48th), Montenegro (50th), Albania (63th) and BiH (89th) lagging far behind.

In order to see the position of the selected countries in the long run in Table 10, we give the value of the Ease of Doing Business Index for the period 2010-2019:

Table 10: Average value of the Ease of Doing Business index, selected countries, 2010-2019

Country/Territory	Average value of the Index 2010–2019
North Macedonia	81
Kosovo*	71
Serbia	72
Montenegro	72
Albania	67
Bosnia and Herzegovina	63

Source: Created by authors, using data from (Doing Business, 2018).

14 The elements which are monitored are quantified on the basis of indicators that are less perceptive of real market circumstances (number of days to obtain a permit, number of procedures, the cost of obtaining an electricity connection, etc.). They aim to state the type of regulatory solution that is being applied (how the law regulates the protection of minority shareholders, types of archiving data used in public administration, legal mechanisms for regulating bankruptcy, etc.). See more about the index methodology: Doing Business (2019a).

The presented data from the previous table suggest that the conditions for doing business are more favourable in North Macedonia, Serbia and Montenegro compared to the average value for the Region (71). The Ease of Doing Business index lags far behind the average in Albania and Bosnia and Herzegovina, while this indicator for Kosovo* is at the level of the average of the Region.

5. INSTITUTIONAL CAPACITIES OF POTENTIAL PARTICIPANTS OF THE *OPEN BALKAN* INITIATIVE IN THE FUNCTION OF ACCELERATING THE EU INTEGRATION

Given that the strategic goal of the Western Balkan countries is EU membership, the institutional conditions for their development are largely determined by the standards and legal framework of the Union. The following Table 11 shows the EU accession process of the Western Balkan countries:

Table 11: The achievements of the Western Balkan countries in the EU accession process

Country	Start of negotiations about SAA	Signed SAA	Entry into force of the SAA	Membership submission	EU grants candidate status	EC approved a date for the start of negotiations	Beginning of negotiations membership	Joining the EU
Albania	1/31/2003	6/12/2006	4/1/2009	4/24/2009	6/27/2014	/	/	/
Bosnia and Herzegovina	11/25/2005	6/16/2008	6/1/2015	2/15/2016	/	/	/	/
Montenegro	10/10/2005	10/15/2007	5/1/2010	12/15/2008	12/17/2010	6/26/2012	6/29/2012	/
Kosovo*	10/28/2013	10/27/2015	4/1/2016	/	/	/	/	/
North Macedonia	4/5/2000	4/9/2001	4/1/2004	3/22/2004	12/16/2005	/	/	/
Serbia	10/10/2005	4/29/2008	9/1/2013	12/22/2009	3/1/2012	1/21/2014	1/21/2014	/

Source: Authors' review of the literature, using data from (Parlamentarna skupština Bosne i Hergcegovine, 2021; Skupština Crne Gore, 2021; Ministarstvo za evropske integracije Republike Srbije, 2021; European Commission, 2021; European Commission, 2021a; European Commission, 2021b)

The process of opening individual chapters in negotiations with Serbia is quite slow. So far, just over one half of the total number of chapters have been opened. By the end of 2021, although Serbia fulfilled the conditions for the opening of Cluster 3, only Cluster 4 was opened: Green Agenda and Sustainable Connectivity - Chapters: 14 - Transport Policy, 15 - Energy, 21 - Trans-European Networks and 27 - Environment and Climate Change.

At the end of March 2020, a decision was made for North Macedonia and Albania to start negotiations, but no date was set for the start of negotiations. Montenegro opened all chapters. In the case of Bosnia and Herzegovina, the next step is for the Commission to make a recommendation to the Council of the European Union on the possibility of approving candidate status and setting a date for the opening of accession negotiations. Here, it should be borne in mind that there are significant institutional obstacles in the functioning of Bosnia and Herzegovina itself to accelerate the process of European integration.

However, changes are happening within the EU (the process of its reform and restructuring, debates on two Europes, a multi-speed *Europe, Brexit,* policy change and a new methodology for further enlargement and treatment of the Western Balkans), as there are other challenges (problems caused by the corona virus pandemic, as well as its energy situation and its current geopolitical position in the world). However, the acceleration of the institutional setup of the Western Balkan countries according to the European standards and values remains *sine qua non*, without which they cannot progress both on their European path and in general.

6. DISCUSSIONS AND CONCLUSIONS

The Western Balkans could count on significant gains in terms of free movement of people, goods and capital, cooperation in the field of disaster protection and ensuring lasting peace. So far, Serbia, Northern Macedonia and Albania have fully joined the regional cooperation initiative *Open Balkan*.

The full implementation of the regional cooperation initiative *Open Balkan* is currently facing significant political obstacles, such as the unresolved status of Kosovo*, major problems in the functioning of Bosnia and Herzegovina, etc. In addition, Montenegro has its own agenda, according to which it expects to join the European Union soon and before other countries in the region, and therefore does not show much interest in the mentioned regional initiative. Given the above limitations that the implementation of this initiative encounters, it cannot be expected that it is currently fully achievable. Therefore, in order to make the *Open Balkan* initiative successful, a flexible approach emerges, taking into account the concrete benefits that each Western Balkan country could have from participating in the regional cooperation initiative.

The countries of the Region that have not joined the *Open Balkan* yet should be given the opportunity to be involved for a certain period of time in certain issues of interest to them as well on a project, network and flexible principle

(for example, in some dimensions such as investment, transport, culture, sports, youth). In that context, it would not be necessary to institutionalise cooperation between *the Open Balkan* and the interested countries, but the principle of bilateral cooperation of an individual member of the Initiative and a country that has not joined the *Open Balkan* yet could be used.

Given that the *Open Balkan* follows the EU values, the principle of cooperation between border regions could be applied, as well as the formation of cross-border regions. The emphasis here is on developing territorial cooperation, which, for example, can solve current problems of energy supply in the Western Balkans and environmental challenges. In fact, this treatment of the *Open Balkan* enables the "training" of applying European standards and values in the case of the Western Balkan countries while waiting for full EU membership. The regional cooperation initiative *Open Balkan* encourages and strengthens the cooperation of the Western Balkan countries in regard to their faster progress in the process of European integration.

The regional cooperation initiative named *Open Balkan* could also be open to accession of countries outside the Region. Perhaps some EU member states, such as Romania, Bulgaria, Hungary, as well as other Central and Eastern European countries, would be interested. The application of the "Open" era model in tennis (participation of players in the US Open, Australian Open, etc.) in the function of *the Open Balkan,* could provide free access in time, content, space and similar aspects to all other countries in Europe and abroad based on their interests and expectations.

Conflict of interests

The authors declare there is no conflict of interest.

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ОТВОРЕНИ БАЛКАН КАО РАЗВОЈНА ОДРЕДНИЦА ЗЕМАЉА ЗАПАДНОГ БАЛКАНА

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САЖЕТАК

У раду се полази од концепта *Отвореног Балкана* као заједнице земаља Западног Балкана, у циљу јачања њихове економске сарадње и развоја ради брже интеграције у Европску унију. Значајна пажња посвећена је анализи међузависности (не)стабилности државе и економског развоја малих земаља. На основу одабраних глобалних композитних индекса анализиран је и положај *Отвореног Балкана* и његових чланица. Важан предмет анализе је стање институционалних капацитета чланица *Отвореног Балкана* и њихова институционална сарадња из перспективе бржег напредовања ка европским интеграцијама. У раду су тестиране двије главне истраживачке хипотезе од којих се пошло: (1) земље ЦИЕ нису хомогена група земаља и (2) Западни Балкан је релативно хомогена регионална интеграција. За тестирање хипотезе конвергенције између 16 земаља Централне и Источне Европе (ЦИЕ) коришћени су годишњи подаци из базе података Свјетске банке о вриједности реалног бруто домаћег производа по становнику (у сталним доларима из 2017. године, ППП метод) у периоду 2000-2026. година (пројектоване вриједности за период до 2026. године). Користили смо метод који су развили Phillips и Sul (2007) који омогућава идентификацију кластера конвергенције на основу алгоритма базираног на подацима. На тај начин се избјегава да се подаци класификују унапред у одговарајуће подгрупе. На основу добијених резултата могло би се закључити да је Србија „локомотива“ Западног Балкана и да би све земље на овом простору требало да се придруже регионалној иницијативи за сарадњу *Отворени Балкан*.

Кључне ријечи: *индикатори развоја, глобални индекси, економске интеграције, Отворени Балкан, Западни Балкан, ЕУ*.

MODELING THE INTERDEPENDENCE OF MARKETING AND ACCOUNTING INFORMATION SYSTEMS

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ABSTRACT

This paper presents a model of interdependence of marketing information system and accounting information system activities, with the aim of harmonizing them while identifying activities on the basis of which the goals of information support for the execution of managerial tasks are completed. The lack of effort to create such models in the past can be explained by the tendency to present individual information systems as integral and sufficient for management needs. However, the growing management informational dependence of a company implies the need for more efficient ways to create and deliver relevant information and reports. The proposed model is based on a general management concept according to which, under the contemporary business conditions, three general groups of activities are performed: research and monitoring of market requirements, creation of value for customers based on previously identified needs and customer relationship management, and customer lifecycle management. On the basis of such grouped management tasks, marketing and accounting activities and their mutual conditionality were identified and unified though the proposed model.

1. INTRODUCTION

In contemporary business conditions the problem of meeting manager's information needs is the dominant issue. The analysis of the ways in which the management needs should be met indicates the number of information sources, significant differences in their contents and how they are supposed to be used. The complexity of such situation and the increasing efforts to present different information systems as comprehensive (integral) and sufficient for satisfying the

manager's information needs were the main motive for choosing the topic that is the subject of the analysis in this paper.

The primary focus in this paper is on identifying and analyzing the interdependence of marketing information system and accounting information system, since both support managing the company by objectives and, during their evolution, have shown a clear tendency to put the focus on external influences on business results. In that sense, there is an increasing need for harmonizing the content and character of the two most complex information systems within the company: marketing information system and accounting information system.

For that reason, an attempt was made to prove the assumption (hypothesis) that the model of interdependence of marketing and accounting information systems is the basis for linking activities within these systems while preparing an adequate information support for making management decisions.

In order to achieve the research goals, a review of relevant literature, related to the research on the relationship between marketing and accounting information systems, especially regarding their tasks and content, will be performed. After that, a model of mutual interrelationship of marketing and accounting information systems will be offered based on the analytical approach to their activities, grouping of the managerial-marketing functions of general activity and the influence of information systems on its work. At the end, within the discussion and concluding remarks, in anticipation of further development of mutual relations between the two key information systems in the company, the assumptions and perspectives will be presented.

2. LITERATURE REVIEW, MATERIALS AND METHODS

The importance of information systems is a question of the relevance of information as an output that such system provides. The relevance of the output of the information systems will be measured primarily by the appropriateness of the output content that the system offers and the time in which the output is offered to users. Also, it is certain that any type of future managerial decision-making will require some form of information system that supports a certain type of decision. In their general form, these systems will not differ, which is confirmed by similar approaches in explaining their layout and contents. Namely, there are three basic parts of any information system: data collection (input), their analysis and processing (process) and creating information (output) that will be used for decision making. In this sense, the marketing and accounting information systems are no exception.

Given the number of decision maker's information needs, the number and differentiation of data sources, methods of their analysis, reports and their users, it has been clear for a long time that only information systems can meet the information needs. However, in order for the information system to be created and to be adequately managed, it is necessary to have elements with clearly separated content, and to perform activities within such elements that will provide adequate contents, while it is assumed that providing relevant content is also economically justified, as should be implied by a preliminary cost-benefit analysis of the system.

Regardless of what businesses companies do, what type and volume of product and services they create and which markets they operate in, the information systems on which they base their own activities are part of their value expressed in the form of intellectual capital. The flows of information, which are the product of such systems, enable companies to function and also to meet the needs of all companies' stakeholders (Figure 1).

The subject of research in this paper is the interdependence of marketing and accounting information systems, given that modern management concepts and business philosophies depend on this connection. Also, the directions of their modern development point to the convergence of input sources that they use as systems. Thus, for a long time now, the coverage of relevant data used by the marketing information system has not been represented predominantly by external sources, created outside the company. In this sense, it is clear that "information in an internal database (as one of the elements of the marketing information system – authors' note) can come from many sources" (Kotler et al., 2017, p. 107). It is known that the accounting department has traditionally been used as one of these sources, and in order to identify "important opportunities and potential problems, marketing managers rely on internal reports on orders, sales, sales prices, costs, inventory levels, receivables and liabilities" (Kotler & Keller, 2012, p. 70).

On the other hand, promoting the need for the content of information offered by the accounting information system to be based on external sources of information about competition (Simmonds, 1981, according to: Drury, 2012, p. 580) and especially on the company's key success factors defined from the customers point of view (Gajić, 2010), also indicates the need and tendency to converge the contents of two information systems.

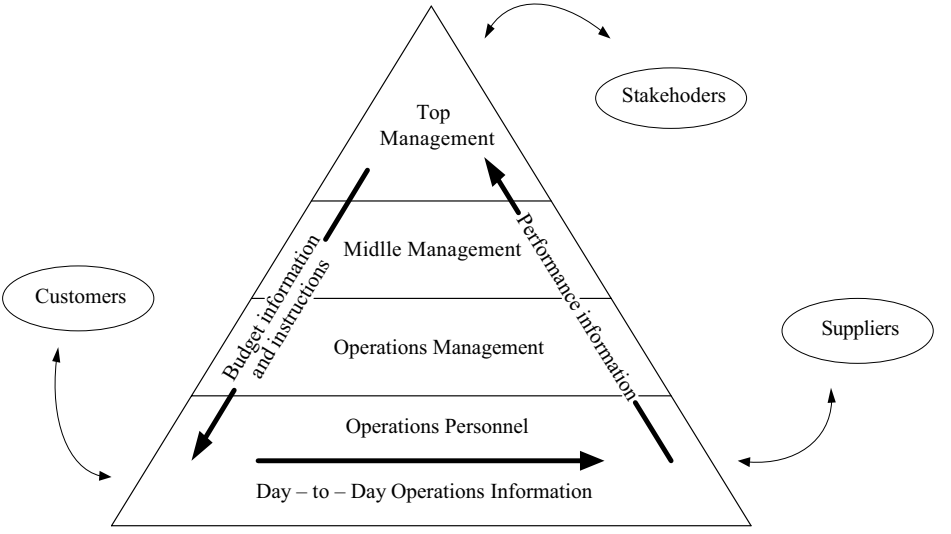

Figure 1: Internal and external flows of information
Source: Hall, 2011, p. 4.

The number of different approaches to the marketing information system is clearly visible in the literature (Macura, 2003). The dominant goal of the marketing information system is to provide relevant information while communicating with market participants on what is demanded, who the bearers of such demand are, to what extent the demand is expressed, what and who currently meets it and under what conditions the existing demand is met, and all in the context of the product or services that companies offer.

Unlike the approaches to the marketing information system, approaches to the accounting information system are fairly uniform in terms of the content they could offer. These contents are used in order to prepare an information base for their users to be able to make planning and control decisions. From the standpoint of general importance, these decisions are related to the effectiveness and efficiency of the use of available resources, and from the point of view of individual importance, especially from the point of view of their internal users (managers at different hierarchical levels), these decisions are related to countless daily activities. Due to the precise differentiation of terms, it should be emphasized that there is a possibility that the term "accounting information system" is treated from the point of view of applying information technology to the accounting system (Bagranoff et al., 2010, p. 4), which will not be the case in this research, because the emphasis will be on the content and usability of the system.

The fact is that information systems evolve with the evolution of management systems and with the activities within them. These activities represent the starting point for the content of the information support they provide and the flows of information between various information systems within the companies[1]. Part of the evolution of information systems is also caused by the importance of functional areas which specific information systems belong to. The historical overview of changes in the status of the marketing function and its information system in relation to other information systems is particularly interesting:

- phase 1 – marketing function subordinated to other functions (primarily to production and financial function),
- phase 2 - marketing function in equal status with other functions,
- phase 3 - marketing function with a dominant status in relation to other functions that have a supporting character,
- phase 4 - marketing function with integrative significance in relation to other functions,
- phase 5 - marketing function as the main function within the company, while other functions have a subordinate character,
- phase 6 - marketing function as a control mechanism in relation to other functions, with the promoted management concept of "customer in focus", which gave the customer the status of a true partner in carrying out the economic mission of the company.

The first three phases in the treatment of the marketing function are caused by the general, dominant status of supply in relation to demand, while the remaining three are the consequences of promoting the concept according to which demand has a dominant impact on business operations. Although one can find a general awareness of the mutual relationship of the two analyzed information systems in the literature, the statement that "without adequate accounting information one cannot imagine a rational information system, nor the efficient marketing management" (Macura, Op. cit., p. 49) does not define the adequate model or concept of their interconnection. Also, it is a general view that the interdependence and relation between the marketing and accounting information systems is not sufficiently emphasized or operationally presented. For example, out of ten best-selling marketing books used in the form of student textbooks, identified through the "amazon.com"[2] platform, the term "accounting" is used mainly when mentioning the organizational unit that is an integral part of the organizational structure of the company. In two sources, it is only briefly stated that within

1 Information systems within: financial function, input procurement function, marketing function, accounting function, human resource management function, etc.

2 Information acquired on May 30th 2021, through: https://www.amazon.com.

the "internal data", as an element of the marketing information system, data are taken from the accounting department. In only one source, a specific accounting tool is mentioned, namely Activity Based Costing as a suitable "accounting method used to measure integration to estimate costs within each supply chain activity" (Lamb et al., 2011, p. 451). Also, only one source (Perreault et al., 2011, p. 599) offers a clear view that "marketing students must be familiar with the basics of business language (meaning accounting – authors' note)", and uses a special heading in the book to present these relationships. However, the implied knowledge relates only to understanding accounting terminology from the perspective of using financial statements rather than relevant internal information for marketing decisions. The situation is similar with leading journals dealing with marketing theory and practice[3].

On the other hand, based on the analysis of ten best-selling management accounting books also used as student textbooks, identified through the same sales platform, it was concluded that accounting literature with much larger and more specific content treats relationship with all elements of internal value chain function including the marketing function (see for example: Bhimani et al., 2019, p. 13), with the common use of case studies to present certain marketing phenomena as well (see for example, Garrison et al., 2012, p. 241, Datar & Rajan, 2018, p. 782, Zimmerman, 2017, p. 174). Although the literature in accounting contains a number of examples that promote accounting support for specific marketing decisions[4] and explain in detail the treatment of marketing costs from the position of their allocation, the accounting literature (including the one that publishes research papers)[5] also does not provide an appropriate model that emphasizes the interconnection of accounting and marketing information system, but only certain possibilities of joint work in specific cases are analyzed (for example, Philips & Halliday, 2008).

3 The following journals were analyzed: Journal of Marketing, Journal of Public Policy & Marketing, Journal of Marketing Research, Journal of International Marketing, Harvard Business Review.

4 For example, the decision on sales price, sales range, identification and measurement on customer profitability and distribution channels (Gajić, 2017; Pete & Réka 2010), customer satisfaction (Cugini et al., 2007), supporting planning activity (Phillips & Halliday, 2008) and the like.

5 The subject of the analysis were: Accounting Horizons, Accounting, Organizations and Society, Advances in Management Accounting, Contemporary Accounting Research, Cost Management (Journal of Cost Management), International Journal of Accounting Information Systems, Journal of Accounting Research, Journal of Applied Management, Accounting Research, Journal of Information Systems, Journal of International Accounting Research, Journal of Management Accounting Research, Management Accounting, Management Accounting Quarterly, Management Accounting Research, Strategic Finance.

2.1. Tasks and content of the marketing information system

There are three general patterns of marketing information systems. The first is authorial with different individual approaches. The second is institutional, created mainly by academic or research institutions, while the third one involves the so-called spontaneous way. Therefore, they were subsequently theoretically shaped. The essence of these models is in their content, which is the most important item for their connection with other information systems.

In the approach chosen for this paper, Kotler's authorial presentation of the marketing information system was used (Figure 2).

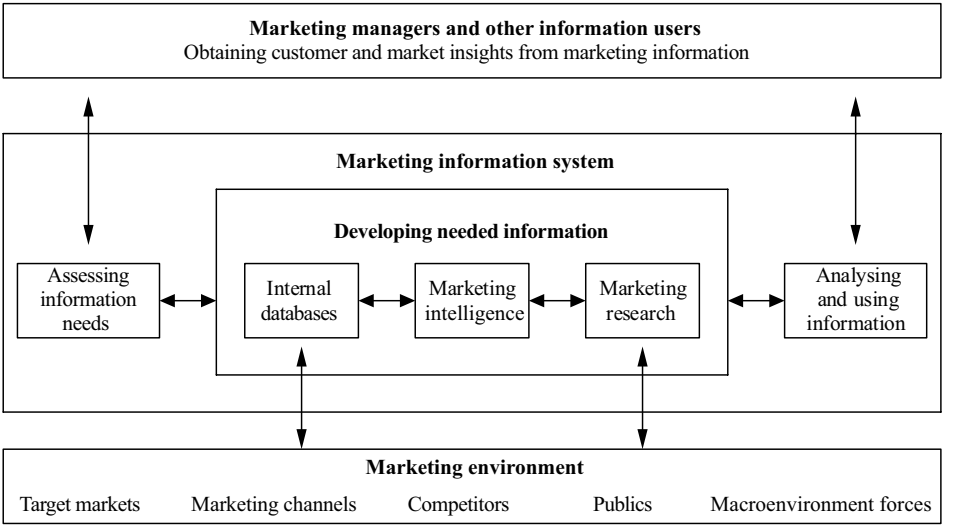

Figure 2: Marketing information system

Source: Kotler et al., 2017, p. 106.

Information needs assessment is the first task of a marketing information system. Based on the identified needs, the requested information is created, after which such information is used for business decision-making.

In the process of assessing information needs, the need to clearly present the requirements of users of marketing information is emphasized, but also the need for the system itself to generate a certain type of alerts about market developments, which will require appropriate management response.

In the process of creating the necessary information, three sources of information are used: internal databases, marketing intelligence (marketing data collection) and marketing research.

1. Internal databases are the basis on which the remaining elements of the marketing information system are financed and upgraded. Such databases contain information from various sources and have a historical character. Their content is especially based on information about customers and target markets, the terms under which certain groups of customers participate in transactions with the company, the level of their satisfaction, any complaints and suggestions they may have and the like. These internal databases usually contain information based on accounting records. Thus, within this part of the system there are accounting reports that contain data on orders, sales, inventory levels, marketing costs and cash flows from customers. Special emphasis is placed on the identification of different categories of costs incurred within the marketing function[6], revenues and cash flows by different calculation categories - by products or services, sales territories and customers. The key sources of data are accounting documents, but also staff working in sales.

   Unlike other two sources used to create the necessary marketing information, internal databases are available without special additional activities and resource consumption, which is why they should be used primarily. On the other hand, the previously performed assessment of information needs may require information that is not automatically ready for use, but needs to be prepared on the basis of available data.

2. The tasks of the marketing intelligence system, within which data collection is performed, are related to monitoring the environment in which the company operates, including data on effects of the competitor's activities. The content adequacy of the reports of this part of the system is based on the information about changes in the environment being up-to-date, so that they can be responded to in a timely manner. The subject of treatment within internal databases is the marketing system and the company relations with the environment, and the subject of study within the framework of marketing intelligence system is only the environment. The primary data that are sought to be collected relate to the actions of the competition, and the requirements and wishes of customers.

3. The marketing research system deals with finding ways to prepare actions on specific issues that need to be decided on. The process involves a logical sequence of activities presented in Figure 3.

6 Although, in most cases, treated as a revenue responsibility center, it should not be overlooked that significant costs occur within this function, to which special attention must be paid.

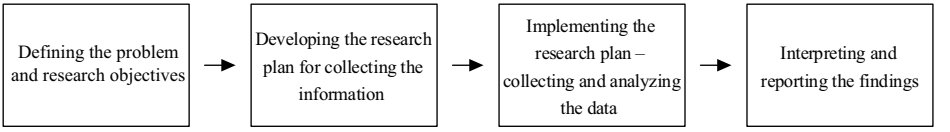

Figure 3: The marketing research process

Source: Kotler et al., 2017, p. 109.

Within the first phase of marketing research, it is necessary to define the problem and goals of the research, which is crucial from the point of view of developing a research plan for data collection. The plan should identify the sources and method of data collection, the time aspects of the research, in terms of the duration of the research and the range of time to observe a particular phenomenon, as well as the data sources that will be used. In order to collect data, the following is performed:

a) market research, with the aim of collecting data on number of consumers, their requirements, location, market share of competitors, etc.,
b) analysis of marketing mix instruments, in the segment of supply content, sales prices, cost eligibility, characteristics of the products and services (own and competitor's), life cycle of products or services, distribution network performance, promotional activities, etc., and
c) analysis of sales from the point of view of sales size, in terms of sales volume by individual segments, efficiency of sales operations, consumer behavior and the like.

After data collection, the instruments of the so-called analytical marketing system are used. They consist of a bank (database) of experiential data, statistical methods and various models for the analysis of marketing data and problems. The bank of statistical methods includes statistical and mathematical programs for data processing. The calculation of averages, various types of indices and trends, regression and correlation analysis, dispersion and cross-tabulation of data are commonly used. In the case of the analysis of several variables, usually multiple regression analysis, discriminant analysis, and factor and group analysis are used. The content of the bank of models is focused on supporting the decision-making on the elements or instruments of the marketing mix (products, prices, distribution and promotion). Observing the market reality by creating a specific model in the modern approach to marketing management is quite common. For example, models for forecasting sales, choosing a location for retail facilities, promotions in the media, and even for financing the content of the marketing mix or marketing activities in general.

Finally, interpretation on research findings and reporting should be done, in order to use most efficiently information during the business decision-making process.

2.2. Tasks and content of the accounting information system

The accounting information system offers information to external and internal users who make planning and control decisions on the basis of accounting reports. This system also identifies and assesses information needs from decision makers, namely: external, such as owners, customers, suppliers, tax authorities (for which routine, standardized and publicly available reports are prepared, on the basis of legal and professional regulations and the same time intervals) and internal users, which are managers at different hierarchical levels (for which non-routine and non-standardized reports are prepared and presented in accordance with individual needs). Within this system (see Figure 4), the identification and assessment of information needs, the creation of information and finally its analysis and use, are also performed.

The elements of the system within which the accounting report and information are created, are: financial, management and cost accounting. There are three groups of tasks that are subject of execution of an accounting system with an aim to provide information to different users:

1) recording the results of business transactions, in terms of their identification, bookkeeping, summarizing and reporting on their financial and non-financial effects;
2) attention directing, in terms of interpretation of business achievements, especially in the part related to the comparison of actual and planned achievements, while providing various information on the basis of which the attention of management is focused on strengths and weaknesses within the organization;
3) support to business decision-making, in terms of identifying the best option for the use of limited resources, after key information on attainable options have been provided.

By performing the first group of tasks, reports on financial position and success of companies are enabled, as a periodic external accounting reporting in a way determined by regulations and accounting principles and standards.

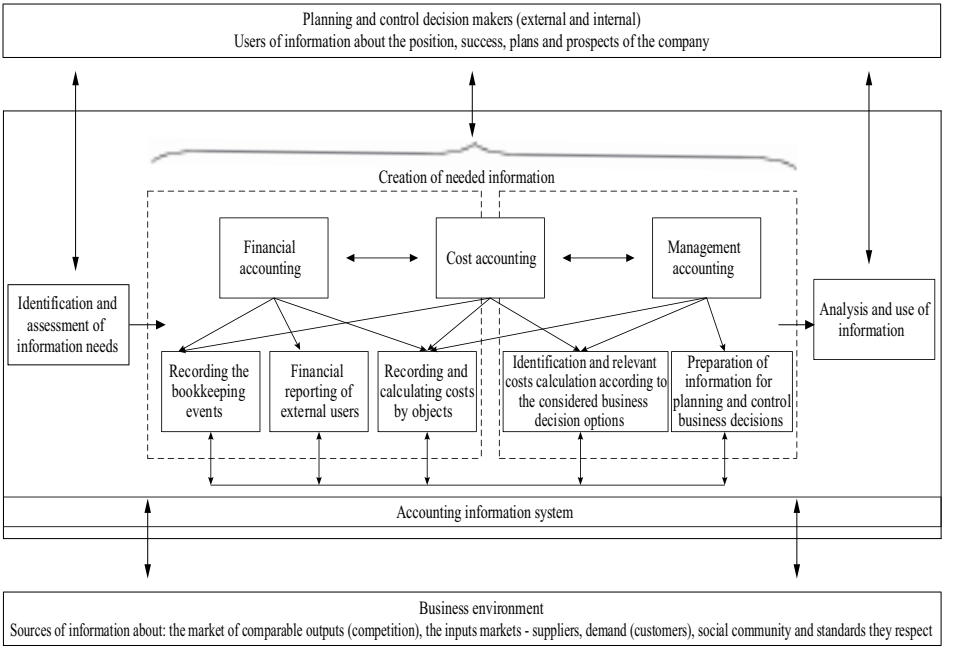

Figure 4: Content and tasks of the accounting information system

Source: Authors' creation

By performing the second and third group of tasks, accounting supports planning (establishing goals and strategies to achieve these goals), business decision-making (using financial and non-financial information to make decision-making consistent with goals and strategies), and performance control (using financial information to keep the business results as close as possible to the planned ones, or to modify the plan itself, if necessary). Basically, in this way, management activities are supported.

The contents of the elements of accounting information system, although clearly defined, are not mutually independent. Thus, within the content of financial accounting, tasks related to the recording of accounting events and the preparation of financial statements used by external stakeholders to the company are performed. Every business event will have certain consequences on spending company resources, which is the subject of planning, recording, controlling and reporting, so that the activities of financial and management accounting are quite intertwined. Considerations regarding cost accounting are similar. This segment of the accounting system has a minimum degree of autonomy compared to other two parts of the accounting information system, which is highlighted in Figure 4 by sharing the objectives of its activities and linking its tasks to supporting

activities located within the financial-accounting segment and the management-accounting segment. Namely, on the basis of the primary activity concerning recording accounting events, various types of cost calculations are performed for the needs of financial reporting on the one hand, and for the needs of preparation of alternative options of resource usage on the other hand.

3. RESULTS - IDENTIFICATION OF A MODEL OF INTERDEPENDENCE OF MARKETING INFORMATION SYSTEM AND ACCOUNTING INFORMATION SYSTEM

It was previously stated that the relations of individual functions have changed over time. In order to present a potentially usable model of the interdependence of marketing and accounting information systems, it should be assumed that the analyzed functions and their significance are equal. This concept is prevalent in practice, primarily due to the dominant market structures (fragmented competition and underdeveloped offers), in which the buyer still does not have the status of a controller in management activities (not yet "in focus"). Also, the fact is that a large number of companies do businesses in which, due to the technological characteristics of the process, it is not possible to make a step towards the dominant influence of marketing activities and a large number of companies are small in terms of investment and production potential which would enable them to have greater strength in market performance (for example with supply diversification).

In order to develop a certain system to the form of a model, it must have the appropriate internal cohesion, but also the appropriate openness to connect with other systems. In operational terms, this is done through activities within the content it offers. Some situations or problems that need to be solved imply emphasizing and favoring a certain type of content, which causes different levels of connection with other systems in order to reach specific information content.

3.1. Grouping of general activities of the management-marketing function and the influence of information systems on its work

Returning to the content of the demand for information that should initiate and prepare the basis for managing the marketing activities, these activities should be presented. In this sense, it is possible to use Figure 5.

Researching and monitoring market demands is the primary business activity that should enable cognition of the demand - in content, scope and time frame. Based on such knowledge, the combination of available resources is performed

and content of the offer is created, represented by the traditionally accepted concept of the marketing mix, i.e. the product or a service, its selling price, the method of promotion and distribution.

This mix, or combination of marketing instruments on the basis of which the needs of product or service users are to be met, implies the appropriate characteristics to meet the previously identified demand. In contemporary business conditions, customers are offered a package of attributes (characteristics) of products or services whose value, from the point of view of customers, should be equivalent to or greater than the amount of money they should give up for this type of products or services. Due to increased market competition, the process of deciding on sales prices takes place simultaneously or even before decisions about the content of the offer and the characteristics of the products or services offered are made. Increased competition causes an increase in market risk to an extent that it can be annulled only by applying the concept of so-called target sales prices. This selling price is the basis for defining the target business result that will be calculated on the pre-defined (target) selling price. The key management challenge comes down to reaching the target costs (as the difference between the target sales price and the target business result). Available supply and opportunities to meet demand must be efficiently communicated to potential customers, therefore different instruments are used in promotional activities. The remaining element of the marketing mix requires deciding on the method and channels of products or services distribution, while looking for options that will provide the lowest costs, with minimal time consumption, from the moment the product or service is created to the moment when it is delivered to the customer and put into use.

Within the third general group of managing marketing tasks, the customer relationship management and product or service lifecycle management activities are carried out. Once the needs have been identified and met, it is important that in order to achieve the desired customer loyalty, all knowledge regarding their behavior is carefully managed, including available information on their future development prospects and strategies that are most effective in terms of gaining their confidence. On the other hand, customer lifetime value management implies understanding the implications of customer relationships over the entire lifetime cooperation with the customer. In essence, this is done through the analysis of customer profitability and striving to make the data base of customers with whom relationships have been established as large as possible, but also more meaningful in terms of contributing to business results.

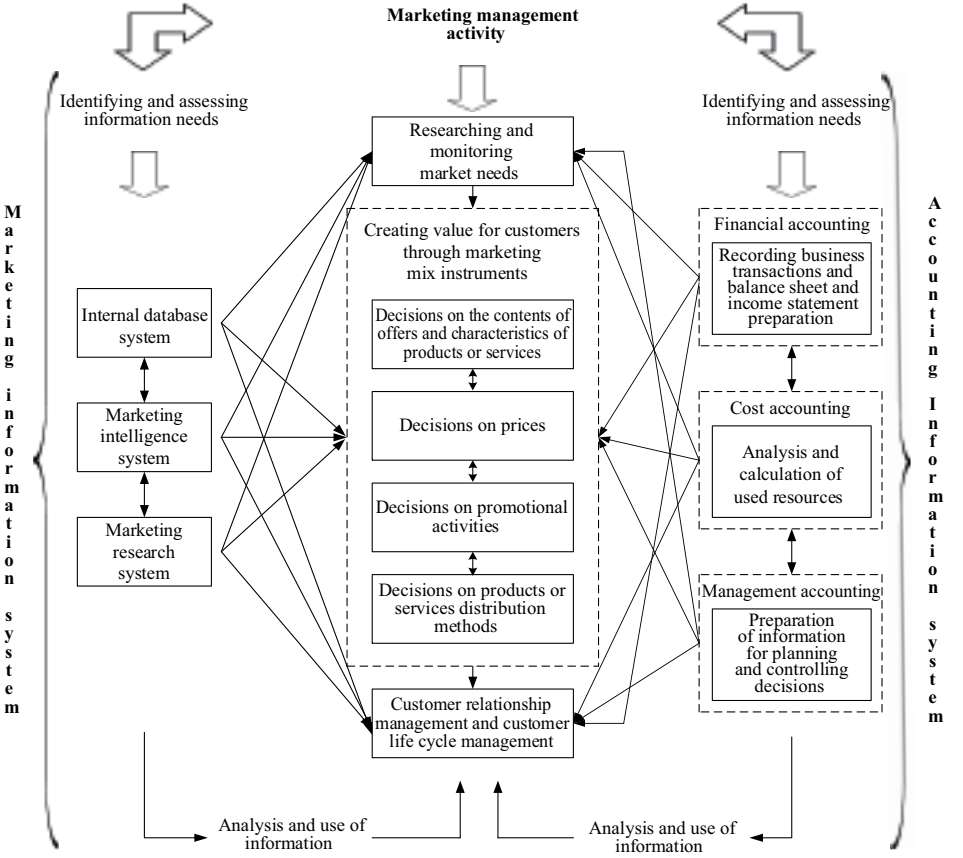

Figure 5: Model of management - marketing activities dependence on the support of marketing and accounting information systems

Source: Authors' creation

3.2. Mutual dependence of marketing and accounting information systems

If the common characteristic of the analyzed or any information system is that in the first phase the data are collected, in the second phase their processing and analysis is done, and in the third phase the decision is made and their effects are monitored, the mutual dependence of the two analyzed information systems can be represented by their basic characteristics. In the data collection phase, the common characteristics of both systems are identified from the position of their relevance, credibility and authenticity of their sources, as well as in terms of their classification. In the phase of data processing and analysis, it is important to identify the usability of the instruments used to prepare information, while in

the third phase, the effects of applied decisions are selected and measured, from the point of view of resource efficiency.

In the segment related to research and monitoring of market demands, in terms of marketing it is crucial to obtain reliable and accurate data on the volume and types of demand, and how this demand is segmented, all related to products or services that the company offers or can offer to the market. Obtaining such data implies the occurrence of costs, which, in accordance with the usual accounting tasks, will have to be identified, measured and about which the appropriate planning and control decisions will have to be made. Examples of such decisions are decisions about which markets the research on demand will be conducted on, what is specifically researched, what is the scope of that research (sample size), how the research will be conducted and how long it will last, which also assumes accounting support. A particular challenge for accounting activities is reflected in the need to allocate such costs and the ways in which they will be contrasted with revenues. As for the accounting instruments to be used for these purposes, they are mainly related to the activity based costing and the need to adjust analytical records in order to apply this calculation concept.

In the segment of creating value for customers through the marketing mix instruments, the marketing information system should provide an answer to identified consumer attitudes, in terms of answering the question of which package of characteristics a product or a service should contain, at what price it should be offered, which promotional instruments should be presented to customers, and through which channels of distribution they should be delivered. In this segment, the need for cooperation with the accounting function is most strongly expressed.

The accounting function can offer an analysis of required and available resources, budgeted calculations regarding the expected financial and non-financial consequences of decisions on the content of individual options for all elements of the marketing mix, measuring the effects of selected and applied decisions, and recommendations for certain corrective actions after their implementation. Regarding the calculation needs, the accounting function can offer advanced instruments that are adapted to changed market assumptions and the effort to meet customer needs according to their desires in terms of quality, time and innovative content and all at reasonable costs i.e. selling price. Among these instruments, the following are already commonly used: Feature costing, Target costing, Life-Cycle costing and others. In addition to these general instruments that will enable efficient cost management and cost calculation, the accounting

function is expected to identify relevant cost and revenues by available options of resource usage.

In the segment related to customer relationship management and customer lifecycle management, it is crucial that the marketing information system identifies the length of cooperation with a particular customer, and that the accounting system identifies profitability by customers and distribution channels within that time period.

In order to present the interdependence of two analyzed information systems, it is possible to use the model presented in Figure 6, and enable the identification of the intertwining tasks of these systems, an approach based on which their general tasks are presented by some common activities.

4. DISCUSSIONS AND CONCLUSIONS

The analysis is presented and solutions are offered in terms of identifying the model which would formalize the abilities and importance of connecting two key information systems within the company, aimed to indicate the need for "cooperation" of analyzed functional areas. In that sense, the expectations and understanding of the mutual relations perspectives of two key information systems in a company are especially interesting. Namely, the contemporary business conditions, regarding information systems, are defined by the following characteristics:

(1) Changeable environment, in a sense of:

- demand, especially from the perspective of continuous pressure on having innovative content,
- supply, especially from the perspective of continuous progress of production technologies and resources used, and
- shortening the lifespan of a product or a service, as a consequence of both previous characteristics,

which will cause the need for the management process to continuously adapt to the changing environment and consequently to changes in the products or services offered. Such characteristic of a management process will mean that the information grounds which decision-making is based on will also change. About all, it is said that "the major responsibility for identifying significant marketplace changes falls to the company's marketers. More than any other group in the company, they must be the trend trackers and opportunity seekers" (Kotler & Keller, 2012, p. 67).

(2) The need to provide information more quickly, by:

- reducing the time for obtaining relevant information - information systems that support the previously described form of management should be based on the concept that will enable reduction of time for preparing the information for business decisions;
- integrating the phase of preparing the information for business decision-making and the phase of decision-making. Even earlier, some authors questioned the classic system of preparing accounting information for business decision-making, stating that "a conventional assumption in management accounting systems design thinking is that managers think and consider information prior to making decisions and taking action" and that, in contemporary business conditions, "action is subsumed within assessments of information" (Bhimani & Bromwich, 2010, p. 105). Although the above statement refers to the management part of the accounting information system, the same principle can be applied to the marketing information system. There are well-known examples of "rush" in the business decision-making, especially in the electronics and automotive businesses. The thesis promoted in the cited work is that in a highly changeable environment, the goals of business activity change during the implementation of planned activities so fast that previously used decision-making concept can only be replaced by simultaneous preparation of information and its use during the business decision-making process;
- using databases - in the future, information systems will be based on data sets, which will be integral in nature and will not be owned by the individual organizational unit that will collect data on request, after the need for decision has occurred. Simply put, the instability of the business environment causes a lack of time to prepare detailed analyzes in advance, so it is expected that business decision-making in the future will be more based on instant and current information created from existing databases. In this way, a proactive approach of the accounting function to the needs of decision makers could be provided as well as the advisory role of accountants to different users of financial statements promoted (IFAC Information Paper, 2010, p. 13);
- automation of data collection and processing (digitalization) - automation of data collection and processing is inevitable in the future, so in addition to operational knowledge on conducting the business, the ability to efficiently use digitally created databases will certainly become of key importance.

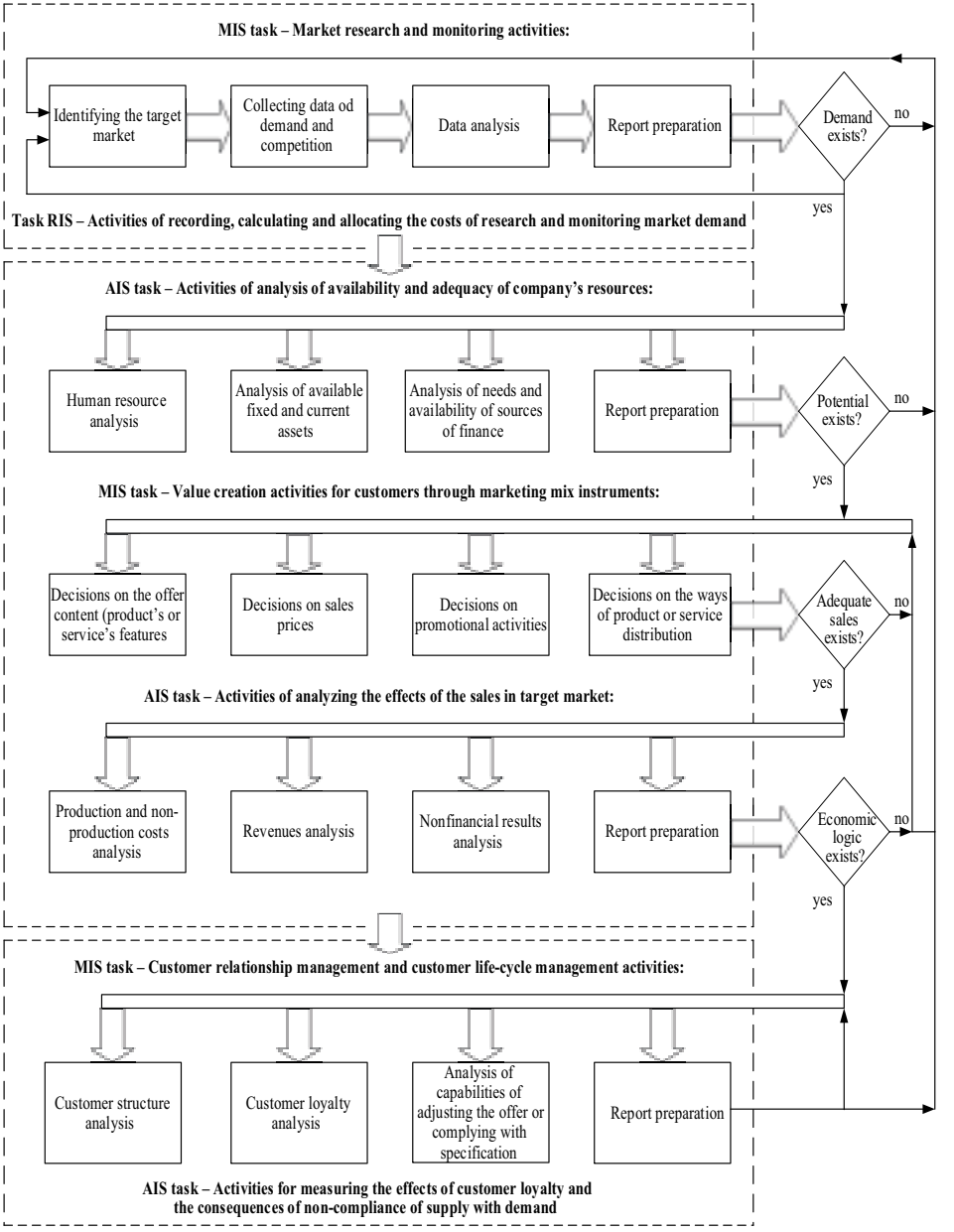

Figure 6: Model of interdependence of marketing information system and accounting information system

Source: Authors' creation

(3) shifting the cost structure towards overhead costs - in addition to the fact that relevant information will gain in importance, their acquisition will also affect the amount of costs necessary for such information databases to be formed and maintained. Given that these are costs that have an indirect character in relation to cost objects (overhead costs), the issue of their allocation will become more important.
(4) changing the importance of performance indicators - since customer satisfaction is defined as the primary performance indicator, marketing metrics and accounting performance measurement will be adapted to such concept of business performance (for example, measuring profitability by customers and distribution channels will be dominant over the profitability of products or services).
(5) finally, the importance of real evaluation of information obtained from these sources should be emphasized, considering that this knowledge is not common, neither in theory nor in practice.

Expectations in terms of creating an integrated model of information support to management are a natural aspiration of people who deal with information systems and make decisions based on the results of such systems. Great expectations, in this regard, are based on the growing role of information technology that will certainly enable automation of data collection, classification and processing, and their easy retrieval and distribution. Nevertheless, the creative role of those involved in identifying relevant information for specific needs will gain importance, with the inevitable growth of competition within the growing market globalization.

Accordingly, the change of tasks and content will be especially visible within the company's information systems, especially in the marketing and accounting information system. Therefore, it is important to identify opportunities to learn about common interests through their adequate connection and avoid certain overlaps in the activities performed, which was done in the paper, with the proposed model of their mutual interdependence.

If the logic of the proposed model is accepted in a sense that the predetermined hypothesis is validated, then the future research could examine several interesting questions, such as: to what extent managerial decisions are based on systematically combined information system, to what extent marketing and accounting activities are correlated nowadays, if this correlation is significantly influenced by availability of financial means, etc.

Conflict of interests

The authors declare there is no conflict of interest.

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МОДЕЛИРАЊЕ МЕЂУСОБНЕ УСЛОВЉЕНОСТИ МАРКЕТИНШКОГ И РАЧУНОВОДСТВЕНОГ ИНФОРМАЦИОНОГ СИСТЕМА

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2 Предраг Гајић, Економски факултет Универзитета у Бањој Луци, Босна и Херцеговина

САЖЕТАК

Овим истраживањем представљен је модел међусобне зависности активности маркетиншког и рачуноводственог информационог система, с циљем њиховог усаглашавања приликом идентификовања активности на бази којих се остварују циљеви информационе подршке извршавању менаџерских задатака. Недостатак настојања да се овакви модели креирају у прошлости може бити образложен тежњом да се појединачни информациони системи представе као интегрални и довољни за управљачке потребе. Ипак, нарастајућа информациона зависност менаџерске структуре у оквиру предузећа подразумијеваће и ефикасније начине да им се релевантна информација и извјештаји доставе. Предложени модел је заснован на општем концепту управљања према којем се, у савременим условима пословања, обављају три опште групе активности: истраживање и праћење захтјева тржишта, креирање вриједности за купце на основу које се задовољавају претходно идентификоване потребе и управљање односима са купцима и животним циклусом купца. На бази овако груписаних управљачких задатака идентификоване су маркетиншке и рачуноводствене активности и њихова међусобна условљеност, која је унифицирана кроз предложени модел.

Кључне ријечи: *маркетиншки информациони систем, рачуноводствени информациони систем, модел међусобне условљености маркетиншког и рачуноводственог информационог система*

FACTOR ANALYSIS OF NON-FINANCIAL MOTIVATORS FOR SUCCESSFUL MANAGEMENT AND PROMOTION OF THE COMPANY

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ABSTRACT

Factor analysis of non-financial motivators will be presented through a statistical model whose goal is to group factors. Composing a statistical model implies grouping the factors that determine the contributions of qualitative preference to business efficiency of the whole company. Empirical material is obtained by surveying the target group, and the response pattern to clarify the management problem is factor analysis. The purpose of factor analysis is to rationalize the number of dependent variables of business efficiency in relation to qualitative and quantitative requirements within the surveyed target group. Considering the modern lifestyle, it is reasonable to assume that general dissatisfaction level is increasing every day. This includes professional orientation, working conditions, leisure time management and all levels of interpersonal relationships such as collegial, friendly, partner and family relationships. It is reasonable to assume that within business systems there is a space for recognizing this dimension and its careful analysis that respects the non-economic dimension of employees' (dis) satisfaction and manages business efficiency in terms of non-economic factors. This paper aims to present thorough analysis of grouped factors that are basically non-financial; they represent a group of spiritual factors that contribute to a better internal climate of the company. All this leads to a prosperous company management that can represent and promote the company in public well.

1. INTRODUCTION

The company is an open system formed of tangible, monetary and intangible components. Companies adapt their business concept to specific goals, but the basic idea is to achieve the maximum possible difference between output and input values.

The business result is measured and expressed through monetary, exact and explicit values, but it is formed by various components, among which it is justified to single out work efficiency, which is not only the result of objective factors but is largely the result of subjective and non-economic factors.

It is justified to examine the impact of such factors and perform their model classification, for which statistical models such as factor analysis are used successfully and efficiently. In order to achieve the maximum possible contribution to business efficiency factor analysis results allow managerial efforts to be targeted.

The task of factor analysis is to group and classify, more concisely than in the total amount, the contributions of individual variables by observed factors, in order to facilitate monitoring and control of their impact in reality.

It is important to emphasize that the research and analysis is related to the territorial unit and that it can manifest itself in different forms in different environments or time periods, therefore, in order to be relevant, the obtained results should be refreshed by repeated research.

2. PREVIOUS STUDIES

Factor analysis is a methodological framework of numerous professional and scientific papers in the field of social sciences, and combines a large number of procedures which, by expert approach, extract reduced dimensional data based on interaction within a set of variables. It allows a large number of variables, used to describe aspects of certain phenomenon, to be presented by using a smaller number of variables which are based on interconnectedness of a larger number of factors as sources of covariance. Factor analysis has the task (Zahirović, 2005) to:

- determine the factors of the interconnected manifest variables, or to reduce the dimensionality of the original space, by some factorization procedure;
- determine the connection of individual manifest variables with these factors, or to achieve more interpretable solutions by rotating the factors.

There are numerous examples of factor analysis application, and, by using factors, it most often determines a group of variables and their impact on attitudes, perceptions or observations about the phenomenon as a subject of the research. The results of several studies that serve as a basis for the systematization of theoretical concepts and results of previous studies have also served, in the paper, as a basis for defining the research problem. Since its inception, more than a hundred years ago, this type of analysis has become one of the most widely used multivariate statistical procedures in applied research across a variety of fields. (Brown, 2006)

In her work, which referred to the determination of the product basic characteristics by applying factor analysis, (Kurnoga Živadinović, 2004) the author researched the respondents' attitudes in relation to a specific product, and it was about "coffee". The researcher's aspiration was related to the empirical analysis of "coffee" product characteristics, where she tried to reduce a great number of manifest variables among which there was covariance to a small number of latent variables, or factors that would explain covariance between manifest variables.

Specific empirical research indicated the fact that the initial matrix of factor structure did not meet the criterion of simple structure and was not interpretable. The analysis continued in the direction of orthogonal varimax rotation of factors, the result of which was the simplification of factors. Factor analysis of the "coffee" product characteristics based on fifteen manifest variables allowed the extraction of four factors, which were expressed as:

- relaxation,
- addiction,
- concentration and
- the fourth factor called "taste-smell".

The author of the paper "Application of factor analysis in researching the usage of information and communication technologies: the case of European countries" (Zoraja, 2014), starting from 17 variables, extracted three factors, related to:

- The first factor called "Internet use by individuals" included eight variables,
- The second factor "high technology transfer" included six variables and
- The third factor "electronic business of companies" included only three variables.

A group of authors (Delić, 2013), in their research related to the identification of influencing factors of student satisfaction with the quality of teaching in

high school, pointed out that satisfaction with the quality of teaching could be expressed with four factors:

- ambience,
- quality of the teaching process,
- discrimination and
- student.

The formulated model indicated the need to formalize the described approach as an extension of the model by using variables that would allow continuous monitoring of their covariance.

Assessing the quality of higher education institutions on the example of the Faculty of Economics, University of Tuzla, the authors identified five key factors that determine the quality of a particular higher education institution, which relate to (Fazlić & Đonlagić, 2016):

- teaching staff expertise and positioning of faculties in the area;
- consistent application and transparency of study programs and syllabus;
- solving student requests, problems and remarks by administrative and teaching staff and
- infrastructure and IT support.

Empirical data analysis generated five factors that profile the consumer: (Landika, Aleksić-Anđelić & Barjaktarević, 2021):

- Factor I, which included: the amount of monthly income, type of housing (-), travel frequency, place of residence (-) and knowledge of foreign languages;
- Factor II, which included: marital status, number of children, respondents' age, children's age (-), property ownership(-) and employment status;
- Factor III, which included: attachment to the "house" outside working hours, choice of travelling companion (-) and pursuing hobbies (-);
- Factor IV, which included: tendency to cook, the way the time is spent with friends (-) and dietary habits (-)
- Factor V, which included: shopping experience and the way the household chores are done.

Based on the above, we can conclude that factor analysis is a powerful analytical tool, it is widely used in researches, and thus can be called a useful technique of multivariate analysis that allows summarization of information about a particular product, process and/or service into a number of factors that replace the subjective approach with their interpretation.

Factor analysis enables the interpretation of complex processes and phenomena to be systematically simplified, empirically proven, and adapted to a specific research problem; it also enables the arbitrariness in the processes and phenomena interpretation to be translated into interpretations based on relevantly modeled information.

3. MATERIALS AND METHODS

3.1. Sample size and type for the analysis and testing

Estimation of the total population in the territory covered by the survey was 3,290,791 for 2020 (Wikipedia, 2021). The number of employees in the territory of Bosnia and Herzegovina was 832,200 and the employment rate was 25.29%. In the same period the unemployment rate was 12.11%. (ARZ, 2020) (Labor and Employment Agency of Bosnia and Herzegovina). The number of pensioners was 416,672 or 12.66% (PIO/MIO, 2020) (Pension and Disability Insurance Fund).

The target population within the population of the territorial unit, which the research project related to, included the categories of unemployed, employed and retired population, whose estimated disposition in the population (basic set) was 50% employed, 25% unemployed and 25% retired population.

3.2. Data collection - Sources and technologies

Data collection was based on a random sample, stratified on the basis of population categorization into groups according to working capacity, taking into account only the working population and the population with work experience, or the category of employed or unemployed in terms of job seekers and pensioners. The survey was conducted electronically, through Google Forms. The content of the questionnaire is visible at the link:

https://docs.google.com/forms/d/e/1FAIpQLSfdyVRBHLwRVbWIz-NBFpMMVsEQk0QCxuA7qVAzVJrZx5Tciw/viewform?vc=0&c=0&w=1&flr=0.

The planned rate sample was at least 600 respondents, 300 employed, 150 unemployed and 150 retired.

Selection was done by filling the planned quotas of respondents in the total number of collected and validly completed questionnaires, so that the formed stratum corresponds to the assumed form of distribution in the basic set (population).

The survey questionnaire was formulated so that it consisted of three parts:

- General data on respondents, which included: age, employment status, place of residence, marital status, education.
- Data on the type of work related to the occupation and employment of the respondents, which included: work sector/type of employment, work experience, job conditions and requirements.
- Data on non-economic factors as an integral part of the business environment, which included: working conditions, care for employees expressed through health insurance, healthy meals, conflict management, correction and management of interpersonal relationships at all levels, psychological support and recreational activities that contribute to physical health.

In the first and second part of the survey the answers were offered in accordance with the questions, and in the third part the questions were formulated in the way "would it affect you if it was possible", and the answers were offered in the form of 3 point Likert scale (1 - fully , 2 - partially, 3 - not at all).

4. RESULTS: MEASURING AND EXPRESSING FACTORS THAT AFFECT THE METRICS OF NON-ECONOMIC CONTRIBUTION TO WORK EFFICIENCY

The purpose of factor analysis is to reduce the number of variables in the model in order to make it easier to describe the phenomenon, but with minimal loss of information contained in the original values. (Hair et al., 2010)

The dimensions of the non-economic factors which impact business efficiency, measured by using a scale of expectations, were treated by factor analysis in order to determine a reduced number of dimensions for their expression.

Table 1: KMO and Bartlett's Test

Description		Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.825
Bartlett's Test of Sphericity	Approx. Chi-Square	6881.908
	Df	105
	Sig.	.000

Source: Authors' calculation

The suitability of the data from the sample used for the factor analysis was checked with KMO (The Kaiser-Meyer-Olkin) and Bartlett's test.[1] The obtained value of the KMO test in this case was 0.825, which made the sample suitable for factor analysis. Acceptable empirical values of the KMO test were considered to be between 0.6 and 1. (Tabachnic & Fidell, 2007). Bartlett's test was used to check the existence of a correlation within the empirical values of the variables. The empirical value of this test was 6881,908. On the other hand the acceptance region of the null hypothesis at 0.005 level of significance for the degrees of freedom 100 was 140.17. The value obtained indicated the fact that there was no correlation of variables within the sample.

After the factor analysis, expectations scale table was obtained, which can be illustrated in the following presentation.

Table 2: Unrotated factor analysis table Extraction Method: Principal Component Analysis

Question – variable	Extraction
Would it affect you if it was possible to work shorter for the same salary (W1)	.858
Would it affect you if it was possible to have additional benefits for working conditions (W2)	.843
Would it affect you if it was possible to have quality healthcare (W3)	.703
Would it affect you if it was possible to have trainings that make your job easier (W4)	.642
Would it affect you if it was possible to have management support (supervisors) (W5)	.816
Would it affect you if it was possible to have understanding and support of colleagues (W6)	.778
Would it affect you if it was possible to have healthy meal at work within no additional expenses (W7)	.768
Would it affect you if it was possible to have a pleasant environment (W8)	.689
Would it affect you if it was possible not to be exposed to noise during work (W9)	.745
Would it affect you if it was possible to have recreational activities (W10)	.755
Would it affect you if it was possible to have team building to be organized in order to connect with colleagues (W11)	.776
Would it affect you if it was possible to have the support of a psychologist (W12)	.767
Would it affect you if it was possible to have someone to take care of the atmosphere at work (W13)	.832
Would it affect you if it was possible to have someone to take care of communication among employees (W14)	.796
Would it affect you if it was possible to have someone to prevent and manage conflicts (W15)	.807

Source: Authors' calculation

1 Kaiser – Meyer – Olkin Measure of Samplyng Adequacy

Extracted factors indicated high values of factor weights, all factors have a factor size above 0.5. The extraction of a certain variable showed the explanation degree by the common factor and its value ranged from 0.642 to 0.858. If the value was less than 0.5 it would mean that the variable could be omitted from the analysis.

The following table shows the eigenvalues of the extracted factors, as well as the value of the total variance, which in this case is 6,447 for the first, 2,626 for the second, 1,499 for the third and 1,003 for the fourth factor and their critical values are greater than 1 and 77.162% of the variability is explained by them (in social research it is necessary to be higher than 60%).

Table 3: Total Variance Explained. Extraction Method: Principal Component Analysis.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.447	42.979	42.979	6.447	42.979	42.979
2	2.626	17.505	60.485	2.626	17.505	60.485
3	1.499	9.992	70.476	1.499	9.992	70.476
4	1.003	6.686	77.162	1.003	6.686	77.162
5	.632	4.216	81.378			
6	.492	3.282	84.660			
7	.424	2.828	87.488			
8	.382	2.543	90.031			
9	.335	2.233	92.264			
10	.301	2.004	94.268			
11	.262	1.744	96.012			
12	.197	1.313	97.325			
13	.160	1.067	98.392			
14	.149	.993	99.385			
15	.092	.615	100.000			

Source: Authors' calculation

The Cattell diagram allows visual identification of the number of factors that explain the analyzed phenomenon and the occurrence of fracture in the diagram shows the degree of explained variability using a certain number of factors.

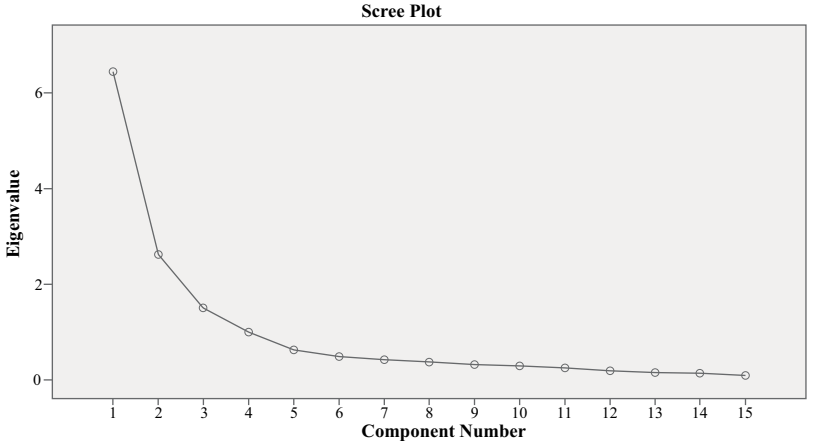

Figure 1: The Cattell's Scree Plot dijagram

Source: Authors' calculation

Considering that the initial matrix didn't have the characteristics of a simple structure, factor rotation was performed, which changed the relationship between variables and factors and a simple factor structure was obtained, which distributed factor loads to all four factors, which was not the case with unrotated matrix.

Table 4: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization

Rotated Component Matrix[a]	Component matrix			
	1	2	3	4
Would it affect you if it was possible not to be exposed to noise during work (W9)	0.804			
Would it affect you if it was possible to have the support of a psychologist (W12)	0.763			
Would it affect you if it was possible to have someone to take care of the atmosphere at work (W13)	0.749			
Would it affect you if it was possible to have someone to prevent and manage conflicts (W15)	0.731			
Would it affect you if it was possible to have management support (supervisors) (W5)	0.653			
Would it affect you if it was possible to have the quality healthcare (W3)	0.545			
Would it affect you if it was possible to have understanding and support of colleagues (W6)		0.796		

Rotated Component Matrix[a]	Component matrix			
	1	2	3	4
Would it affect you if it was possible to have a pleasant environment (W8)		0.789		
Would it affect you if it was possible to have trainings that make your job easier (W4)		0.755		
Would it affect you if it was possible to have healthy meal at work within no additional expenses (W7)		0.750		
Would it affect you if it was possible to have team building to be organized in order to connect with colleagues (W11)			0.828	
Would it affect you if it was possible to have recreational activities (W10)			0.805	
Would it affect you if it was possible to have someone to take care of communication among employees (W14)			0.744	
Would it affect you if it was possible to work shorter for same salary (W1)				0.906
Would it affect you if it was possible to have additional benefits for working conditions (W2)				0.903

a. Rotation converged in 17 iterations.

Source: Authors' calculation

The results of the factor analysis indicate the following:

- the first factor explains 42.979% of the variance and consists of six variables,
- the second factor explains 17.505% of the variance and consists of four variables,
- the third factor explains 9.992% of the variance and consists of three variables and
- the fourth factor explains 6.866% of the variance and consists of two variables.

5. DISCUSSIONS

The research showed that there were 4 groups of factors that showed the perception of users about non-economic factors, whose structure can be illustrated by the scheme using the diagram in the Figure 2.

All four groups of factors show over 77% of the value, or we can say that almost 80% of the factors that show the non-economic impact on workers can actually be changed.

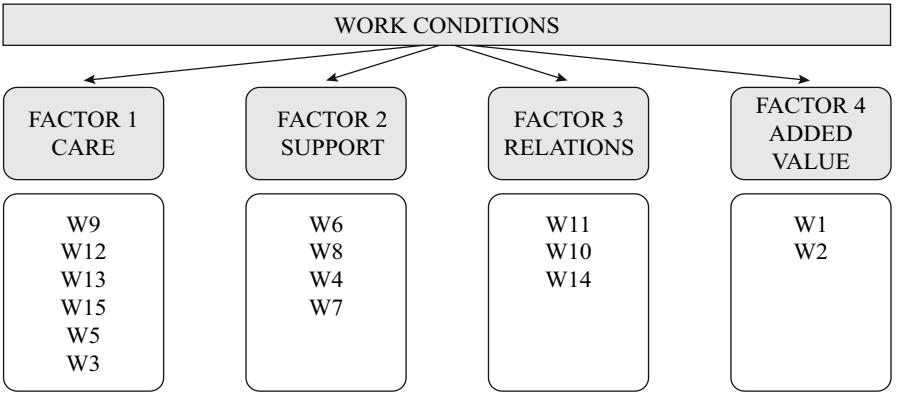

Figure 2: Factor analysis results of the scale of the expectations of employees in terms of non-economic factors as a dimension of business efficiency

Source: Authors' calculation

In order to influence the large percentage of changes in beliefs of employees in the company, within the management, it is necessary to include staff training. Staff training would be related to the work of ESTH managers. Based on this, guidelines can be given for staff training which will help deal with the issues of ESTH managers (Aleksić, 2020.).

When it comes to non-economic factors, or factors that would have a motivating role in management among employees, it is desirable to work on the knowledge and perception of employees.

The issues are also important when it comes to hiring psychologists, but many are not ready for these changes in the company's climate. If the ESTH managers, who deal with education, spiritual techniques and health in the company, further educated employees, it would be possible to influence the acceptance of changes that bring success to the company.

On the other hand, in order to make people in the company open for changes, a solution could be offered through new psychological methods that can be applied to employees. ESTH Manager (Education, Spiritual Technique and Health manager) is an abbreviation for manager for education, spiritual techniques and health. The role of the ESTH manager is precisely to work with employees at the group and individual level through the aforementioned spiritual techniques related to theta healing, eft tapping and healing timelines. Cooperation within the company leads to satisfaction, and this influences employees to good cooperate well with external clients, and all this together contributes to the prosperity of the company and the achievement of its goals, mission and vision.

ESTH managers can influence the positive energy in the company by working hard with people on their emotions and beliefs. When it comes to doing business and working in companies, it would be good to expand our minds to a wider picture. Also, critical thinking questions, which have a scientific basis and improve employee performance, are:

- reduce working hours in the company to effective 5 to 6 hours;
- make more time for the family;
- for all company activities concerning non-working hours, include the family of employees;
- enable activities of relaxation and recreation, babysitting, taking care of helath of employees;
- through engaging ESTH managers, enable the individual and company development and growth.

6. CONCLUSIONS

The research showed that almost 80% of the variability in the expectations of employees related to the impact of non-economic factors on business efficiency can be explained by four factors that show non-economic impact on employees, which is actually possible and economically justified to change.

In order to influence a large percentage of changes in the beliefs of employees and the success of a company, within the management, it is necessary to include staff training. Staff training would be related to the work of ESTH managers. ESTH managers can be a great support to market research, internal and external factors analysis of a company, as well as the main support to PR experts and managers who deal with human resources as the greatest resource of a company. It is the cooperation between HR managers and ESTH managers that can bring big changes for the better.

Together, they make changes in the company and encourage employee motivation. All groups of factors (care, support, relationships and added value) that were included in the analysis can be raised to a higher level which would show the obvious employees' openness and inclination to change and the acceptance of these changes in the company and a complete change of climate will result in greater satisfaction, motivation and ultimately the success of the company in the market.

Conflict of interests

The authors declare there is no conflict of interest.

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ФАКТОРСКА АНАЛИЗА НЕФИНАНСИЈСКИХ МОТИВАТОРА ЗА УСПЈЕШНО УПРАВЉАЊЕ И ПРОМОЦИЈУ ПРЕДУЗЕЋА

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САЖЕТАК

Факторска анализа нефинансијских мотиватора је приказана кроз статистички модел чији је циљ груписање фактора. Формирање статистичког модела подразумијева груписање фактора који одређују доприносе квалитативне преференције пословној ефикасности цијелог предузећа. Емпиријски материјал је добијен анкетирањем циљне групе, а образац одговора за разјашњавање проблема управљања је факторска анализа. Сврха факторске анализе је да се рационализује број зависних варијабли пословне ефикасности у односу на квалитативне и квантитативне захтјеве у оквиру испитиване циљне групе. С обзиром на савремени начин живота, разумно је претпоставити да је опште незадовољство сваким даном све веће. То укључује професионалну оријентацију, услове рада, управљање слободним временом и све нивое међуљудских односа као што су колегијални, пријатељски, партнерски и породични односи. Разумно је претпоставити да у оквиру пословних система постоји простор за препознавање ове димензије и њену пажљиву анализу која уважава неекономску димензију (не)задовољства запослених и управља пословном ефикасношћу с обзиром на неекономске факторе. Овај рад има за циљ да представи детаљну анализу груписаних фактора који су у основи нефинансијски; они представљају групу духовних фактора који доприносе бољој унутрашњој клими предузећа. Све ово води ка просперитетном менаџменту компаније који може добро да представља и промовише компанију у јавности.

Кључне ријечи: *факторска анализа, статистички модел, успјешно управљање, оглашавање, менаџмент, мотивациони фактори.*

MONEY SUPPLY, INFLATION AND ECONOMIC GROWTH IN BOSNIA AND HERZEGOVINA: AN EMPIRICAL ANALYSIS

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ABSTRACT

The analysis of monetary variables and their impact on the economic growth rate has always been in the focus of economic research. In the broadest sense, economic theory distinguishes two basic views defined by the views of monetarists and Keynesians. Although the basic difference is reflected in the determination of price rigidity and money neutrality, specifics of modern economic systems shift the focus towards the positive influence of monetary on real variables. The aim of our research is to identify and quantify the impact of monetary variables on economic growth in Bosnia and Herzegovina. The research was conducted using data from the period 2000-2020. The paper starts with the hypothesis that money supply and inflation ultimately have a positive impact on the real economic growth in BiH. The money supply M2 and the annual inflation rate are taken as explanatory (monetary) variables in the research, while real growth is a dependent variable. The long-term relationship between monetary variables and real growth rates was tested, taking into account the specificity of the BiH monetary arrangement established in the form of a currency board. In order to prove the hypothesis, we applied econometric techniques such as VEC model, cointegration analysis, innovation analysis based on the impulse-responsive function, decomposition variance as well as a causality test. The research results showed the connection between the money supply and the inflation rate with the economic growth in BiH, the relation being positive and statistically significant in the long run. With this, we confirmed the initial hypothesis of the work.

1. INTRODUCTION

Thinking about economic growth and what it represents (being the increase of the domestic product), the question of different determinants in its realization arises. Among other things, the variables that determine economic growth can be observed through real variables, such as investment, consumption, imports and exports. However, economic growth is not achieved only through real variables. The economic system of each country consists of a real sector that creates added value, but also of financial and monetary institutions that ensure the normal functioning of the entire economic system of a country.

Takahashi (1971) concludes that monetary and institutional variables, the money supply growth rate, the ratio of supply and monetary base, and the rate of required reserves on deposits affect the long-term equilibrium of real variables. Economic growth cannot be achieved without an adequate money supply, loans and adequate financial conditions in general. For some researchers, the degree of development in the financial sector is a key factor of economic growth (Levine, 1997; King & Levine, 1993; Demirguc-Kunt & Maksimovic, 1998). There are a number of relevant papers that have explored the relationship between money supply and its impact on growth rates in particular (Barro, 1977, 1978; Mishkin, 1982; Frydman & Rappoport, 1987). Most studies are focused on showing the long-term neutrality of money (Asongu, 2014), but the impact of monetary policy on real variables and primarily output remains at the center of research (Walsch, 2003). Lu et all. (2016) show that the connection between the fictitious and the real economy is getting closer.

When considering the effects that fictitious variables have on real variables, i.e. the growth rate, there are two opposing views. The first one comes from the supporters of monetarism and confirms the connection between the money supply and economic growth. This view is based on the quantitative theory of money. The view of monetarists says that nominal income is a function of the money supply (Friedman & Schwartz, 1963; Friedman, 1968). By observing it through Fisher's equation, one can see in perspective the theory of monetarists who point to the connection between money supply and economic growth. Monetarists' opinion, based on the quantitative theory of money, says that with constant turnover the money supply growth leads to higher prices and lower interest rates. At the same time, interest rates are lower than profit rates, which increases investment and consumption, leading ultimately to increased production. Fridman & Schwartz (1963) concluded that changes in the money supply lead to corresponding changes in output 2 quarters in advance.

Opposite the monetarists is the Keynesians' point of view, which begins with the assumption that the economy is in a state in which it does not employ factors of production, so it is necessary to intervene on the side of raising aggregate demand in order to achieve higher production. Keynesians assume that there is a neutrality in the money supply. Money neutrality implies that the money supply does not affect real output (Lewis & Mizen, 2000). The money supply in the long run is inflationary and neutral (Bernanke & Mihov, 1998; Bullard, 1999; Nogueira, 2009; Gali, 2008; Mankiw & Taylor, 2007). Evans (1996) reveals that money is neutral in the case of exogenous growth. In the absence of nominal price rigidity, a change in money supply leads to changes in prices without affecting real variables (Romer, 2012).

The aim of this research is to identify and quantify the impact of monetary variables on the economic growth in Bosnia and Herzegovina. The research was conducted on the basis of data from the database of the Central Bank of Bosnia and Herzegovina for the period from 2000 to 2020. The money supply M2 and the annual inflation rate are considered the explanatory (monetary) variables in the research, while real growth is dependent. This paper will test the long-term relationship between monetary variables and real growth rates. Along with that, the paper will review the specifics of the monetary system in Bosnia and Herzegovina, which operates on the monetary board basis. Using the relevant literature and research results, we try to confirm the hypothesis: ultimately there is a positive link between money supply, inflation and real economic growth in Bosnia and Herzegovina.

2. EMPIRICAL RESEARCH

There have been numerous written works showing a wide range of research related to the impact and effects of monetary variables on economic growth. Thus Cover (1992) shows that the positive effects in the money supply have no effects on output, while the negative ones do. McCandless & Weber (1995) confirm the link between monetary base growth and inflation. Based on quarterly data from 1999 to 2012 related to Turkey, Bozkurt (2014) showed that inflation depends on the money supply and the turnover cycle. Blinov (2017) concludes that economic growth depends on the growth rate of money supply and the inflation rate. Barro (2013) comes to the results according to which the growth of inflation means a decrease in domestic product per capita and a decrease in the share of investments, with other factors unchanged. Amiri & Gang (2018) used the example of the USA to investigate the impact of monetary policy on economic growth based on available data from 1970 to 2016. This research showed that

inflation has a positive effect on the growth rate in the short, medium and long term.

Agbonlahor (2014) investigated the long-term impact of monetary variables on economic growth on the example of Great Britain in the period from 1940 to 2012. The research confirmed the long-term link between monetary variables and economic growth. George (2018), based on research conducted for the period from 1985 to 2016 on the example of Nigeria, concludes that inflation has an inverse effect on economic growth. Sequeira (2021) confirms that inflation has a negative impact on economic growth. Hu et al. (2021) confirmed the negative effects of inflation on economic growth. Precious & Palesa (2014) confirm the long-term link between monetary variables and real growth on the example of South Africa, based on research conducted for the period 2000-2010. Mahara (2021) investigated the relationship between money supply, capital expenditures and economic growth on the example of Nepal. Research has shown that there is a long-term stable relationship between money supply, capital expenditures and growth. Also, the paper confirms the causal impact of money supply and capital expenditures on economic growth.

Kausar et al. (2020) investigated the impact of money supply on domestic product on the example of Pakistan. Their dynamic ARDL model was set up to examine the regularity between the observed variables based on time series spanning from 1972 to 2018. This research showed that the money supply, capital investments and labor supply have a positive impact on the movement of the domestic product. Srithilat & Sun (2017) conclude that changes in the money supply can have negative consequences for the economic development of a country. Adaramola (2020), based on research conducted on Nigeria's example, shows that inflation and the exchange rate have a negative impact on domestic product movements, while money supply and interest rates have a positive impact. Dingela & Khobai (2017) confirmed the impact of money supply on long- and short-term economic growth according to research conducted on series from 1980 to 2016 in South Africa.

2.1. Monetary system in Bosnia and Herzegovina

The monetary system in Bosnia and Herzegovina was established on the basis of the Dayton Peace Agreement, which also regulated the political structure of the state itself. On the basis of this agreement, the Central Bank of Bosnia and Herzegovina (CBBH) was established, and it operates on the principles of the classical currency board. A key role in the formation of the CBBH was played by the International Monetary Fund, which advocated the view that emerging

markets should have such an exchange rate regime that will allow predictability of the exchange rate (Doyle et al., 2005). The CBBH possess the three most important characteristics of the currency board, namely a fixed exchange rate against the replacement currency, full coverage of domestic money with reserves, and free convertibility of domestic money into the replacement currency at a fixed exchange rate. The country in which the currency board arrangement is established chooses one of the leading currencies to ensure the stability of the domestic currency, while it is also the currency of the country that is the most important trading partner (Frank, 2004). In Bosnia and Herzegovina, the national currency convertible mark BAM) is firmly pegged to the euro, with an exchange rate of 1.95583 BAM to 1 euro. The currency board arrangement implies that there is full coverage of the domestic currency (BAM) with the reserve currency, while in the case of Bosnia and Herzegovina there is an obligation to hold an additional reserve of foreign currency. Therefore, the functions of the CBBH as a classic currency board differ from "normal" central banks that have independence in conducting the country's monetary policy. The only monetary policy instrument available to the CBBH is the required reserve, by which the bank regulates the rate of banks on deposits that they must keep in reserves.

The main advantages and benefits of monetary committees are monetary discipline and the reduction of inflation, given that the discretion of monetary authorities is limited by the rule which makes it impossible to expand the monetary base beyond the level of foreign exchange reserves. Monetary discipline is also related to fiscal discipline, as deficit financing of budget spending is not allowed, which implies macroeconomic stability as a result of a sound economic policy. The currency board is considered to signal great credibility to market participants, thus attracting foreign capital and being immune to speculative attacks (Becker, 2006). The fixed exchange rate and disabling of speculations, cancel foreign exchange risk and thus enhance the effect of direct foreign investment and a favorable climate for new capital investment. Another view which is in defence of the fixed exchange rate regime is its usefulness for developing countries, assuming that monetary and fiscal stability bring the credibility they need, given their dependence on international trade and international capital markets (Calvo & Reinhart, 2000).

In addition to the above advantages, the currency board arrangement has all the shortcomings that are consciously accepted with the choice of this model of monetary policy management as the imperfections that the fixed exchange rate undoubtedly has. The absence of discretionary monetary policy through the fixed exchange rate which the monetary board rests on, further reduces the room

for maneuvering in any macroeconomic adjustments, because there is no change in the exchange rate (Topić-Pavković, 2014).

In the conditions of the monetary board, there may be a need to change the established exchange rate, which can realistically become overestimated. This is due to inflationary inertia, as a rule, but also due to the fact that domestic prices, even in a fixed exchange rate, are rising and trying to gradually adjust to prices in reserve currency countries. The overestimated exchange rate will result in a decrease in the country's international competitiveness with the monetary board and will cause significant foreign trade problems and slow economic growth. (Dušanić & Špirić, 2009). According to Roubini (1998), fixed exchange rates, and in particular currency board arrangements, are associated with real currency appreciation, loss of competitiveness, and deterioration of trade balance and current accounts.

2.2. Overview of macroeconomic indicators in Bosnia and Herzegovina

Bosnia and Herzegovina is a small country with a transition economy that operates on the basis of a complex political organization with significant constraints on the economic system and its prosperity, and as such it is far below the average economic growth of European countries. Political instability and the complex political and ethnic structure are in conflict with the realization of economic development of this area. The following table shows the development of certain macroeconomic indicators in Bosnia and Herzegovina for the period from 2000 to 2020:

Table 1: Gross domestic product, money supply and inflation rates from 2000 to 2020

Year	Real GDP growth	GDP per capita at constant prices	GDP amount in billions of BAM	Money supply - M2 in millions of BAM	CPI with base in 2015	CPI percentage changes
2000	4.442	4874.44	18.284	2467.3	75.534	4.973
2001	2.362	4984.268	18.716	4669.3	77.96	3.212
2002	5.053	5230.566	19.662	5071.3	78.204	0.313
2003	3.858	5430.938	20.42	5496.1	78.632	0.547
2004	6.257	5766.16	21.698	6831.6	78.853	0.282
2005	4.236	6005.605	22.617	8075.1	81.678	3.582
2006	5.691	6344.025	23.904	9901.8	86.681	6.125
2007	5.979	6734.067	25.334	11953.2	87.982	1.501
2008	5.594	7125.9	26.751	12439.3	94.516	7.427
2009	-0.816	7101.815	26.532	12709.1	94.156	-0.381
2010	0.767	7218.129	26.736	13627.1	96.155	2.124
2011	0.908	7371.251	26.979	14417.4	99.991	3.989

Year	Real GDP growth	GDP per capita at constant prices	GDP amount in billions of BAM	Money supply - M2 in millions of BAM	CPI with base in 2015	CPI percentage changes
2012	-0.707	7430.803	26.788	14909.7	102.044	2.053
2013	2.351	7740.779	27.418	16093.6	101.949	-0.093
2014	1.148	7964.563	27.733	17268.9	101.034	-0.897
2015	3.088	8337.432	28.589	18647.2	100	-1.023
2016	3.146	8708.909	29.488	20197.6	98.416	-1.584
2017	3.176	9073.903	30.425	22116.3	99.213	0.81
2018	3.740	9498.257	31.563	24191.1	100.619	1.417
2019	2.831	9832.247	32.456	26332.7	101.182	0.559
2020	-4.327	9469.885	31.052	28249.0	100.117	-1.052

Source: The Central Bank of Bosnia and Herzegovina and the International Monetary Fund

From the table above we can see that over the last 20 years the value of domestic product per capita in Bosnia and Herzegovina has doubled. With 4.8 thousand BAM of GDP in 2000, the value of domestic product per capita in 2019 was 9.8 thousand BAM, while in 2020 this level was reduced as expected. It can also be seen that the total domestic product value has grown from around 18 billion BAM since the beginning of the observed period, reaching a level of over 32 billion BAM in 2019. The GDP growth was accompanied by the growth of money supply, which is clearly visible in the money supply M2 increasing by seven times in 2020 compared to 2000, while the inflation rate remained relatively low over the observed period. Specifically, the average inflation rate during the observed period was 1.6%, and if the crisis years were to be put aside, this average inflation rate would be even lower.

3. MATERIALS AND METHODS

Starting from the subject and goal of the research, which is quantifying the impact of money supply (M2) and inflation rates on the real growth rate, the basic model that will be used in the empirical research is given in the following form:

$$GDP = f\left(MS, INF\right) \tag{1}$$

where is the real growth rate of the gross domestic product, is the money supply M2 and *INF* is the annual inflation rate. The impact of inflation and money supply on the real growth rate in Bosnia and Herzegovina in the period from 2000 to 2020 is analyzed on the basis of the Vector Autoregressive Model (VAR).

The specification and description of the variables in the model are given in the following table:

Table 2: Specification of research variables

Variable	Type	Label	Source	Description
Real GDP growth rate	Dependent	GDP	International Monetary Fund	The real GDP growth rate is given as a percentage
Money supply M2	Independent	MS	Central Bank of Bosnia and Herzegovina	The money supply uses the logarithmic transformation of the original data in millions of BAM
Annual inflation rate	Independent	INF	International Monetary Fund	The annual inflation rate is given in levels

Source: Authors' review

The application of the VAR model in economics has gained particular importance since the appearance of the works of Granger and Newbold (1974) who pointed to the problem of false regression. The conclusion is that the similar nature of a trend in an observed time series cannot predict a long-term relationship between the observed phenomena (Granger & Newbold, 1976). With the VAR model, we create a vector of endogenous variables that will enable the regression of each of the variables, i.e. the regression to the current and previous values of the explanatory variables in the model. Mathematically, we write the VAR model of order as:

$$y_{kt} = \phi_0 + \phi_1 y_{1t-1} + \phi_2 y_{2t-2} \ldots + \phi_k y_{kt-p} + \varepsilon_t \qquad (2)$$

where the is a vector of endogenous variables , or otherwise , is the matrix vector of dimensional constants , to matrices of the dimensions coefficients , and is the vector of the white noise process with which the expected value of variance is and whose variance and covariance are constant .

If the time series are not stationary in levels, then the VAR model is not applied. Instead, the Vector Error Correction Model (VECM) is used. This model observes the existence of a long-term cointegration relationship between the observed variables. If there is a cointegration relationship between the variables then we form a vector model of error correction (VECM) which is represented in the following form:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i^* \Delta Y_{t-i} + \varepsilon_t \qquad (3)$$

According to the above relation, the Π matrix consists of the matrix of the adjustment parameter α and the matrix of cointegration vectors β. From relation (2) it can be seen that the formation of a linear process based on these vectors implies that the first difference of vector Y_t is stationary, i.e. I(1). These cointegration vectors form the basis for forming a long-term relationship between the observed variables. It is the testing of the coefficients that is the subject of Johansen's cointegration test. This cointegration test assumes testing of variables in levels, not in differences.

4. RESULTS AND DISCUSSIONS

As previously emphasized, the condition for applying the VAR model is that all time series are stationary in levels, otherwise we test only the existence of a cointegration relationship between variables that can be treated as long-term and create a model with error correction. In this paper, we apply the extended Dickey-Fuller test and the Philips-Perron test to check the stationarity of time series in levels and after the first derivation. The results of the ADF test are given in the following table:

Table 3: Results of the Dickey-Fuller stationarity test

Series		Critical values of the ADF test	p-value
GDP	Levels	-2.463	0.340
	The first difference	-4.800	0.006
MS	Levels	-6.772	0,000
	The first difference	-2.425	0.353
INF	Levels	-3.919	0.030
	The first difference	-6.946	0.000

Source: Authors' calculations

As shown in the previous table, the results of the ADF test say that the GDP variable is non-stationary in levels, while it becomes stationary after the first derivation, i.e. it is I(1) at the significance level of 1%. The variables M2 and INF are stationary in levels, i.e. I(0) at the significance level of 1%, MS is non-stationary after the first derivative, while the INF variable is stationary even after differentiation. Constant and trend were used in the analysis of stationarity. The results of the PP stationarity test do not deviate greatly from the previously obtained results of the ADF stationarity test:

Table 4: Results of PP stationarity test

Series		Custom t-statistics	p-value
GDP	Levels	-1.757	0.389
	The first difference	-4.816	0.001
MS	Levels	-4.067	0.005
	The first difference	-7.591	0.000
INF	Levels	-3.468	0.020
	The first difference	-7.986	0.000

Source: Authors' calculations

The results of stationarity tests indicate that due to the lack of stationarity in the levels of the GDP variable it is impossible to use the VAR model, therefore the existence of cointegration relationship between the observed variables must be examined to further inspect the possibility of developing error-correcting models. Before testing the existence of a cointegration relationship, the optimal number of previous values on the basis of which the cointegration between variables is tested must be determined. AIC, HQ, FPE, LR and SC were used as information criteria for selecting the optimal shift length. The following table shows the results of testing the optimal number of previous values based on the observed criteria for a maximum of three shifts:

Table 5: Selection of the optimal number of previous values

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-91.25168	NA	7.093094	10.47241	10.6208	10.49287
1	-45.42574	71.28481	0.121193	6.380637	6.974219	6.462484
2	-26.89862	22.64426*	0.046796*	5.322069*	6.360836*	5.465301*
3	-23.21449	3.274779	0.1135	5.912721	7.396674	6.117338

Source: Authors' calculations

Five information criteria suggest that for the optimal number of shifts for the observed time series, two previous values should be taken. Implicitly, based on these results, Johansen's cointegration technique is used to determine the existence of a cointegration relationship between the observed variables, and in testing this relationship, we use two previous values of the variables. Johansen's cointegration test uses the trace test and the largest characteristic root test to determine the cointegration relationship between variables. The results of the Johansen cointegration test are shown in the following table:

Table 6: Results of the Johansen cointegration test

Zero hypothesis	Alternative hypothesis	Test statistics	Critical values	p-value
Trace test				
r = 0	r ≤ 1	38.86684	29.79707	0.0035
r = 1	r ≤ 2	10.75995	15.49471	0.2267
r = 2	r ≤ 3	4.96848	3.841466	0.0258
Test of the largest characteristic root				
r = 0	r = 1	28.10689	21.13162	0.0044
r = 1	r = 2	5.791473	14.2646	0.6401
r = 2	r = 3	4.96848	3.841466	0.0258

Source: Authors' calculations

Based on the previously presented results of Johansen's cointegration technique, or rather, based on the trace test and the test of the largest characteristic root, we reject the null hypothesis (r=0) which suggests that a cointegration relationship between the observed variables doesn't exist, and we conclude that at 1% level of significance, there exists a long-term link between real growth, money supply (M2) and inflation rates.

According to what was found through previously performed cointegration tests, we can conclude that there is one cointegration equation that testifies to the long-running relationship between real growth rate (GDP), money supply M2 (MS) and inflation rates (INF). The normalized cointegration equation that shapes this long-term relationship based on the VECM model and previously calculated coefficients using the E-Views 10 statistical software is given in the following equation:

$$GDP_{t-1} = 11{,}513 + 1{,}426\,MS_{t-1} + 0{,}739\,INF_{t-1} \tag{4}$$

The previously defined cointegration equation shows that the long-term relationship between inflation and money supply, on one hand, and the real growth rate, on the other hand, is positive. In other words, the results suggest that an increase of 1% in the money supply will increase the real growth rate by 1.43% in the long run, while an increase of 1% in inflation implies an increase of 0.74% in the growth rate.

The cointegration equation can be observed in a system with three previously defined variables that are the subject of research:

$$\begin{aligned}\Delta GDP = {} & -0{,}07 * [GDP_{t-1} - 1{,}43\,MS_{t-1} - 0{,}74\,INF_{t-1} - 11{,}51] \\ & - 0{,}22\,\Delta GDP_{t-1} + 4{,}73\,\Delta MS_{t-1} - 0{,}21\,\Delta INF_{t-1} - 1{,}01\end{aligned} \tag{5}$$

If we look at the previous system, we see that the degree of adjustment of the system at equilibrium is 7%. If the system is imbalanced when the GDP variable is above equilibrium in the current period, this implies that the independent variables MS and INF must be increased in the coming period in order for the system to return to the equilibrium. Coefficients that speak of the short-term effects of independent variables on the dependent one say that the impact of money supply is positive in the short run, meaning an increase in money supply M2 of 1% in the short term will imply a 4.73% increase in the GDP. The impact of inflation on the movement of the real growth rate is negative, evident in how in the short term an increase in inflation of 1% will mean a decrease in the real growth rate by 0.21%.

In the continuation of the research, we will test the causal relationship between the previously described variables in the system. The existence of a causal relationship between the observed variables will be examined on the basis of the causality test proposed by Granger (1969). This test reveals the existence of a short-term causal relationship between observed variables. One of the anomalies of this causality test is its inability to observe a long-term relationship (Toda & Philips, 1993; Toda & Yamamoto, 1995). When there is a cointegration relationship between variables, it is recommended that causality be tested on the VECM model (Granger, 1988). Therefore, the block test is most often used to detect a causal relationship in the model already described. The following table shows the results of Granger causality testing in our model:

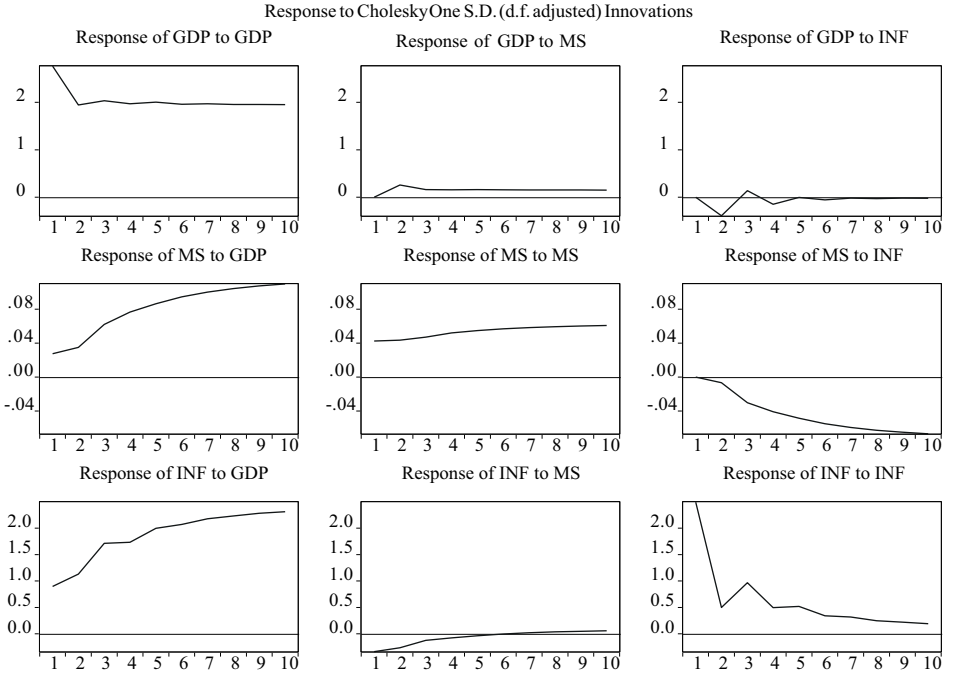
Table 7: Results of the Granger causality test

Zero hypothesis		p-value	Causality test result
MS does not cause GDP	0.920445	0.3374	The money supply does not cause a growth rate
INF does not cause GDP	0.764387	0.382	The inflation rate does not cause a growth rate
MS and INF do not cause GDP	1.605347	0.4481	The money supply and the inflation rate together do not cause a growth rate
GDP does not cause MS	2.724797	0.0988	The growth rate does not cause a money supply
INF does not cause MS	3.510746	0.061	Inflation does not cause money supply
GDP and INF do not cause MS	4.301937	0.1164	Growth rate and inflation rate do not cause money supply
GDP does not cause INF	0.185281	0.6669	The growth rate does not cause the inflation rate
MS does not cause INF	0.647427	0.421	The money supply does not cause the inflation rate
GDP and MS do not cause INF	0.741891	0.6901	Growth rate and money supply do not cause inflation rate

Source: Authors' calculations

The results of the Granger causality test applied to the previously described VECM model suggest that there is no causal relationship between the observed variables in the system. The causal relationship was not confirmed in any of the previously described cases. The closest result that could confirm causality is the testing of the causal effect of the inflation rate on the money supply, where the probability was 0.06.

The impulse response function (IRF) analysis used to determine the relationship between M2 money supply and the inflation rate, i.e. the real growth rate of GPD, also shows the results caused by the "shock" of one standard deviation in an individual series to the "shock" in the endogenous system variable. The following charts show the results obtained based on an IRF analysis:



Graph 1: Results of impulse responsive analysis

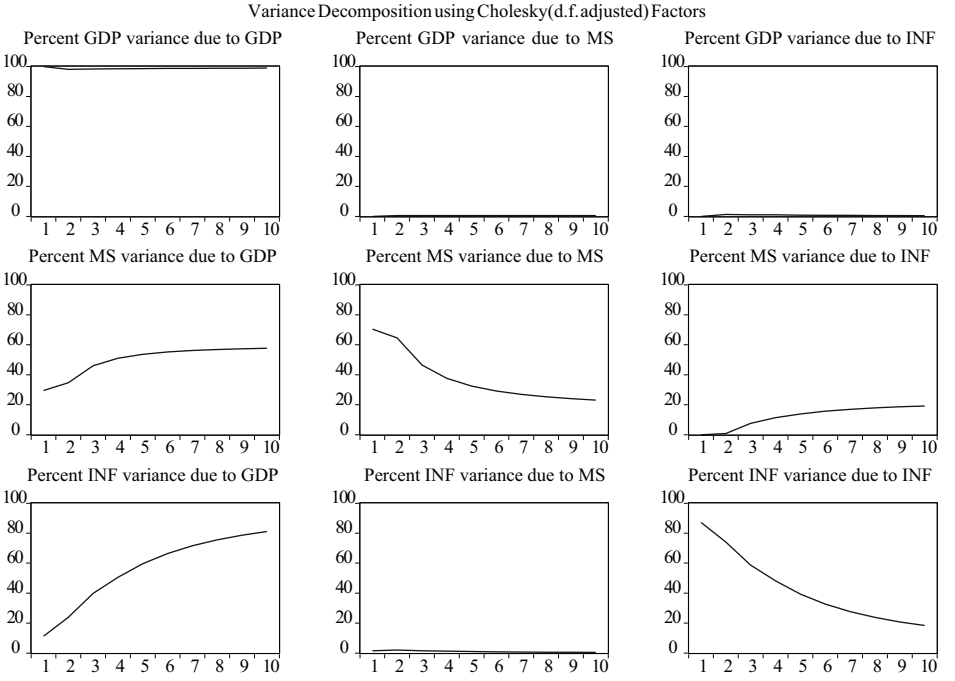
Source: Authors' calculations

IRF analysis shows the projected "shocks" over the next 10 years in one variable observed through the standard deviation and their impact on the movement of other variables in the system. As shown in the previous graph, the shock of one standard deviation in the GDP variable will have a negative impact on the growth rate in the two years of the projected period, after which the growth rate will

be balanced. A shock of one standard deviation in the MS variable will have a positive impact on the movement of the GDP variable, followed by a stagnant impact in the MS shocks on the movement of GDP. The shock of one standard deviation in the inflation rate in the first two years will have a negative impact on GDP, in the third year this impact will be positive, then in the fourth it will be negative, and after the fifth year of the projected period this effect will decrease significantly. A shock of one standard deviation in the movement of GDP will mean a positive impact on the movement of MS in the first ten projected periods. The shock of one standard deviation of MS has a positive impact on the growth of MS from the third year to the end of the projected period. One standard deviation in the INF variable means a slight decrease in MS in the second year of the projected period, while the decrease from the third year to the end of the period is significantly pronounced. One standard deviation in the GDP variable has a positive effect on the movement of the INF variable over the projected period. A shock of one standard deviation in the INF variable negatively affects the MS variable in the first four years of the projected period, while from the fifth year the impact is positive. The shock of one standard deviation in INF has a positive effect on the movement of the INF variable in the first year of the period, in the second year this impact is smaller but positive, and after the third year the INF impact on INF itself is positive but tends to zero.

In the analysis, we also applied the analysis of the decomposition variance in order to examine the proportion in which the variables participate in the variations of other variables from the system over a period of 10 years. The results of the variance analysis are shown in the Graph 2.

By decomposing the variance of the VAR model, we came to the results according to which a small percentage of the explanation for the GDP variable is described by changes in the MS and INF variables, the results of the decomposition of variance show that changes in growth are explained at the level of 1% changes in the movements of inflation and money supply. On the other hand, the percentage of explanations of money supply movements was explained at the level of 60% by the GDP growth rate, and was explained at the level of almost 20% by variations in inflation trends in the first ten years of the projected period. In addition, the decomposition of variance shows that the significance of changes in the money supply is less important when explaining the prediction of the same variable in the future. Variations in the inflation rate are explained at the level of 80% by variations in the real growth rate. This ratio is characterized by an upward trend, while variations in the inflation rate are explained at the level of about 20% at the end of the projected period with the observation of a declining trend when we talk about the relationship between these variations.



Graph 2: Variance decomposition analysis

Source: Authors' calculations

5. CONCLUSIONS

The relation of monetary variables, especially the phenomenon of inflation and money supply, in relation to economic growth has always been the focus of public attention. Whether it is the Keynesian view on price rigidity or money neutrality of the neoclassical school of monetarists, the basic goals of all economic policies are uniquely reflected in achieving high rates of economic growth and price stability of the national economy. These parameters gain even more importance in countries such as Bosnia and Herzegovina. The specificity of Bosnia and Herzegovina as a small transition country is reflected in the functioning of a complex political organization with significant restrictions on the economic system, which with passive monetary policy in the currency board arrangement, further worsens significant economic growth and development. On the other hand, the main advantage of currency boards is monetary discipline and the reduction of inflation, since the discretion of monetary authorities is limited by a rule that prevents the spread of the monetary base outside the level of foreign exchange reserves.

The aim of this paper is to quantify the impact of money supply (M2) and inflation rates on the real economic growth rate of Bosnia and Herzegovina. In the paper, we applied econometric techniques such as VEC model, cointegration analysis, innovation analysis based on impulse response function, variance decomposition as well as a causality test. By applying the mentioned methods, the obtained results indicate a long-term connection between monetary variables and economic growth, and it has been proven in the model. Since the analyzed variables are of the first order of integration, their cointegration was established by appropriate cointegration tests. Based on the presented results of Johansen's cointegration technique, that is to say, based on the trace test and the test of the largest characteristic root, we rejected the null hypothesis of there not being a cointegration relationship between the observed variables and conclude that at the 1% significance level there is a maximum of one cointegration equation representing the relationship between real growth, money supply (M2) and inflation rates. The results suggest that a 1% increase in the money supply will increase the real growth rate by 1.43% in the long run, while a 1% increase in inflation will imply a 0.74% increase in the growth rate.

The Implementation of the VEC model for the observed period from 2000 to 2020, confirms the positive impact of monetary variables on economic growth in Bosnia and Herzegovina. The results showed a link between money supply, inflation rates and economic growth, which is positive and statistically significant in the long run. We have confirmed the initial hypothesis of the paper, which states that there is ultimately a positive impact of money supply and inflation on the real economic growth of Bosnia and Herzegovina.

The innovation analysis based on the impulse response function (IRF) and used to determine the relationship between the money supply M2 and the inflation rate, i.e. the real growth rate of BPD, as well as the decomposition of variance show the intensity of the above-explained relationships. It can be noted that this relationship in regression is not at a high level, it cannot be described with complex explanations, which is acceptable given the fact that in addition to monetary variables we analyzed, economic growth is conditioned by a number of other factors and determinants, real and monetary variables that are not included in this analysis.

The obtained results are in line with previous research which has shown that stable economic growth implies price stability, but also that a moderate inflation rate is in a positive feedback loop with economic growth. Based on the previously presented results, we can conclude that the basic characteristic of the monetary board, which is reflected in maintaining price stability and flexible adjustments

of money supply in conditions that are present in BiH, positively affects economic growth. The task to be achieved by increasing economic activity while maintaining a stable and low inflation rate in the country, is a prerequisite for achieving long-term sustainable development of Bosnia and Herzegovina.

Conflict of interests

The authors declare there is no conflict of interest.

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APPENDICES

Appendix 1. Results of the autocorrelation test

As can be seen in the following account, by testing the serial correlation on two shifted values of the model's time series, based on F-statistics and p-values, it can be concluded that the model used in this study is free of serial correlation.

VEC Residual Serial Correlation LM Tests						
Date: 02/07/22 Time: 22:56						
Sample: 2000 2020						
Included observations: 19						
Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	5.881321	9	0.7517	0.634156	(9, 22.1)	0.7561
2	6.569435	9	0.6818	0.718346	(9, 22.1)	0.6872
Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	5.881321	9	0.7517	0.634156	(9, 22.1)	0.7561
2	18.56789	18	0.4189	1.041405	(18, 17.5)	0.4674

*Edgeworth expansion corrected likelihood ratio statistic.

Appendix 2. Residual normality test

To test the normality of the model residuals Skewness, Kurtosis and Jarque-Bera tests were used. Based on the p-value, we conclude that the model residues are normally distributed.

VEC Residual Normality Tests					
	Orthogonalization: Cholesky (Lutkepohl)				
	Null Hypothesis: Residuals are multivariate normal				
Date: 02/07/22 Time: 22:59					
Sample: 2000 2020					
Included observations: 19					
Component	Skewness	Chi-sq	df		Prob.*
1	-1.421227	6.396310	1		0.0114
2	0.411055	0.535059	1		0.4645
Joint		7.303727	3		0.0628
Component	Kurtosis	Chi-sq	df		Prob.
1	5.004689	3.181533	1		0.0745
2	2.257957	0.435914	1		0.5091
3	2.100190	0.640979	1		0.4234
Joint		4.258426	3		0.2349
Component	Jarque-Bera	df	Prob.		
1	9.577843	2	0.0083		
2	0.970973	2	0.6154		
3	1.013337	2	0.6025		
Joint	11.56215	6	0.0725		

*Approximate p-values do not account for coefficient estimation

ПОНУДА НОВЦА, ИНФЛАЦИЈА И ЕКОНОМСКИ РАСТ У БОСНИ И ХЕРЦЕГОВИНИ: ЕМПИРИЈСКА АНАЛИЗА

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САЖЕТАК

Анализа монетарних варијабли и њихов утицај на стопу економског раста дуги низ година се налази у фокусу економских истраживања. Најшире посматрано, економска теорија разликује два основна гледишта дефинисана становиштима монетариста и кејнзијанаца. Иако се основна разлика огледа у детерминисању ригидности цијена и неутралности новца коју истичу већина наведених студија, специфичности савремених економских система фокус помјерају ка позитивном утицају монетарних на реалне варијабле. Циљ нашег истраживања јесте идентификовати и квантификовати утицај монетарних варијабли на економски раст у Босни и Херцеговини. Истраживање је спроведено на основу података за временски период од 2000. до 2020. године. У раду полазимо од хипотезе да у дугом року постоји позитиван утицај понуде новца и инфлације на реални економски раст Босне и Херцеговине. Као објашњавајуће варијабле (монетарне варијабле) у истраживању се посматрају понуда новца М2 и годишња стопа инфлације, док је реални раст зависна варијабла. Тестирана је дугорочна веза између монетарних варијабли и стопе реалног раста, узимајући у обзир специфичност монетарног аранжмана БиХ који је успостављен у облику валутног одбора. Како би се доказала хипотеза, у истраживању смо примијенили економетријске технике као што су ВЕЦ модел, коинтеграциона анализа, иновациона анализа на основу импулсно-респонсивне функције, декомпозиција варијансе, као и тест каузалности. Резултати истраживања су показали везу понуде новца и стопе инфлације са економским растом Босне и Херцеговине, која је позитивног знака и статистички је значајна у дугом року. Овим смо потврдили и почетну хипотезу рада.

Кључне ријечи: *понуда новца, М2, инфлација, економски раст, валутни одбор, Босна и Херцеговина.*

Прегледни научни чланци
Review Scientific Papers

COMPARATIVE ANALYSIS OF OPERATIONS OF INVESTMENT FUNDS IN SELECTED COUNTRIES OF THE WESTERN BALKANS

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ABSTRACT

Investment funds are gaining importance in recent times, since they allow small investors to reduce risk, use financial expertise, facilitate access to the international capital market and achieve a higher rate of return on investments compared to banks. The aim of this research is to show, in accordance with the available data and using comparative analysis, the similarities and differences in the operations of investment funds in Bosnia and Herzegovina, Serbia, Croatia and Montenegro, and to prove that these financial institutions, although they have potential, do not contribute to the economic development of these countries to the extent that they could. The object of the comparison is the nature of the origin, the number, the type, the net asset value and the percentage of the participation of investment funds in the GDP of the observed countries. The main hypothesis is that investment funds in analyzed countries do not represent a significant part of the financial system and, due to the nature of their creation, do not make a significant contribution to economic development. Two auxiliary hypotheses arise from the main hypothesis: investment funds, created in the process of privatization, due to the absence of essential market conditions for their establishment, are not able to achieve a significant impact on economic growth; the growth of the value of the investment funds assets does not affect the growth of the volume of investments in the country. In addition to the comparative analysis methods, the method of simple correlation analysis, as well as other scientific methods, will be used to prove these hypotheses. The results of the survey confirmed the hypothesis that investment funds do not represent an important part of the financial system in the analyzed countries today and, due to the nature of their creation, and do not make a significant contribution to the economic development.

1. INTRODUCTION

Financial markets are one of the most important parts of the financial and total economic system of every country. They enable the unobstructed functioning of the national economy. There is great interdependence between the financial market and the economic development of the country, because economic development leads to a rise in the income of citizens, which increases savings, and therefore the financial market. On the other hand, if there are no savings, there are no investments and no economic growth and development. The basic task of the financial system is to raise the savings and focus on investments in the most effective and efficient way.

The function of intermediation was first performed by banks and the development of the financial system also brought the development of other financial institutions, which directed the savings collected towards investors. This process is called financial intermediation. The growth of financial mediation stimulates economic development in three ways: it enables new sources of financing and thus fosters new investment opportunities; it increases the productivity of investments due to the selection of projects to be financed; it contributes to attracting savers from other countries and reduces the outflow of domestic savings (Plakalović, 2004).

In the well-known Solow macroeconomic model, savings will affect the level, but not the steady-state growth rate of production. Hence, the growth of savings will lead to an increase in output in the short term, but once stability is achieved, there will be no growth, which means that in the long run, savings will not affect the growth rate. As equity capital increases, the depreciation will increase, and hence the need to replace the capital. Thus, in order to maintain a constant stock of capital, more and more investments will be needed. On the other hand, the marginal productivity of capital is declining, so investment has no place to grow. The principle of declining marginal productivity means that more investments will become less and less payable (Plakalović, 2004).

Investment funds are among the financial institutions that have the character of a financial intermediary and enable the channeling of investment savings. When it comes to investment funds in less developed countries, such as former SFRY members, they are considered to be mostly underdeveloped, regardless of the fact that, after the break-up of this socialist country, there has been a significant increase in the volume of operations compared to the previous period. The different pace of growth in this part of the financial system has led to differences in the degree of development achieved by individual countries.

It is evident that for the structural changes in the BiH economy, which should provide sustainable and continuous growth, it would be necessary to change the structure of the financial system. Banks did not realize this role, as well as corporations and insurance companies. Increasing the number and activities of investment funds could bring a concrete development benefit to this plan as well (Mayer et al., 2003).

Investment funds have played an important role in the mass privatization process in many transition economies. Mass voucher privatization (MVP) survey conducted in Russia and the Czech Republic, the countries where this process first took place, showed that investment funds did not meet expectations. They were not able to increase the value of assets and make profits for investors, and the main reasons were asymmetric information, poor property relations and lack of an adequate institutional framework to regulate the operations of these financial institutions. The only success was the privatization of a large number of companies in a short period of time (Pistor & Spicer, 1997).

2. LITERATURE REVIEW

Investment funds have played an important role in the mass privatization process in many transition economies. Mass voucher privatization (MVP) survey conducted in Russia and the Czech Republic, where this process first took place, showed that investment funds did not meet expectations. They were not able to increase the value of assets and make profits for investors, and the main reasons were asymmetric information, poor property relations and lack of an adequate institutional framework to regulate the operations of these financial institutions. The only success was the privatization of a large number of companies in a short period of time (Pistor & Spicer, 1997).

Different authors have defined investment funds in different ways. According to Šoškić (2001), an investment fund is a financial institution that withdraws funds from smaller individual investors and emits shares or stakes in return. According to the Croatian author Leko (2012), investment funds are institutional investors who collect cash from the general public and place them on long-term and short-term financial instruments. According to American authors, investment funds are financial intermediaries that collect individual investor assets and invest in a potentially wide range of securities or other assets. Pooling of the funds is the key to the idea which investment funds are based on. Each investor has a portfolio receivable in proportion to the amount he has invested. This offers small investors the opportunity to combine and draw on the benefits of large-

scale investments (Bodie, Kane & Marcus, 2009). Taking into account all the above definitions, it can be said that the concept of an investment fund always refers to raising funds from smaller investors and investing them in different types of financial instruments.

Open-ended funds are specific because they invest in liquid securities, whose market value is determined on a daily basis, and investors are allowed to invest and withdraw funds on a daily basis. The market value of all securities constituting the investment portfolio is called the net asset value (NAV), which is determined according to the following formula:

$$NAV_t = \frac{TVA_t - P_t}{N_t}$$

where:

TVA_t – the market value of the assets of the fund at time t, which is determined as the sum of the prices of each individual security multiplied by the total number of the securities in the fund plus the amount of cash the fund holds;

P_t – the amount of liabilities that must be deducted from the total market value of asset;

N_t – the number of issued shares of the fund at the moment t.

The shares prices of open investment fund are quoted on the stock exchange, with the necessary price and the required price. At the offered (bid) price, the fund is ready to purchase the securities from investors. At the asking price, the fund offers its securities to the public for sale and it is equal to the net asset value increased by the amount of commission charged by the fund. Some open-end funds do not charge this commission and then they are called unencumbered funds (Erić, 2003, p. 217). Closed-end investment funds operate as well as all the other stock companies, raising funds by selling shares through a public offering.

The second criterion of division is the investment objectives, by which they differ: investment funds that invest in shares, those that invest in debt securities and those that invest in short-term financial instruments of the money market. Funds that invest in debt instruments aim to preserve the value of capital and generate returns in the future.

Money market funds invest in short-term money market instruments, such as treasury bills, deposit certificates, etc. They are different from other types of funds in exceptional liquidity and the ability to issue checks and credit cards to shareholders. Funds can also be managed or unmanaged. For managed funds,

shares are constantly bought and sold, while for unmanaged fund, cash assets are merged and invested in a portfolio of securities that is constant for the duration of the fund (Bodie, Kane & Marcus, 2009).

Country fund is a special type of closed-end investment fund, which is predetermined for investment in security-specific countries. A special type of closed-end fund is a fund that invests in various types of real estate or mortgage loans (REITs - real estate investment trusts). Hedge funds are not legally regulated as other investment funds (Mishkin & Eakins, 2018).

The economy of each country consists of two key sectors - real and financial. They are in an interdependent position, so without a strong first - there is no strong second sector. Investment funds are becoming increasingly important participants in the global financial market. This is proved by the fact that the total global assets they managed at the end of 2017 amounted to 49.3 trillion US dollars, which is 18.25% more than in the previous year. As can be seen in Figure 1, in this property the share of USA funds is 45%, European 36%, while investment funds of the rest of the world account for 19% of total assets. Considering that in 2014 this ratio was 59%:29%:12%, it can easily be concluded that there has been progress in the operations of investment funds in the rest of the world, which has increased their significance (ICI, 2018).

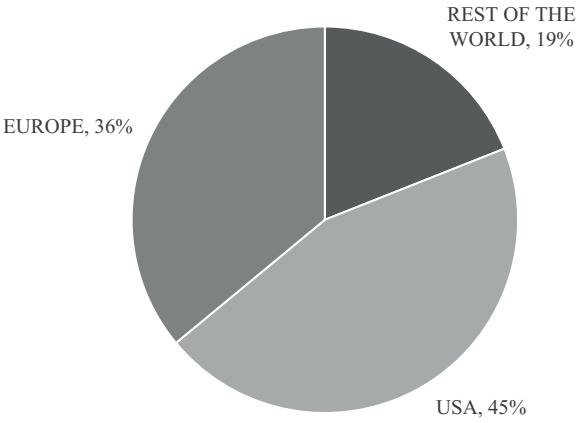

Figure 1: Percentage of total net assets managed by investment funds in 2017

Source: Adapted from (ICI, 2018)

After the establishment of efficient portfolio, it should be periodically monitored and reviewed, because incorrectly selecting investments can sometimes give worse results than keeping the money "under the mattress". Investment funds help to overcome this problem (Šoškić, 2001, p. 228).

Investment funds are favorable for smaller investors as well as for all other companies. Since they are mainly minority shareholders, they are not interested in management, but most often only in capital gains or dividends. It is investing in profitable projects that, by increasing the value of the company's shares, will ultimately lead to capital gain. That is why companies need to represent their projects to investment funds as one of the possible financiers in the best possible way, but also to strive to become as profitable as possible in order to be attractive for investment in the future.

2.1. Savings in investment funds as a generator of economic growth and development

Savings, as an economic phenomenon, is the basis of investment and development, which is why all owners of income (households, enterprises, the state) need to be economical. Analysis of national savings, as a key source of financing economic development, must take into account differences in the development of countries. For example, developed market economies have a favorable savings structure, because the domestic currency is convertible and there is practically no difference between domestic savings and foreign currency savings. In these countries, there is a network of financial institutions capable of efficient allocation of domestic savings in the country and abroad. On the other hand, developing countries are characterized by extremely low savings, non-convertible domestic currency and underdeveloped financial markets (Dragutinović, Filipović & Cvetanović, 2004, p. 517). The marginal propensity to save is higher in developed than in underdeveloped economies. The lower a country's national income per capita, the lower its savings potential (Marsenić, 1996, p. 112).

As a form of deferred consumption, savings can be influenced by different motives. One group consists of material motives, such as increasing property value, improving life in the future, meeting certain economic goals. Intangible motives, which make up the second group, relate to the providing social security, education of children, etc. (Erić, 2003, p. 434).

Table 1: Changes in savings and investments in the target countries for the period 2008-2017

Year	Bosnia and Herzegovina		Serbia		Croatia		Montenegro	
	Gross savings (% of GDP)	Gross investment (% of GDP)	Gross savings (% of GDP)	Gross investment (% of GDP)	Gross savings (% of GDP)	Gross investment (% of GDP)	Gross savings (% of GDP)	Gross investment (% of GDP)
2008	10.73	27.07	10.11	30.34	22.90	31.45	-8.30	41.18
2009	8.69	19.78	13.42	19.42	20.44	25.13	-0.75	26.95
2010	7.66	16.34	12.48	18.47	20.55	21.42	1.16	21.76
2011	6.95	18.74	11.60	20.10	20.13	20.67	4.27	19.33
2012	5.46	19.22	10.19	21.01	19.43	19.18	5.15	20.59
2013	7.40	18.17	12.04	17.65	20.44	19.42	8.21	19.60
2014	8.14	19.12	11.62	17.49	20.76	18.77	7.80	20.21
2015	9.33	18.66	14.16	18.85	24.56	20.01	9.13	20.08
2016	11.14	19.62	14.91	19.08	23.28	20.76	9.85	26.10
2017	12.87	21.07	14.84	21.00	25.01	20.93	14.45	29.03

Source: Adapted from (WB, retrieved 20/01/2020, https://databank.worldbank.org/data/source/world-development-indicators/preview/on#)

Based on the data presented in Table 1 it can be concluded that there is no consistent relationship between the level of savings and investments, measured by their share in the GDP of the observed countries - the savings growth is not accompanied by investments growth. This conclusion points to the problem of conversion of savings into investments, through which the transfer to economic growth would be achieved. One of the reasons for disparities between savings and investment, which in macroeconomic terms is one of the basic relations for the establishment of macroeconomic balance, shows that savings-investment complex containing inhibiting factors.

The negative effects of this imbalance are manifested in the form of potential factors of economic stagnation and recession. If investments are absent, the volume of production activity will decrease, with the potential recession threatening. For these reasons, it is crucial for economic development to identify key factors that hinder the transformation of savings into investment.

Financial institutions that directly link the savings and investment process through their work are investment funds. Therefore, their formation and participation in the financial market is important from the point of view of economic growth and economic development. Unlike banks, they have competent staffing base that analyzes investment opportunities and, thanks to the achieved returns on investments, provides income to its shareholders. With the growth of their business volume and the growth of their participation in the financial market, the speed and scope of the transforming savings into investments increases.

2.2. Comparison with other financial institutions

An individual investment in the capital market implies that every individual investing in securities must have a good knowledge of the market and monitor market trends to make a profit. When the capital is invested in an investment fund, all liabilities are borne by the management of the fund. Management is composed of experts who create a diversified portfolio of investments, continuously monitor market developments and thus minimize risk. Achieving the diversification effect is, in fact, a key asset of investment funds in relation to other financial institutions, available to small shareholders, not just large investors.

Another significant advantage is the transparency of investment. This is achieved by daily disclosure of the value of the shares, which makes it easier to decide if securities will be sold immediately or whether to wait for a more appropriate moment for the action.

An important advantage of investment funds compared to other financial institutions are the transaction costs of investment, which are generally lower than in other institutions.

One of the main drawbacks of investment funds in relation to banks is the absence of state guarantees. Namely, in the banking sector there is a state-owned institution that provides certain guarantees on deposits of individuals and legal entities, while there are no such guarantees in the investment fund sector. This means that the collapse of the fund on the market automatically means the collapse of money invested in investment funds. In particular, there is an institution in Bosnia and Herzegovina that guarantees deposits by individuals and legal entities under the name of The State Deposit Insurance Agency. For individuals, the guarantee is up to the amount of BAM 50,000, which proved to be extremely important in the event of the collapse of Bobar bank, when The State Deposit Insurance Agency paid all depositors' amounts up to the aforementioned limit. In the case of investment funds, the entire loss would be borne by the investor.

Even though investment funds also have the stated shortcomings, they represent an important segment of the financial market, primarily because they enable the placement of small investors' savings and thus contribute to its faster and easier transformation into investments.

3. MATERIALS AND METHODS

After detailed analysis of the operations of investment funds in Bosnia and Herzegovina (RS and FBiH), Serbia, Croatia and Montenegro, in accordance with the available data, it is necessary to compare them. For this purpose, a comparative method will be used first and then a simple correlation analysis method.

According to Zelenika (2000), a comparative method is a process of comparing the same or related facts, phenomena, processes and relationships that determine their similarity in behavior and intensity and the difference between them.

3.1. Simple linear correlation

Unlike regression, in simple correlation both observed phenomena have the same status and are treated as random variables, i.e. no distinction is made between the dependent and the independent variable. Pearson simple linear correlation coefficient was used to test the hypothesis that the growth in the value of investment fund assets does not affect the growth of investment volume in the country. Pearson simple linear correlation coefficient "r" shows the degree of linear agreement of variations between two numeric variables. The following formula is used to calculate this coefficient:

$$r_{yx} = \frac{C_{xy}}{\sigma_x \sigma_y}$$

where:

C_{xy} – covariance (average deviation of the values of two characteristics from their arithmetic means);

σ_x, σ_y – standard deviations of variables x and y (positive value of square root from variance) (Dragović, 2008, p. 384).

The correlation coefficient measures whether the values of some variables are moving in the same direction (positive correlation, both phenomena show dichotomies), opposite direction (negative correlation, one phenomenon increases, the other decreases and vice versa) or move independently. It ranges $-1 \leq r \leq 1$. The closer, by absolute value, coefficient is to one, the stronger the correlation between observed phenomena. The closer coefficient is to zero, the weaker linear connection.

4. RESULTS

In Table no. 2, a comparison was made according to the number and type of investment funds operating in 2017 in the observed countries. As can be seen, Croatia has many more funds than other countries, exactly three times as much as BiH, seven times as much as Serbia and as much as thirteen times more than Montenegro. The reason for this is certainly the more developed capital market in Croatia and the earlier establishment of the investment funds sector.

Table 2: Comparison of the number and structure of the IF in 2017

TYPE	Number of IF			
	BiH	Serbia	Croatia	Montenegro
Closed IF	25	1	3	5
Open-ended IF	12	16	97	5
Private IF	0	2	34	0
TOTAL	37	19	134	10

Source: Author's research results

In terms of structure, BiH is dominated by closed funds, Serbia and Croatia by opened funds, while in Montenegro both types are equally represented. The dominance of open-ended funds shows that investors in these two countries place great importance on the liquidity of securities. In recent years, the number of open-ended funds has increased in other countries.

Another object of comparison is the value of IF assets over a 10-year period. As can be seen in Table 3, Croatian investment funds had a higher value over the whole observed period than other countries. Thus, e.g. in 2017, according to this indicator, the IF sector was almost seven times larger than in BiH, 14 times in comparison with Serbia and 55 times in comparison with Montenegro. However, in the last few years, the value of IF Croatia's assets has grown at a relatively lower rate compared to Serbia, where in the last five years this parameter has achieved an average upward trend of 62.25% annually, which is a positive indicator of the development of this part of the financial market, regardless of the still small absolute value of the property. When it comes to Bosnia and Herzegovina, regardless of the increase in the number of funds, the value of the assets is fairly constant.

Table 3: Comparison of the value of IF assets in the period 2008-2017

YEAR	VALUE OF IF ASSETS (million EUR)			
	BiH	Serbia	Croatia	Montenegro
2008	626.33	19.38	1,603.51	130.34
2009	445.34	11.84	1,900.78	280.49
2010	454.03	11.24	2,115.58	268.07
2011	414.15	16.35	1,808.47	196.60
2012	406.48	21.42	1,930.63	123.70
2013	389.60	47.11	1,980.48	108.83
2014	401.87	76.80	2,033.05	135.64
2015	421.30	140.65	2,192.25	106.66
2016	410.06	169.90	2,910.24	73.93
2017	433.06	211.30	2,951.83	52.87

Source: Author's research results

Due to the lack of data on the participation of the investment funds sector in the structure of the total turnover realized on the stock exchanges, a comparison of the participation of the investment funds sector in the gross domestic product (GDP) of the countries was made. This gives a clear picture of the significance of this sector for the economies of the analyzed countries.

Table 4: Comparison of the share of investment funds in the GDP of the observed countries in the period 2008-2017

	Bosnia and Herzegovina			Serbia			Croatia			Montenegro		
Y	GDP (m. EUR)	Value of IF assets (m. EUR)	Share of IF in GDP (%)	GDP (m. EUR)	Value of IF assets (m. EUR)	Share of IF in GDP (%)	GDP (m. EUR)	Value of IF assets (m. EUR)	Share of IF in GDP (%)	GDP (m. EUR)	Value of IF assets (m. EUR)	Share of IF in GDP (%)
08	13,039.99	626.33	4.80	30,980.61	19.38	0.06	48,135.00	1,603.51	3.33	3,085.60	130.34	4.22
09	12,669.81	445.34	3.51	30,035.41	11.84	0.04	45,093.00	1,900.78	4.21	2,981.00	280.49	9.41
10	12,959.20	454.03	3.50	29,073.58	11.24	0.04	45,022.00	2,115.58	4.70	3,125.10	268.07	8.58
11	13,400.96	414.15	3.09	32,564.35	16.35	0.05	44,737.00	1,808.47	4.04	3,264.80	196.60	6.02
12	13,392.27	406.48	3.04	31,518.55	21.42	0.07	43,959.00	1,930.63	4.39	3,181.50	123.70	3.89
13	13,673.48	389.60	2.85	33,813.08	47.11	0.14	43,516.00	1,980.48	4.55	3,362.50	108.83	3.24
14	13,960.31	401.87	2.88	32,312.54	76.80	0.24	43,002.00	2,033.05	4.73	3,457.90	135.64	3.92
15	14,391.84	409.54	2.85	33,245.07	140.65	0.42	43,870.00	2,192.25	5.00	3,624.70	106.66	2.94
16	15,289.66	410.06	2.68	36,723.05	169.90	0.46	46,640.00	2,910.24	6.24	3,954.21	73.93	1.87
17	16,042.28	433.06	2.70	39,183.27	211.30	0.54	49,118.00	2,951.83	6.01	4,299.09	52.87	1.23

Source: Author's analysis according to data by the Central Bank of BiH, National Bank of Serbia, Croatian National Bank, Central Bank of Montenegro

The table above shows that the investment funds sector is of the highest importance for the economy of Croatia and Montenegro, since it has the highest share in GDP in these countries (4.72% and 4.53% on average respectively). In

Montenegro, this indicator tends to decline. This result was logical to expect, given that the whole comparative analysis indicated a better position for Croatia. In the case of BiH, the share of IF in GDP is fairly constant, at about 3%. Serbia's investment funds have the convincingly lowest share (0.21% on average), but it should not be overlooked that this share, although small, is increasing year by year.

Table 5: Simple linear correlation - the relation between the growth in the value of IF and growth in investment volume

Year	Bosnia and Herzegovina		Serbia		Croatia		Montenegro	
	The value of assets (million EUR)	Gross investment (% of GDP)	The value of assets (million EUR)	Gross investment (% of GDP)	The value of assets (million EUR)	Gross investment (% of GDP)	The value of assets (million EUR)	Gross investment (% of GDP)
2008	626.33	26.66	19.38	30.33	1,603.51	31.43	130.34	40.67
2009	445.34	19.35	11.84	19.42	1,900.78	25.04	280.49	27.12
2010	454.03	15.91	11.24	18.47	2,115.58	21.35	268.07	21.77
2011	414.15	18.35	16.35	20.10	1,808.47	20.63	196.60	19.33
2012	406.48	18.83	21.42	21.01	1,930.63	19.27	123.70	20.59
2013	389.60	17.84	47.11	17.65	1,980.48	19.10	108.83	19.61
2014	401.87	18.38	76.80	17.49	2,033.05	18.19	135.64	20.22
2015	409.54	18.65	140.65	18.56	2,192.25	20.62	106.66	20.09
2016	410.06	19.62	169.90	17.91	2,910.24	21.03	73.93	26.10
2017	433.06	21.04	211.30	19.59	2,951.83	21.77	52.87	30.22

Source: Author's research results

In accordance with the available data, Table 5 gives an overview of the evolution of the value of investment fund assets in the observed countries over a ten year period, as well as the movement of gross investment in those countries, expressed as a percentage of gross domestic product. Using this data, a simple linear correlation analysis was made, the result of which is a simple linear correlation coefficient between the two observed variables at the level:

$$rxy = -0.0148.$$

It is a very weak correlation, or there is no connection between the observed variables. The analysis statistically confirmed what was assumed – the growth in the value of investment fund assets is not correlated with the growth in investment volume in any country.

5. DISCUSSIONS

There are two key sectors in the economic development of the whole country, including investment funds – the financial and real sectors. Within the financial sector, state action is needed. The state should create adequate legal regulation for the functioning of all financial institutions, where there are no privileged and where the market is the only measure of success. Consequently, it will increase competitiveness in the financial sector, which will have positive effects on the economy.

Regardless of the sophistication of the financial sector, if there are problems in the real sector and there are no strong firms - there is no investment in the financial sector. The key role in bringing the real sector to a satisfactory level is played by the state that creates the business environment. When there is a favorable business environment, a favorable investment climate will also be created. Investment funds, that include investing in company shares in the investment structure, would have more expedient effect in terms of stimulating economic activity.

From the current situation on the financial market of the observed countries, it is possible to draw some basic recommendations for the development of investment funds in the future:

- increasing investor confidence in the financial system in general by preserving general monetary stability;
- improving the legal framework in this area and adjusting operations of investment funds to the standards applicable in the European Union, which would attract more foreign capital and encourage domestic investors;
- education of individual investors and companies through seminars, courses and various publications about investment opportunities;
- economic growth and development of the country that would lead to lower energy and food prices, and then increase the disposable income for investment.

Given that investment funds play an important role in the financial markets of developed countries, it is expected that, given the above assumptions, the growth of their share in the total turnover on the observed stock exchanges could give a significant boost to the development of capital market.

Investment funds represent a stable financial institution that can provide quick and easy access to liquid assets, on the one hand, and fairly secure savings with a satisfactory rate of return, on the other hand.

Nothing is universal, even investment funds cannot be observed in the same way in different environments. In the case of developed countries, such as the USA, it is clear that they operate on a well-established system and therefore play an important role in the financial sector, but in general in the economy of those countries. According to the latest available OECD data, the value of USA investment fund assets in 2017 was 110.7% of GDP (OECD, 2018, p. 14). There is a clear separation between commercial and investment banking. The stock market is organized so that, in the event of a fall in the share price of a company, shareholders can change the management team of the company. This ability to take over a company in the market causes management teams to strive for the best possible financial performance.

In other countries, investment funds operate, but they are not at the very top of the financial sector - a typical example is Germany and Japan. According to the German model, the importance of banks in comparison to the American model is emphasized and they are the main institutional investors of companies. The so-called universal banks, which represent a combination of commercial and investment bank, can participate in the equity capital of companies in the real sector of economy. The role of stock exchanges has traditionally been limited, with the aim of limiting the impact of stock market oscillations on the functioning of companies (Ćirović, 2001, p. 279-280). More recently, there has been a more intense development of with 61.1% (OECD, 2018). The Japanese model is close to German, with differences in state control of the financial sector and bank specialization. Namely, commercial banks deal with short-term deposit-credit operations, while specialized financial institutions approve long-term loans from long-term deposit certificates, not from deposits. Relations between companies and financial institutions highlight confidence in the forefront. The financial institution provides financing, with a guarantee from the funded company that it will achieve a certain level of return. If this guarantee is not respected, the financial institution is in a position to replace the company's management. Today banks play an increasingly smaller role in the Japanese market, because part of the savings is diverted to the capital market (Ćirović, 2001, pp. 281-283). The share of investment funds sector in GDP in 2008 was 16.6%, while today it is 38% (OECD, 2018).

When it comes to developing countries and countries in transition, they rely on banks, because there are not enough companies that qualify for the issue of securities on the stock exchange. Countries that have undergone the transition process, such as Slovakia, the Czech Republic or Hungary, have used investment funds in the best possible way. The Czechoslovakia started the process of mass privatization in 1991, when the Government's primary goal was to take over the

state-owned companies. In just four years, 70% of enterprises were privatized in two waves. Given that 80% of citizens had vouchers, the problem of ownership dispersion arose. Therefore, the Government allowed privatization investment funds to participate in privatization, with the main goal of restructuring firms and creating an active capital market. This makes the funds a major actor in the privatization process. They could not hold more than 20% of an individual company's shares, and one company's shares could not account for more than 10% of the portfolio's value. The number of registered PIFs increased from 437 in the first wave of privatization to 633 in the second. PIFs collected 72% of the total vouchers. At the time of privatization, the rates of return on securities under investment funds were between 20% and 40% annually. Due to such a scenario, the companies did not borrow on the foreign market and domestic investors in the securities made acceptable profits. In the end, the Czech privatization program proved successful because of its speed of implementation, mass character, establishment of capital markets and the revival of the stock exchange. The final results were the development of the domestic economy, successful privatization and the increase in the number of jobs (Jovović, 2015, p. 137-144).

Relevant research on investment fund management best practices has shown that the European Union, through certain regulations, seeks to channel foreign investment outside strategic sectors, such as energy. This would, through the regulatory framework, direct foreign investment beyond the natural resource based sectors (Mitchell, Piggott & Kumru, 2008).

The basic conclusion of the analysis of the above models, as well as the models considered in empirical research, is that they are determined by the financial system existing in the country. The more developed the capital market in the country - the smaller role of the banking system. The main role of the state is, through regulation and control, to mobilize savings for productive purposes and thus to accelerate economic growth. Development strategy, as well as the country's economic policies, should move in this direction (Vladušić, 2010, p. 244).

The remaining countries that are stuck "halfway" through the transition process should learn on the example of the mentioned countries. These countries include Bosnia and Herzegovina, which is characterized by unsatisfactory privatization process, low economic growth rate, high unemployment rate and low standard of living. Investment funds exist in this country, but their capacities have not been adequately used. Such a thing requires the complete synchronization of all sectors in order to stimulate the economic development of the country, which can lead to the final goal, which is a better standard of living.

6. CONCLUSIONS

Regarding the general picture of the investment funds market, it can be said that all four analyzed countries are significantly behind the developed countries, which is confirmed by the low participation of this sector in the gross domestic product of the countries. The main reasons for this are: underdeveloped capital market, a bank-centric market that shifts investment into securities, aversion of potential investors to risk, poor awareness of the investment public about the possibility of placing surplus funds, etc.

These financial institutions in all observed countries, except for Serbia, were not created due to the needs of the market, but because of the need to complete the privatization process quickly, as they are transition countries. Thus, privatization investment funds were formed, whose primary role was to channel citizens' vouchers into the shares of privatized companies. The absence of the essential preconditions of establishing investment funds – raising the funds of smaller investors and investing them in securities - from the very beginning complicates their proper functioning.

The study used the simple correlation analysis method, which statistically confirmed the hypothesis that the growth of the value of investment funds assets in any observed country is not correlated with the growth of investment volume. In other words, investing in investment funds is not channeled in the best way to investments that would contribute to GDP growth. In order to achieve this effect, more activities to develop the IF sector are needed.

Based on the comparative analysis, it can be concluded that, although underdeveloped, the Croatian investment funds sector is the most developed in comparison to other countries. There are several basic indicators that confirm this:

- the early establishment of this sector in the financial market (10 years before Serbia and about five years before Montenegro and BiH) and a more developed capital market, given that it is a member state of the European Union;
- a larger number of investment funds (134:37:19:10);
- the diversity of the investment fund structure, which provides a wider choice to potential investors;
- higher value of IF assets than other countries;
- significantly higher share of the net asset value in the country's GDP.

Judging by the most relevant indicators, it could be said that the worst position among the observed countries is achieved by Serbia. The reason is the global

financial crisis that plagued the country's investment fund market in the first years of its existence. However, since the funds were created solely because of the market's need to find an alternative to savings in banks, their recovery is recorded year after year. Thus, there is a constant upward trend in the number of these funds, the value of their assets, the value of shares, as well as their importance as measured by their share in GDP.

The overall results of the research confirmed the hypothesis that investment funds in the analyzed countries do not represent a significant part of the financial system and, due to the nature of their creation, they do not make a significant contribution to economic development of the country.

From the experience of other countries that have successfully undergone the transition process, such as the Czech Republic, Slovakia and Hungary, it is possible to draw lessons for the development of the investment fund sector. Based on the improvement of the aforementioned sector, these countries managed to successfully complete the privatization process, stimulate the development of the domestic economy and achieve a number of positive effects. The experience of the Czech Republic, for example, shows that the privatization process through investment funds did not initially produce the desired results. The funds did not increase the value of the assets and thus made a profit for investors. However, in the end, this privatization program proved to be successful – in a short period of time a large number of companies were privatized, the rates of return on securities within investment funds were between 20% and 40% annually, so the investor securities made acceptable profit. This led to the revival of the entire capital market, and thus the growth and development of the Czech economy.

The future of the investment fund market in Bosnia and Herzegovina, Serbia, Croatia and Montenegro is determined by the development of capital market, better information to the investment public, the development of internal regulations and, most importantly, the achievement of macroeconomic stability. The regulatory framework needs to be gradually adapted to EU legislation in this area, which firstly involves opening funds, liberalizing their operations and identifying strategic areas for their activities with state support. Only in a package with reforms of the financial and overall economic system, investment funds can make their full contribution to the prosperity of the national economies of the analyzed countries.

Conflict of interests

The author declares there is no conflict of interest.

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КОМПАРАТИВНА АНАЛИЗА ПОСЛОВАЊА ИНВЕСТИЦИОНИХ ФОНДОВА У ОДАБРАНИМ ЗЕМЉАМА ЗАПАДНОГ БАЛКАНА

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САЖЕТАК

Инвестициони фондови у посљедње вријеме све више добијају на значају, јер мањим инвеститорима омогућавају смањење ризика, коришћење знања финансијских стручњака, олакшан приступ међународном тржишту капитала и већу стопу приноса на уложена средства у односу на банке. Циљ овог истраживања јесте да се у складу са доступним подацима, кроз компаративну анализу, укаже на сличности и разлике у пословању инвестиционих фондова Босне и Херцеговине, Србије, Хрватске и Црне Горе, те да се на основу тога докаже да ове финансијске институције, иако имају потенцијал, не дају допринос привредном развоју поменутих земаља у мјери у којој би требало. Предмет компарације су природа настанка, број, врсте, нето вриједност имовине, као и проценат учешћа инвестиционих фондова у БДП-у посматраних земаља. Главна хипотеза гласи да инвестициони фондови у анализираним земљама не представљају значајан дио финансијског система, те због природе њиховог настанка, не дају значајан допринос привредном развоју. Из главне хипотезе произлазе и двије помоћне хипотезе: инвестициони фондови настали у процесу приватизације, усљед одсуства суштинских тржишних претпоставки

њиховог оснивања, нису у стању да остваре значајнији утицај на привредни раст; раст вриједности имовине инвестиционих фондова не утиче на раст обима инвестиција у земљи. Поред метода компаративне анализе, за доказивање наведених хипотеза користила се метода просте корелационе анализе, као и друге научне методе. Резултати истраживања потврдили су постављену хипотезу да инвестициони фондови данас у анализираним земљама не представљају значајан дио финансијског система и да, због природе њиховог настанка, не дају значајан допринос привредном развоју.

Кључне ријечи: *финансијско тржиште, инвестициони фондови, штедња, привредни развој, корелациона анализа, компаративна анализа*.

COVID-19 PANDEMIC AND FRAUDULENT ACTIONS IN THE FINANCIAL STATEMENTS: THE CASE OF HOTEL COMPANIES IN THE REPUBLIC OF SERBIA

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ABSTRACT

The quality of information presented in the financial statements of companies may be impaired due to fraudulent activities. One of the frequently used instruments that indicates that fraud has been committed in the financial statements is the Beneish M-score model. The purpose of the research is to examine the exposure of hotel companies in the Republic of Serbia to the risk of fraud in financial statements, as well as to determine whether there has been a change in that risk due to the COVID-19 pandemic. The research was conducted on a sample of 100 randomly selected hotel companies, and their financial reports for 2019 and 2020 were observed. There was a high risk of fraud based on the recognition of costs of sales, management and administration, and borrowing in both observed years, as well as a high risk of fraud based on the recognition of income and gross margin index in 2020. Further, it was determined that in the year of the COVID-19 pandemic, there was an increase in the risk of fraud in the financial statements based on the gross margin index and recognition of selling, management and administration costs. Micro-enterprises are exposed to a higher risk of fraud based on the recognition of costs of sales, management and administration compared to medium-sized ones. Limited liability companies are more exposed to risk based on the recognition of sales revenue, accrual item and total risk (measured by the 8-variable model) compared to joint-stock companies. On the other hand, joint-stock companies are more exposed to the risk of fraud based on gross margin and general risk of fraud (measured by the 5-variable model) compared to limited liability companies.

1. INTRODUCTION

The financial statements of a company, as the end products of the accounting function, are an important and indispensable source of information about the company's operations when making business decisions (Vasilev, Cvetković & Grgur, 2019). In order for financial statements to satisfy the information needs of their users, assuming that they are publicly available (Obradović, Milašinović & Bogičević, 2021), they must be true and objective and must show the real financial position and earning power of the company (Dimitrijević, Jovković & Milutinović, 2021).

In practice, the quality of financial statements is often impaired due to fraudulent actions (Dimitrijević, Jovković & Milutinović, 2021). In this way, users of financial statements acquire a false or distorted picture of the company's operations, which will result in making the wrong business decision (Melville, 2011). It is one of the main culprits for the collapse of a large number of multinational companies (Ogoun & Peralayefa, 2019). However, this will not only affect the users of financial statements, but also companies that belong to the same sector as companies in which the investigation found the existence of fraud in financial statements. This can lead to social stratification of society, increase in the grey economy and decrease in the inflow to the state (Dimitrijević, 2012). In addition, there is a loss of confidence in the financial reporting system, and the accounting and auditing professions are most often blamed for this (Mitrić, Stanković & Lakičević, 2012).

In addition to great efforts to prevent their occurrence, fraud in financial statements occurs from time to time (Jan, 2021), with the risk of their occurrence increased by globalization of business, market growth and rapid technological development (Jan, 2018). Fraud is a global problem, i.e., it is present in all countries of the world (Luković & Stojković, 2020). The same authors state that countries with underdeveloped financial markets, poor institutional framework for supervising the quality of financial reporting and low living standards are a suitable environment for their wider distribution. Further, the occurrence of fraud in financial statements can be linked to the occurrence of economic crises, natural disasters, pandemics and the like (Levi & Smith, 2021).

The emergence of the COVID-19 pandemic, in addition to a large number of infected and deceased persons, also led to rising unemployment, large financial losses and endangered functioning of the capital market (Jan, 2021). The issue of ensuring business stability, sustainability and long-term growth, which has been called into question by the emergence of the COVID-19 pandemic (International Federation of Accountants, 2020), may encourage individuals to

resort to fraudulent financial reporting (Deloitte, 2020). The fact that the morale of employees weakens due to teleworking, dismissals and lack of control also contributes to the increase in the risk of fraud (Luis, 2020).

As companies often cannot prevent fraud in their financial statements (as the best strategies for maintaining their quality and credibility), it is necessary to identify signals that indicate the existence of fraud in them (Rezaee & Riley, 2009). The subject of this paper are indicators of fraud in the financial statements of hotel companies in the Republic of Serbia. As companies in this area are significantly affected by the COVID-19 pandemic (Luković & Stojković, 2020; Milovanović, Paunović & Avramovski, 2021; Wieczorek-Kosmala, 2021), the likelihood of fraud in their financial statements may increase. This is supported by the fact that these companies in the Republic of Serbia, even before the COVID-19 pandemic, had a significant space for improving performance (Mitrović, Knežević & Milašinović, 2021). Therefore, the aim of this paper is to determine whether there has been an increase/decrease in fraud indicators in the financial statements for 2020 compared to 2019, in 100 randomly selected hotel companies in the Republic of Serbia, as well as to determine whether the risk of fraud is due to the size and legal form of hotel companies. The Beneish M-score model with five and eight variables was used to determine the signals that indicate the existence of fraud in the financial statements.

The following hypotheses were tested in this paper:

H1: With the onset of the COVID-19 pandemic, there was an increase in the risk of fraud in the financial statements of hotel companies in the Republic of Serbia.

H2: The size of the hotel company has a statistically significant effect on the level of risk of fraud in the financial statements.

H3: The legal form of a hotel company has a statistically significant impact on the level of risk of fraud in the financial statements.

After the introductory considerations, there is a review of the literature in which the very notion of fraudulent financial reporting is pointed out. In addition, within the literature review, the tools and techniques for detecting fraud in financial statements were emphasised with the greatest attention paid to Beneish M-score model. After that, the research methodology is described. This is followed by a presentation of the results of empirical research. In the last part of the paper, the concluding considerations and contribution of the research are presented, as well as the limitations in the research.

2. LITERATURE REVIEW

There are a number of terms in the literature and practice that are used to denote fraudulent financial reporting. Thus, it can be found under the name of manipulative, false, falsified, styled or biased financial reporting. Further, the terms intentional error and irregularity have been long used in order to denote the same term (Rezaee & Riley, 2009). Apart from the fact that both creative accounting and fraudulent financial reporting will result in the creation of a "distorted image" of the company's business, there is no sign of equality between these two concepts. Namely, cosmetic creative accounting, as a form of creative accounting, is conducted without violating rules and norms, i.e. it is conducted within the regulatory framework (Jones, 2011). There are also numerous definitions of fraudulent financial reporting. Among the most commonly used are those provided by International Standards on Auditing, the Association of Certified Fraud Examiners (ACFE) and the American Institute of Certified Public Accountants (AICPA).

According to International Standards on Auditing, fraudulent financial reporting is the intentional misrepresentation or omission of certain information or disclosures in financial statements with the aim of misleading users of financial statements (Petković, 2010). ACFE defines it as intentional misstatement or omission of material facts or accounting data, which, when all available information is taken into account, will mislead users and result in wrong business decisions (Rezaee & Riley, 2009). According to the AICPA definition, false financial reporting is intentional inaccuracies or omission of amounts or disclosures in the financial statements in order to deceive their users. Common to all above definitions is that it is a deliberate activity and will result in making the wrong business decision.

It is often identified with fraud committed by management, and the reasons for this are the facts that: 1) company management is responsible for compiling reliable financial statements and 2) fair presentation, integrity and quality of the financial reporting process is the responsibility of management (Rezaee & Riley, 2009). When it comes to fraud committed by managers, it is most often committed in collusion with accountants and other employees, and includes: a) manipulation, falsification, concealment or alteration of accounting records or supporting documents on the basis of which financial statements are prepared; b) misrepresentation or intentional omission of significant business transactions, events and information from the financial statements; c) incorrect application of accounting principles and e) inadequate classification or disclosure (Ljubisavljević & Jovković, 2016, p. 487). They can be made by top-level managers as well as lower-level managers. Wells (2017) states that top-level

managers commit fraud in order to: 1) cover up real business successes; 2) preserve their job or status and 3) maintain income/wealth (p. 300). The same author states that lower-level managers cheat in the financial statements assigned to their centers of responsibility (divisions or organizational units) in order to hide bad performance or achieve higher bonuses. Frauds in financial reports can also be committed by employees, and they usually involve falsification of some types of documents, which, unlike fraud committed by management, are relatively easier to detect (Ljubisavljević & Jovković, 2016). Further, members of organized criminal groups resort to false financial reporting in order to unjustifiably obtain loans from financial institutions, or to manipulate stock market values (Petković, 2010).

There are numerous methods and techniques for detecting fraudulent transactions in financial statements, each of which has certain advantages and disadvantages (Mitrović & Knežević, 2020). In order to detect the existence of fraudulent actions in financial reports, it is necessary to analyse the accounting policies of companies, the quality of corporate governance and check whether there are deviations in the reports that would indicate manipulative actions (Milojičić & Živković, 2021). In order to determine the existence of certain deviations in financial statements, the techniques of financial statement analysis are most often used, such as horizontal, vertical and ratio analysis (Vasilev, Cvetković & Grgur, 2019). By comparing the results of the analysis of financial statements in the observed year with data from previous years, it is possible to detect certain deviations, which can direct the investigation in a certain direction (Golden et al., 2011). In addition to the previously mentioned traditional financial analysis techniques, the application of specific techniques, such as Benford's law, Beneish model, Computer-assisted auditing tools and Data mining techniques (Cvetković et al., 2021, pp. 41-42), is increasingly common.

The Beneish M-Score model is a quantitative model based on financial indicators and eight or five variables to identify manipulative actions in financial statements. The eight-variable model can be represented as follows (Beneish, 1999):

$$\text{Beneish M-Score (8)} = -4.84 + 0.92\times DSRI + 0.528\times GMI + 0.404\times AQI + 0.892\times SGI + 0.115\times DEPI - 0.172\times SGAI + 4.679\times TATA - 0.327\times LVGI$$

While the model with five variables is as follows:

$$\text{Beneish M-Score (5)} = -6.065 + 0.823\times DSRI + 0.906\times GMI + 0.593\times AQI + 0.717\times SGI + 0.107\times DEPI$$

Table 1 shows how to determine these 8 variables, as well as the reference values for companies that have not manipulated financial statements, as well as for those that manipulate. In a situation where the value of this model is greater than -2.22, there are indications that the company committed a fraudulent act in its financial statements.

Table 1: Variables and their threshold values

Variables	Calculation method	Average for non-manipulators	Average for manipulators
DSRI (Days' Sales in Receivables Index)	$(receivables_t/sales_t)/(receivables_{t-1}/sales_{t-1})$	1.031	1.465
GMI (Gross Margin Index)	$((sales_{t-1}$-cost of good $sold_{t-1})/sales_{t-1})/ ((sales_t$-cost of good $sold_t)/sales_t)$	1.014	1.193
AQI (Asset Quality Index)	$(1-(current\ assets_t + net\ PP\&E_t)/total\ assets_t)/ (1-(current\ assets_{t-1} + net\ PP\&E_{t-1})/total\ assets_{t-1})$	1.039	1.254
SGI (Sales Growth Index)	$sales_t/sales_{t-1}$	1.134	1.607
DEPI (Depreciation Index)	$(depreciation_{t-1}/(depreciation_{t-1}+net\ PP\&E_{t-1}))/ (depreciation_t/(depreciation_t+net\ PP\&E_t))$	1.001	1.077
SGAI (Sales, General and Administrative expenses Index)	$(sales,\ general\ and\ administrative\ expense_t/ sales_t)/(sales,\ general\ and\ administrative\ expense_{t-1}/sales_{t-1})$	1.054	1.041
TATA (Total Accruals to Total Assets)	$(\Delta current\ assets_t - \Delta cash_t - \Delta current\ liabilities_t - \Delta current\ maturities\ of\ long\ debts_t\ -depreciation_t) / total\ assets_t$	0.018	0,031
LVGI (Leverage Index)	$((long\text{-}term\ debts_t + current\ liabilities_t) / total\ assets_t) / ((long\text{-}term\ debts_{t-1} + current\ liabilities_{t-1}) / total\ assets_{t-1})$	1.037	1,111

Source: Beneish, 1999, p. 27

Notes: t – current year, t-1 previous year, PP&E – property, plant and equipment

Dimitrijević, Obradović & Milutinović (2018) list the following three limitations of the Beneish M-score model:

- The model is created on the basis of financial statements prepared in accordance with the Generally Accepted Accounting Principles - GAAP;
- The reliability of the model decreases in a situation where the company for a number of consecutive years compiles false financial statements; and

– The model only recognises the changes, but cannot fully discover the causes of those changes.

How companies in the Republic of Serbia, when preparing their financial statements, adhere to regulations that differ from GAAP (apply the full version of IFRS, IFRS for small and medium entities and Ordinance of the Minister of Finance), also due to the fact that financial statements differ in its form, has the consequence that certain adjustments must be made when determining the value of the Beneish M-score model. This has the consequence that the results of this model may have the character of indications that fraud has been committed (Dimitrijević, Obradović & Milutinović, 2018). In addition to these limitations, many researchers have used this model, primarily because of its simplicity. Franceschetti & Koschtial (2013) observed 60 Italian small and medium-sized enterprises (30 of which went bankrupt, while 30 did not go bankrupt) and found that there are significantly more "red flags" among bankrupt companies, with their number decreasing as they approach years when the bankruptcy occurred. Looking at 1,809 joint-stock companies from five leading industries in Italy between 2005 and 2012, Paolone & Magazzino (2014) found that more than half of them were more likely to have committed fraud in their financial statements. Repousis (2016) examined the effectiveness of the Beneish M-score model in predicting fraud in the financial statements of Greek companies. The survey was conducted on a sample of 25,468 companies (banks were excluded from the survey), and their reports for 2011 and 2012 were observed. The results of the research indicate that in the case of 33% of companies that make up the sample, there is a probability that they committed fraud. The author also states that the use of this model is an easy and inexpensive way to investigate fraudulent activities in financial statements. Ramírez-Orellana, Martínez-Romero, & Marino-Garrido (2017) conducted research on the example of the Spanish international family company Pescanova, which went bankrupt in 2013, and observed its business in the period from 2008 to 2011 (in 2012 it was announced that the company manages earnings). The results of the research indicate that in the years before the bankruptcy, Pescanova conducted an aggressive accounting practice. According to the authors, the application of this model could detect and prevent fraudulent work in the financial statements in the years before the onset. Hołda (2020) conducted a study on the example of 8 joint-stock companies from the Warsaw Stock Exchange and found that Beneish model with 8 variables identified manipulators with 100% accuracy, while the model with 5 variables showed a slightly lower degree of accuracy. Of the 68 companies that manipulated financial statements, the Beneish M-score model confirmed the existence of fraud in 54 companies (Halilbegović et al., 2020). Based on that, the same authors point out

that the Beneish M-score model is an effective tool for detecting fraud in the financial statements of companies in Bosnia and Herzegovina.

Dimitrijević & Danilović (2017) proved with their research that the application of the Beneish model as a method for detecting fraud can greatly help control the quality of financial statements of companies in the Republic of Serbia. They conducted research on the example of 5 companies where tax evasion was proven or a report was filed due to tax evasion, and the research covered the year before the fraud was committed, as well as the year when it occurred. The results of the research indicate that in the case of 2 companies the threshold value was exceeded in 4 indices, while in the case of 3 companies the exceedance was observed in as many as 5 indices. In addition, the research found that in 4 observed companies the threshold value for the model with 8 variables was exceeded, while in the case of one company the value of individual indices and the model itself could not be determined (the value of sales revenue was 0). Kokić, Gligorić & Knežević (2018) applied the Beneish M-score model with 5 variables to determine whether Super League football clubs manipulate earnings in their financial statements. The research included 13 football clubs, and their reports in the period from 2009 to 2016 were observed. The research found that in the case of 4 clubs, the median value of the model is above the limit of -2.2, i.e. 31% of clubs manipulate earnings in their financial statements. Conducting research on the example of 42 business entities from the Republic of Serbia of different sizes and activities, Dimitrijević, Obradović & Milutinović (2018) found a number of warning signs in the financial statements for 2013 and 2014, that is, there is a moderate general risk of fraud. According to the authors, a significant source of this risk is corporate borrowing. Further, the research revealed a general risk of manipulation with the recognition of income, a high risk of manipulation of accounting items in general and in particular depreciation and an increase in administrative costs. When it comes to the activities which the observed companies belong to, the risk of fraud is higher in manufacturing companies and financial institutions than in trade and service companies. The mentioned research also found that the risk of fraud related to capitalization of costs and growth of sales revenue is higher in large companies and SMEs, while in joint-stock companies the risk of fraud with capitalisation of costs is higher in relation to limited liability companies. Observing the companies listed on the Belgrade Stock Exchange within Sector A-Agriculture, Forestry and Fisheries in the period from 2016 to 2019, Srebro et al. (2021) found that in a number of companies there are indications that fraudulent actions were performed in the financial statements. Kušter (2021) found a high risk of manipulation in the financial statements of 3 out of 73 observed SMEs in the manufacturing industry.

3. MATERIALS AND METHODS

The research was conducted on a sample of 100 randomly selected hotel companies in the Republic of Serbia, and their financial reports for 2019 and 2020 were observed. These are companies whose activity code is: 5510—hotels and similar accommodation. According to the data of the Serbian Business Registers Agency (2022), there were 855 such companies operating in Serbia in 2019 and 704 in 2020. The share of total operating assets of the observed companies in the total operating assets of the entire population companies whose activity code is 5510 in the Republic of Serbia in 2019 was 56.12% and 56.05% in 2020. The share of equity of the observed companies in the equity of the entire population companies whose activity code is 5510 in the Republic of Serbia in 2019 was 71.35% and 72.64% in 2020. Based on that, it can be concluded that the sample is representative. As can be seen from Figure 1 and Figure 2, the sample is dominated by small enterprises, as well as those registered as limited liability companies.

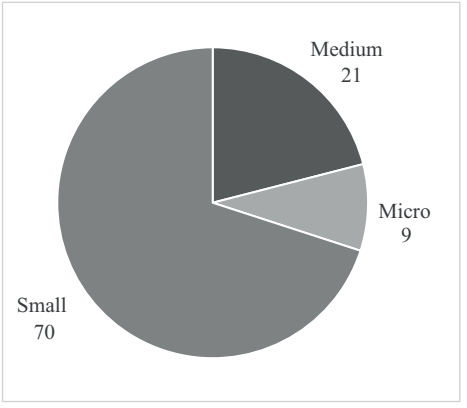

Figure 1: Hotel companies according to their size*

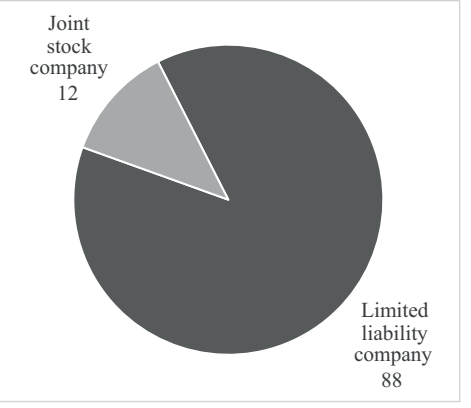

Figure 2: Hotel companies according to their legal forms

Source: Authors' creation based on the data from the official internet presentation of The Business Registers Agency of the Republic of Serbia

Note: * In 2020 the classification was performed according to the Accounting Act from 2019

As the distribution of data deviates from normality, the testing of the set research hypotheses was performed as follows:

- The first hypothesis - by comparing the values of individual variables, as well as the values of the models themselves with 5 and 8 variables in 2020 compared to 2019 using the Wilcoxon rank test;

- The second hypothesis - by comparing the values of individual variables, as well as the values of the models themselves with 5 and 8 variables between micro, small and medium hotel companies using the Kruskal-Wallis H test. In the situation when the mentioned test determines the existence of a statistically significant difference in the risk of fraud between hotel companies of different sizes, the Mann-Whitney U test will be applied to determine between which groups of companies this difference exists. As the Mann-Whitney U test will be conducted between micro and small, micro and medium and small and medium enterprises, it will result in the implementation of Bonferroni correction of alpha values (α=0.05/3=0.017) (Pallant, 2009); and
- Third hypothesis - by comparing the values of individual variables, as well as the values of the models themselves with 5 and 8 variables between hotel companies organized as limited liability companies and joint-stock companies using the Mann-Whitney U test.

The second and third research hypotheses were tested at the level of individual observed years. The IBM SPSS Version 23 statistical package was used for statistical data processing.

4. RESULTS AND DISCUSSIONS

Table 2 shows the descriptive statistics of the observed variables for 2019 and 2020.

Table 2: Descriptive statistics

Variables	Year	n	Mean	Median	Std. Dev.	Min.	Max.	Low risk	Moderate risk	High risk
DSRI	2019	100	1.591	1.135	1.821	0.037	13.394	39	32	29
	2020	100	2.522	1.311	4.482	0.000	32.455	39	14	47
GMI	2019	100	0.962	1.000	0.284	-1.486	1.399	58	36	6
	2020	100	0.972	1.115	1.663	-14.428	3.961	30	41	29
AQI	2019	80	1.115	0.965	1.031	-0.134	6.574	54	18	8
	2020	80	2.814	0.995	11.471	-7.705	97.837	55	16	9
SGI	2019	100	1.034	1.014	0.279	0.324	2.103	77	19	4
	2020	100	0.507	0.414	0.310	0.044	1.753	96	3	1
DEPI	2019	100	1.165	0.977	1.420	0.028	14.654	61	14	25
	2020	100	1.096	0.972	1.139	0.039	11.975	65	14	21
SGAI	2019	100	1.114	1.050	0.337	0.509	2.551	49	0	51
	2020	100	2.017	1.759	1.319	0.000	7.899	12	0	88

Variables	Year	n	Mean	Median	Std. Dev.	Min.	Max.	Low risk	Moderate risk	High risk
TATA	2019	100	-0.005	0.003	0.101	-0.514	0.220	63	8	29
	2020	100	0.043	0.001	0.032	-0.292	3.172	70	7	23
LVGI	2019	100	1.106	0.981	0.593	0.029	5.024	63	7	30
	2020	100	1.113	1.062	0.384	0.212	3.374	44	12	44
M5	2019	100	-2.496	-2.836	1.454	-4.204	6.433			
	2020	100	-1.297	-2.845	7.151	-15.611	55.038			
M8	2019	100	-2.032	-2.361	1.718	-5.761	8.168			
	2020	100	-1.031	-2.555	6.035	-10.964	38.203			

Source: Authors' calculation

The average values of DSRI at the sample level (in both observed years) indicate a high level of risk of fraud related to the recognition of income in the observed hotel companies in the Republic of Serbia. However, this fact should be taken with reserve due to the presence of extreme values in both observed years. Observed individually, in the first year, the largest number of hotel companies is in the zone of low risk of income fraud, while in 2020, the largest number of companies is in the high-risk zone. The explanation for this can be found in the fact that the emergence of the COVID-19 pandemic affected the reduction of sales revenues in the observed companies, as well as maintaining the level of receivables from the end of the previous year. In 2019 and 2020, the average value of GMI at the sample level is lower than 1.031, which indicates a low level of fraud based on the gross margin index. In 2019, the largest number of companies were in the zone of low risk of fraud based on the gross margin index. However, in the year of the COVID-19 pandemic, there was a significant increase in the number of companies with a high level of risk of fraud based on the gross margin index (to the detriment of the number of companies in the low-risk zone). Observed at the sample level, in 2019 the average value of AQI indicates a moderate exposure of the observed hotel companies to the risk of fraud based on cost capitalisation, while in 2020 this exposure is high. The maximum value of this indicator of 97.84 in 2020 significantly contributed to that. When it comes to individual companies, more than 65% of companies in both observed years were in a zone of low risk of fraud based on cost capitalization. On the other hand, less than 14% of the observed companies in both observed years were in a zone of high risk of fraud on the same basis.

As the average values of SGI at the sample level in both observed years are below the average value for non-manipulators (1.039), it can be concluded that the observed hotel companies are in a zone of low risk of fraud related to sales growth. This is confirmed by the fact that 4 hotel companies in the first

year, and one company in the second observed year had a high level of risk of fraud related to sales growth. The average value of DEPI at the sample level in 2019 and 2020 is above the average value for manipulators, which indicates a high exposure to the risk of fraud based on depreciation calculations. As in the case of the previous indicator (SGI), the high average value of this indicator was contributed by the extreme values recorded in some companies. Observed individually, in more than 60% of the observed companies in 2019 and 2020, there was a low exposure to the risk of fraud based on depreciation calculations. All 14 companies, with which a moderate risk of fraud was identified based on the calculation of depreciation in 2019, were in the moderate risk zone in 2020 as well. The average value of SGAI at the sample level in both observed years indicates a high risk of fraud in the financial statements based on the recognition of costs of sales, management and administration. The existence of a high risk of fraud based on the recognition of these costs in the financial statements for 2019 was identified in 51 companies, while in 2020 that number increased by 37.

The average value of TATA at the sample level in 2019 is below the average value for non-manipulators, while in 2020 it is above the average value for manipulators. The largest number of companies in both observed years is in the zone of low risk of fraud based on the accounting item (63 companies in 2019 and 70 companies in 2020). The average value of LVGI at the sample level in 2019 indicates a moderate risk exposure based on borrowing, while the average value in 2020 indicates a high risk exposure. In 2019, the largest number of companies (63 of them) were in the zone of low risk of fraud based on borrowing, while in 2020 the same number of companies were in the zone of low and high risk zones (44 companies each).

The average value of the Beneish M-score model with 5 variables at the sample level indicates a low level of fraud risk in the financial statements for 2019, while the 8-variable model indicates the existence of a high risk of fraud. Looking at the level of individual companies, the model with 5 variables identified the existence of a probability of fraud in the financial statements for 2019 in 23 companies, while the model with 8 variables determined the same in 39 companies. The average value of both Beneish M-score models at the sample level in 2020 is higher than -2.22, which indicates a high risk of fraud. The model with 5 variables determined that 35 companies are likely to have committed fraud in the financial statements for 2020. On the other hand, the 8-variable model identified the existence of a probability that fraud was committed in the financial statements for 2020 in 40 companies. For companies that were identified as likely to have committed fraud in the financial statements for 2019, it was determined that they were likely to have committed fraud in the financial statements for 2020.

Higher number of companies in both observed years in which the probability of committing fraud was identified using the 8-variable model, compared to the 5-variable model, can be explained as a result of the increased risk of fraud on the basis of, primarily, the recognition of costs of sales, management and administration (SGAI). It is one of three variables (besides TATA and LVGI) that is not contained in the model with 5 variables.

As stated in the third part, in order to determine whether there is a statistically significant difference in the values of individual indicators, as well as the values of the models themselves between two observed years, Wilcoxon's rank test will be applied. The results of this test are shown in Table 3.

Table 3: Wilcoxon's rank test

Variables	Wilcoxon's rank test	Median	
		2019	2020
DSRI	z=-1.699; p=0.089; r=0.12	1.135	1.311
GMI	z=-4.941; p=0.000; r=0.35	1.000	1.115
AQI	z=-0.396; p=0.692; r=0.03	0.965	0.995
SGI	z=-7.798; p=0.000; r=0.55	1.014	0.414
DEPI	z=-0.516; p=0.606; r=0.04	0.977	0.972
SGAI	z=-6.670; p=0.000; r=0.47	1.050	1.759
TATA	z=-0.265; p=0.791; r=0.02	0.003	0.043
LVGI	z=-1.943; p=0.052; r=0.02	0.981	1.062
M5	z=-0.457; p=0.647; r=0.03	-2.836	-2.845
M8	z=-0.083; p=0.934; r=0.00	-2.361	-2.555

Source: Authors' calculation

As can be seen from Table 3, Wilcoxon's rank test revealed that in the case of GMI, SGI and SGAI there is a statistically significant difference in value between the observed years. The mentioned test determined that in 2020 there was a statistically significant increase in the risk of fraud based on the gross margin with a medium effect. In 2020, there was a statistically significant reduction in the risk of fraud based on sales growth compared to 2019, with a strong effect. The risk of fraud based on the recognition of costs of sales, management and administration increased statistically significantly in 2020 compared to 2019, with the effect of this increase being medium. The above results in partial acceptance of the first research hypothesis.

The results of the Kruskal-Wallis test (which tested the second research hypothesis) are presented in Table 4.

Table 4: Results of Kruskal-Wallis test

Variables	Year	Chi-Square	df	Sig.	Median for micro enterprises	Median for small enterprises	Median for medium enterprises
DSRI	2019	3.392	2	0.183	1.697	1.088	1.219
	2020	0.533	2	0.766	1.942	1.375	1.187
GMI	2019	0.253	2	0.881	1.008	0.998	1.004
	2020	2.749	2	0.253	1.066	1.114	1.117
AQI	2019	1.547	2	0.461	1.034	0.952	0.923
	2020	1.104	2	0.576	1.002	1.005	0.956
SGI	2019	0.774	2	0.679	0.984	1.026	1.013
	2020	4.703	2	0.095	0.572	0.410	0.357
DEPI	2019	1.069	2	0.586	0.934	0.981	0.976
	2020	0.988	2	0.610	0.998	0.967	0.973
SGAI	2019	3.909	2	0.142	0.989	1.079	1.009
	2020	6.597	2	0.037	1.562	1.747	1.949
TATA	2019	0.686	2	0.710	0.004	0.005	-0.002
	2020	0.528	2	0.768	0.000	0.003	0.003
LVGI	2019	1.991	2	0.370	1.077	0.972	0.988
	2020	0.241	2	0.886	1.043	1.072	1.056
M5	2019	0.364	2	0.834	-2.447	-2.829	-2.843
	2020	1.861	2	0.394	-2.907	-2.736	-3.079
M8	2019	1.435	2	0.488	-1.932	-2.374	-2.475
	2020	1.349	2	0.509	-2.688	-2.396	-3.062

Source: Authors' calculation

The results of the Kruskal-Wallis H test indicate that there is a statistically significant difference in the risk of fraud between hotel companies of different sizes based on the recognition of costs of sales, management and administration in 2020 (Sig.<0.05), with the growth of the size of the company there is an increase in the value of the median (Table 4). Mann-Whitney's U test revealed a statistically significant difference in the risk of fraud based on the recognition of costs of sales and administration in 2020 between micro (Md=1.562, n=9) and medium-sized hotel companies (Md=1.949, n=21) where the difference is between medium and strong intensity (U=40.000, z=-2.467, p=0.014, r=0.45). Based on that, it can be concluded that the risk of fraud based on the recognition of costs of sales, management and administration in micro enterprises is higher than in medium enterprises. Thus, the second research hypothesis was partially confirmed.

The results of the Mann-Whitney U test (which tested the third research hypothesis) are shown in Table 5.

Table 5: Results of Mann-Whitney U test

Variable	Year	Mann-Whitney U	Z	Sig.	r	Median for limited liability company	Median for joint- stock companies
DSRI	2019	341.000	-1.984	0.047	0.198	1.183	1.013
	2020	376.000	-1.612	0.107	0.161	1.286	2.285
GMI	2019	507.500	-0.217	0.828	0.022	1.002	0.983
	2020	294.000	-2.482	0.013	0.248	1.086	1.165
AQI	2019	327.000	-0.734	0.463	0.073	0.957	0.982
	2020	270.000	-1.530	0.126	0.153	0.965	1.033
SGI	2019	510.000	-0.191	0.849	0.019	1.014	1.012
	2020	430.500	-1.034	0.301	0.103	0.431	0.382
DEPI	2019	507.500	-0.217	0.828	0.022	0.970	0.988
	2020	441.000	-0.923	0.356	0.092	0.969	1.012
SGAI	2019	419.000	-1.156	0.248	0.116	1.057	1.004
	2020	349.000	-1.899	0.058	0.190	1.706	2.229
TATA	2019	336.500	-2.032	0.042	0.203	0.006	-0.023
	2020	427.500	-1.074	0.283	0.107	0.000	0.015
LVGI	2019	389.500	-1.469	0.142	0.147	0.971	1.051
	2020	412.500	-1.225	0.221	0.123	1.052	1.145
M5	2019	401.000	-1.347	0.178	0.135	-2.828	-3.048
	2020	339.000	-2.005	0.045	0.201	-2.912	-1.978
M8	2019	254.000	-2.906	0.004	0.291	-2.306	-2.896
	2020	352.000	-1.867	0.062	0.187	-2.662	-1.575

Source: Authors' calculation

Mann-Whitney U test found the existence of statistically significant differences in the risk of fraud between hotels registered as limited liability companies and joint-stock companies based on the recognition of sales revenue in 2019, with this difference between low and medium intensity (U=341.000, z=-1.984, p=0.047, r=0.198). As the value of the median DSRI for limited liability companies in 2019 was 1.183, and for joint-stock companies 1.013, it can be concluded that the risk of fraud based on the recognition of sales revenue is higher in limited liability companies compared to joint-stock companies. In addition, in 2019, there is a higher risk of fraud on the basis of the accrual item in limited liability companies (Md=0.006) compared to joint-stock companies (Md=-0.023), with the difference between low and medium intensity (U=336.600, z=-2.032, p=0.042, r=0.203). For the same year, limited liability companies (Md=-2.306) were exposed to

a higher risk of fraud in financial statements (measured by the eight-variable model) compared to joint-stock companies (Md=-2.896), with the difference between small and medium intensity (U=254.000, z=-2.906, p=0.004, r=0.291). Joint-stock companies (Md=1.165) are exposed to a higher risk of fraud based on gross margin in 2020 compared to limited liability companies (Md=1.086), with the difference between low and medium intensity (U=294.000, z=-2.482, p=0.013, r=0.248). Further, the research found that joint-stock companies (Md=-1.978) are more exposed to a higher risk of fraud in the financial statements for 2020 (measured model with five variables) compared to limited liability companies (Md=-2.912), with the difference between low and medium intensity (U=339.000, z=-2.005, p=0.045, r=0.201).

5. CONCLUSIONS

Financial statements as the main products of the company's accounting information system are the main means of communication between companies and external persons. Based on the information contained in them, users make certain business decisions. In order for these decisions to be adequate, it is necessary that the information contained in the financial statements be true and objective. However, in practice, this often does not happen due to manipulative (fraudulent) actions. The financial statements show the business of the company that differs from the real thing. This can result in business decisions being made by their users, with negative consequences for non-fraudsters as well as the community as a whole. No country is immune to fraudulent financial reporting, and the risk of fraud can be increased by economic crises, pandemics (such as the COVID-19 pandemic), natural disasters and the like. As fraudulent financial reporting can cause great losses at the local and global level, it is necessary to pay special attention to preventing its occurrence, as well as its detection.

The Beneish M-score model, which uses five and eight factors, is one of the most widely used strategies for detecting fraud in financial statement. Because organisations in the hotel and tourism industries are particularly vulnerable to the COVID-19 epidemic, their risk of financial statement fraud may rise. As a result, the goal of this study is to assess the risk of fraud in the financial statements of 100 randomly selected hotel enterprises in the Republic of Serbia in the year leading up to the COVID-19 pandemic (2019) and in the year following the pandemic (2020).

Of the 100 hotel companies observed, Beneish's five-variable model identified an increased risk of fraud in 23 of them in 2019 and 35 in 2020. On the other hand,

the eight-variable model identified an increased risk of fraud in the financial statements of 39 companies in 2019 and 40 companies in 2020. When it comes to individual variables of these two models, in the largest number of companies in both observed years, an increased risk of fraud was noted when recognising the costs of sales, management and administration. Further, there was a high risk of fraud based on borrowing in 2019 and 2020, as well as a high risk based on revenue recognition and gross margin index in 2020. The research established that in the year of the COVID-19 pandemic, there was a statistically significant increase in the risk of fraud based on the gross margin index, sales growth and recognition of sales, administration and administration costs compared to the year before the pandemic. In other words, with the onset of the COVID-19 pandemic, there has been an increase in exposure to the risk of fraud in financial statements based on certain aspects. Therefore, it is necessary to improve the existing system of financial reporting in hotel companies in the Republic of Serbia during the pandemic, as well as to make greater efforts to control their quality. The research established that in 2020, micro companies are exposed to a higher risk of fraud based on the recognition of costs of sales, management and administration compared to medium-sized companies. In addition, it was determined that limited liability companies in 2019 are more exposed to the risk of fraud based on the recognition of sales revenue, accounting items and general risk of fraud in the financial statements (measured by the eight-variable model) compared to joint-stock companies. When it comes to 2020, it was determined that joint-stock companies are exposed to a higher risk of fraud based on gross margin and general risk of fraud in the financial statements (measured by the five-variable model) compared to limited liability companies. This indicates that, despite the fact that the financial statements of joint stock companies are subject to mandatory audit, there is a possibility to improve their quality. In other words, the auditor, due to the inherent limitations of the audit, cannot detect the existence of all fraudulent actions in the financial statements and thus affect the quality of the information contained in them.

The research offers several theoretical contributions to the existing literature in this field. According to the authors' knowledge, this is the first research conducted in the Republic of Serbia, which examines the existence of warning signs of financial fraud in the financial reports of hotel companies. The research also enables the perception of warning signs of financial fraud in hotel companies in the year before the outbreak of the COVID-19 pandemic, as well as in the year of its occurrence. In addition, the results of the research may be important for researchers of fraud in financial statements, government agencies, regulators of financial reporting, but also the compilers and users of financial statements.

There are several limitations. The key limitation of the conducted research is reflected in the lack of empirical evidence of how much the mentioned model is really used in practice. Therefore, in the following study, a research should be conducted in which fraud investigators would be examined, and in which the real application of this model, as well as other techniques, would be considered. One of the limitations is related to the Beneish M-score model itself, primarily to the fact that it was developed on the basis of reports prepared in accordance with GAAP and that it is necessary to make certain adjustments to determine the value of the model. This can significantly affect the value of the results obtained. Therefore, in future research, other techniques should be applied that indicate the existence of fraudulent actions in the financial statements. Because the current study only includes hotel companies in the Republic of Serbia, the next study should include hotel companies from other countries in the region.

Conflict of interests

The authors declare there is no conflict of interest.

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ПАНДЕМИЈА КОВИД 19 И ПРЕВАРНЕ РАДЊЕ У ФИНАНСИЈСКИМ ИЗВЈЕШТАЈИМА: СЛУЧАЈ ХОТЕЛИЈЕРСКИХ ПРЕДУЗЕЋА У РЕПУБЛИЦИ СРБИЈИ

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САЖЕТАК:

Квалитет информација презентованих у финансијским извјештајима предузећа може бити нарушен услијед преварних радњи. Један од често коришћених инструмената који указује на индиције да је у финансијским извјештајима извршена превара је Бениш М-скор модел. Сврха истраживања је да се испита изложеност хотелијерских предузећа у Републици Србији ризику од превара у финансијским извјештајима, као и да се утврди да ли је дошло до промјене тог ризика услијед настанка пандемије изазване ковидом 19. Истраживање је спроведено на узорку од 100 случајно одабраних хотелијерских предузећа, при чему су посматрани њихови финансијски извјештаји за 2019. и 2020. годину. Утврђен је висок ризик од превара по основу признавања трошкова продаје, управе и администрације и задуживања у обје посматране године, као и висок

ризик од превара по основу признавања прихода и индекса бруто марже у 2020. години. Примјеном Вилкоксоновог теста ранга, утврђено је да је у години настанка пандемије ковида 19 дошло до раста изложености ризику од превара у финансијским извјештајима по основу индекса бруто марже и признавања трошкова продаје, управе и администрације. Ман-Витни У тест је утврдио да су већем ризику од превара по основу признавања трошкова продаје, управе и администрације изложена микро предузећа у односу на средња. Такође, Ман-Витнијев У тест је утврдио да су друштва са ограниченом одговорношћу изложенија ризику по основу признавања прихода од продаје, обрачунске ставке и укупног ризика (мјереног моделом са осам варијабли) у односу на акционарска друштва. Са друге стране, акционарска друштва су изложенија ризику од превара по основу бруто марже и општем ризику од превара (мјереног моделом са пет варијабли) у односу на друштва са ограниченом одговорношћу.

Кључне ријечи: *ковид 19, преваре, финансијски извјештаји, хотелијеркса предузећа, Бениш М-скор модел.*

DOES TOURISM INFLUENCE FINANCIAL DEVELOPMENT IN KENYA?

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ABSTRACT

Objective: In this study, we investigate the impact of tourism on financial development in Kenya using time series data from 1995 to 2017. The study uses the autoregressive distributed lag (ARDL) bound testing approach to cointegration and error correction model to examine this connection. To increase the robustness of the results, the study uses two proxies of financial development, namely broad money (bank-based financial development proxy) and total value of stocks traded (market-based financial development proxy). Results show that tourism has an insignificant impact on financial development in Kenya – both in the short run and in the long run. The results are relevant regardless of whether the financial development is proxied by a bank-based financial development indicator or by a market-based financial development indicator. This finding points to the fact that, although tourism is one of the main sources of foreign exchange in Kenya, it has no direct impact on financial development. The findings from this study add value to policy makers in Kenya by revealing the insignificant impact that tourism has on financial development, although this is in contrast to other studies that found a positive contribution. Based on the findings, Kenya may not anchor its financial development policies on tourism.

1. INTRODUCTION

Kenya embarked on broad financial sector reforms after financial sector challenges experienced in the 1980s and early 1990s (United Nations Economic and Social Council, 1997). The challenges included non-compliance of financial institutions to the regulatory requirements of the 1989 Banking Act, the inability of the Central Bank of Kenya (CBK) to supervise banks effectively, and loss of control of money supply growth (United Nations Economic and Social Council, 1997). Numerous financial sector reforms have been implemented in Kenya to address both the legal and the regulatory challenges, as well as to reshape policies and build capacity in the Kenyan financial sector (United Nations Economic and Social Council, 1997).

Since the 1990s, Kenya has not looked back in using financial sector reforms as a vehicle for economic growth, access to financial services and financial sector prudence. This has led to Kenya signing the 2013 Monetary Union Protocol with a timeline of creating a regional currency by 2024 (Ndung'u, 2014a). The protocol comes with further financial sector reforms and streamlining of policies, regulations, and procedures as a process for the harmonization of all monetary policies in preparation for the introduction of the monetary union.

This development comes at a time when tourism inflows have improved worldwide (World Tourism Organization [UNWTO], 2020). According to UNWTO (2020), tourist arrivals grew by 4% in 2019 to reach 1.5 billion. Although tourism growth was depressed in 2019 compared to 2018, where 6% was recorded, a growth was registered (UNWTO, 2020). Africa, Europe, and the Middle East are among the regions that enjoyed an increase in tourist arrivals (UNWTO, 2020). The major question that this study seeks to answer is whether Kenya can harness tourism in its journey to develop a better and more efficient financial system, given the burgeoning of its tourist arrivals.

The growing importance of tourism as a source of economic growth has ignited the interest of researchers to investigate the relationship between tourism and economic growth empirically (see, among others, Nyasha, Odhiambo & Asongu, 2020). In general, these studies found that tourism is a significant source of economic growth. A question that remains is whether tourism can be a catalyst for financial development in Kenya, apart from being a major stimulant of economic growth.

Although a significant number of studies exist on the tourism–growth nexus, the same cannot be said for the tourism-finance nexus. Only a few studies have investigated the relationship between tourism and financial development, with those focusing on causality tilting the scale (Yenisehirlioglu & Bayat,

2019; Shahbaz et al., 2019; Shahbaz et al., 2017; Basarir & Cakir, 2015). This, therefore, leaves a gap in the impact of tourism on financial development, in general, and in Kenya, in particular (Cannonier & Burke, 2017). Thus, a very limited number of studies have investigated the impact of tourism on financial development in SSA countries, in general, and in Kenya, in particular – despite the role which tourism plays in the development of the financial sector. It is the gap that the current study aims to close with an empirical study of the impact of tourism on financial development in Kenya. This study comes at a time when many countries are striving to modernize their financial systems and to improve their efficiency and accessibility to integrate into the global economy.

The study uses the autoregressive distributed lag (ARDL) bound testing approach to cointegration and error correction model to examine this linkage. This method has numerous advantages, such as being robust in small samples and does not require all variables to be integrated of the same order (Pesaran et al., 2001). The approach also allows the analysis of the results in the long-run and short-run time frames. The findings from this study will provide policy makers in Kenya with an insight into the nexus between tourism and financial development. The rest of the study is organised as follows: section 1 outlines the literature review; section 2 discusses estimation techniques and empirical results. Section 3 concludes the study.

2. LITERATURE REVIEW

2.1. Tourism and financial development dynamics in Kenya

The Ministry of Tourism spearheads tourism development in Kenya with the support of other bodies and agencies such as Kenya Wildlife, Ministry of Transport, and Ministry of Trade and Industry (Ministry of Tourism and Wildlife, 2020). Under the Ministry of Finance, departments such as Tourism Support, Tourism and Security, and Tourism Policy and Strategy work closely with other bodies and agencies to support the tourism agenda (Ministry of Tourism and Wildlife, 2020). Apart from the Ministry of Tourism, the Tourism Regulatory Authority, a body established under Section 4 of the Tourism Act 28 of 2011, is mandated to regulate the tourism sector in Kenya (Tourism Regulatory Authority, 2020). The body also develops regulations, standards, and guides to ensure delivery of quality services (Tourism Regulatory Authority, 2020). Tourism is recognised as an industry that encompasses numerous ministries (World Bank, 2010). Apart from public bodies that rally around tourism in Kenya, there is the Kenya Tourist Board, which is responsible for destination marketing. Then there

is also the Kenya Tourist Development Corporation (KTDC) that owns several tourism facilities and leases them to the private sector, thus boosting private sector participation in the tourism sector.

The top five tourist source countries in 2019 and 2018 were the United States of America (USA) with 245 400 arrivals; Uganda with 223 000; Tanzania with 193 700 thousand, a fall from 204 000 in 2018; the United Kingdom with 181 500 thousand, a fall from 184 000 the previous year; and India with 122 600 arrivals recorded (Ministry of Tourism and Wildlife et al, 2019). Although the arrivals recorded a mixed success, overall, the receipts depicted a growth of 3.9% from 2018 to 2019 (Ministry of Tourism and Wildlife et al, 2019). This growth was driven by aggressive marketing using different platforms, a stable political environment, and improved security – a side from the Dusit D2 hotel terrorist attack that occurred in January 2019 and the global slowdown in economic activities (Ministry of Tourism and Wildlife et al, 2019). Kenyan tourism is anchored on safari, coastal, and business and conference travel (World Bank, 2010). Figure 1 shows the trend in tourism, as depicted by tourist arrivals and tourism receipts.

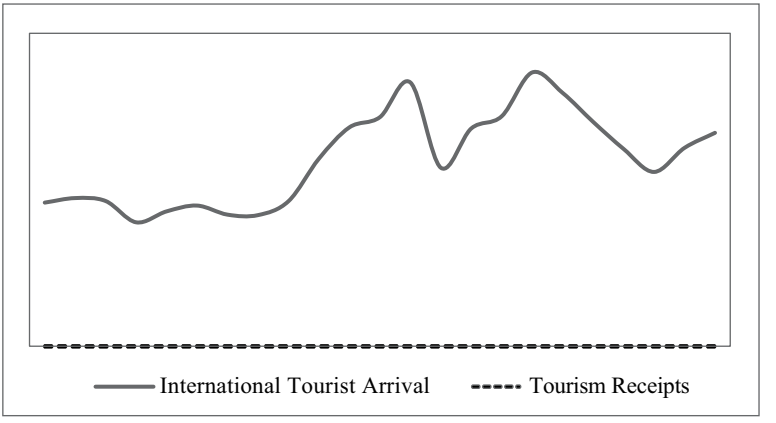

Figure 1: Trends in Tourism Receipts and Tourist Arrivals (1995-2017)
Source: World Bank, 2020

As shown in Figure 1, tourism receipts grew rapidly from 1995 to 1999 before heading into a sharp decline in 2000 (World Bank, 2020). The tourism receipts picked up gradually from 2001 to 2007 before declining again (World Bank, 2020). A gradual decline was recorded from 2012 to 2017 (World Bank, 2020). For the greater part of the period since then (i.e., from the year 2000), the tourist arrivals mimicked the trend in tourism receipts showing a seemingly positive relationship between the two (World Bank, 2020).

On the financial development front, Kenya implemented an overhaul through a combination of policy reforms and regulatory revamps of the financial sector that started in the late 1980s – in line with a drive to modernise, enhance competitiveness and capacitate the financial sector to support economic activities (United Nations Economic and Social Council, 1997). The financial sector reform initiatives included the amendment of the Banking Act of 1989 and 1991; the revision of Capital Markets Authority Act of 1994; the interest rate and the exchange rate policy reforms (United Nations Economic and Social Council, 1997). The governor of the central bank then identified smart and better regulations as contributing factors towards a successful financial development with a huge outreach to the Kenyan population (Ndung'u, 2014b).

These reforms have been strengthened by the need for a transformation of the Kenyan financial sector in preparation for the adoption of the East Africa Monetary Union. The country signed the 2013 Monetary Union Protocol with a timeline towards a single regional currency by 2024 (Ndung'u, 2014a). The protocol demands that Kenya streamlines its financial system, and adopts common principles, rules and regulations, and supervision by 2018 (Ndung'u, 2014a). To achieve these standards, East African Banks adopted the pronouncements of the international setting bodies such as the Financial Stability Board, Basel Committee on Banking and Supervision, and Financial Action Task Force (Ndung'u, 2014a). Some of the regulatory rules that Kenya is expected to harmonise include licensing requirements, prudential requirements on capital and liquidity, joining the East African Payment System to reduce transaction costs within the region, corporate governance, and public disclosures. Given the measures that Kenya is expected to implement in preparation for the Monetary Union, major steps towards creating a sound financial system are inevitable. Figure 2 shows the trend in the financial development of Kenya, as measured by broad money, domestic credit to the private sector provided by banks, domestic credit provided by the financial sector, and the total value of stocks traded.

As reflected in Figure 2, all four measures of financial development suffered a mild slump in 1996 and a rebound in 1997 but, in general, they exhibited a rather stable trend over the period under study (World Bank. 2020). Three bank-based financial development measures have shown the same trend, indicating a close association between the three proxies (World Bank, 2020). Domestic credit provided by the financial sector maintained the lowest share, when measured as a percentage of GDP, from 1995 to 2017 (World Bank, 2020). Broad money and domestic credit to the private sector by banks oscillated, maintaining a negligible margin over the years (World Bank, 2020).

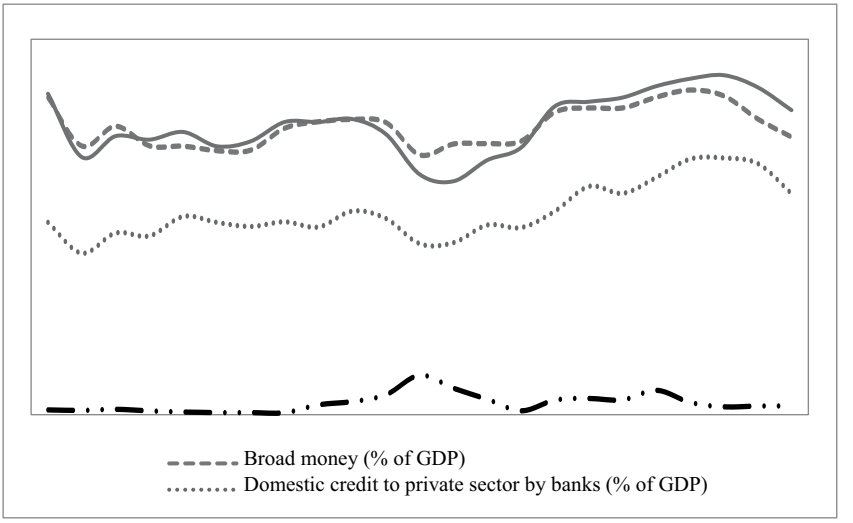

Figure 2: Trends in the Financial Sector Development Indicators.
Source: World Bank, 2020

From the market-based financial development side, the total value of stock traded as a percentage of GDP shows a gradual decline from 1995 to 2002, before an upsurge, reaching a peak of 5.2% in 2006 (World Bank, 2020). The total value of stock traded declined sharply from 2006 and stabilised in 2009 recording 0.53% (World Bank, 2020). From 2009, the total value of stock traded has averaged 1.9% (World Bank, 2020). Overall, the trend in the financial sector development measures recorded in Figure 2 shows a steady-state development in the Kenyan financial market, which could only be achieved by consistency in policies, regulations, and oversight.

2.2. A Review of Related Literature

A financial system plays an important role as a conduit through which financial resources are mobilised and lent to deficit units (Levine, 1997). This role is important in economic growth through the resource mobilisation for investment purposes. Financial systems can be classified into bank-based or market -based depending on which intermediaries play a key role in the economy (Demirguc-Kunt & Levine, 2001). A financial system where the financial intermediaries play an important role is called a bank-based financial system, while a financial system where financial market plays an important role is called a market-based financial system (Nyasha & Odhiambo, 2014; 2015; Demirguc-Kunt & Levine, 2001). The importance of financial development in economic growth cannot be

underestimated irrespective of the source of the financial sector development – market or bank-based. The growing importance of tourism in Kenya as one of the six key sources of economic transformation of the country into a middle-income country demands that the tourism-finance nexus in the country be put to empirical test.

According to Wang (2009), exchanges rates, travel costs and the economic conditions of the tourist source country determine the demand for tourism in the tourist destination country. Looking at the receiving country like Kenya, political, economic – including financial development and social factors – are among the factors that determine tourist demand (Song & Lin, 2012). When the focus is placed on economic activities that take place in the host country in support of successful tourism, the role of the financial sector becomes important in facilitating transactions and mobilising resources from savers to investors – in this case, in the tourism supporting sectors. The ease of carrying out transactions, of financial inclusion and of confidence in the financial system become important.

On the empirical front, it can be observed that the tourism-finance field is still emerging and thin; hence, relevant studies to review are limited. Given this limitation, the study also reviews empirical literature on the causality between tourism and financial development to gain insight into the relationship between these two variables of interest (Kumar & Kumar, 2013; Cannonier & Burke, 2017; Ridderstaat & Croes, 2015; Cannonier & Burke, 2017; Shahbaz et al., 2019). These studies found tourism to have a positive impact on financial development. Financial development was found to benefit from the increasing number of tourists.

Shahbaz et al. (2019) analysed the relationship between financial development and tourism development in Malaysia. The study used real domestic credit to private sector per capita as a measure for financial development and tourism receipts, arrivals and expenditure as measures of tourism. Using data between 1975 and 2016 and employing the Toda-Yamamoto Granger causality approach, they found tourism development to be positively related to financial development. Further investigation on the causality between tourism and financial development revealed a bidirectional causality. Thus, the two have a reinforcing relationship. In the same vein, Cannonier and Burke (2017) analysed the relationship between tourism and financial development in the Caribbean countries employing data from 1980 to 2013. Using annual panel data, financial development was measured by three proxies: financial depth, measured by broad money; efficiency of the financial sector, measured by bank credit to the public sector; stability, measured by bank credit to the private sector, while tourism was measured by tourism

expenditure per capita. The study found tourism expenditure to have a positive effect on financial development.

In a separate study, Yenisehirlioglu and Bayat (2019) investigated the causal relationship between tourism and financial development in the MENA. Employing data from the period between 1995 and 2016, they found a unidirectional causal flow from tourism to financial development in Sudan and Morocco. Katircioglu et al., (2017) investigated the association between tourism and financial development in Turkey. Tourism expansion was found to influence financial development. Change in tourism was found to precede changes in financial development. Basarir and Cakir (2015) found bidirectional causality between financial development and tourism in a study on Greece, Italy, Turkey, France, and Spain using data from 1995 to 2010. Although the reviewed literature was limited, what came out strongly was the presence of a significant relationship between tourism development and financial development – supporting the notion that tourism is good for financial development.

3. MATERIALS AND METHODS

3.1. Estimation Techniques

This study employs the Autoregressive Distributed Lag (ARDL) bounds testing approach to investigate the impact of tourism on financial development in Kenya. The selection of a parsimonious model was based on Schwarz Bayesian Criteria (SBC). The ARDL has been selected for this study for a number of reasons. Firstly, the approach gives robust estimates in small samples. Secondly, unlike residual-based cointegration methods such as Engle and Granger (1987) and other approaches that use a system of equations, the ARDL approach uses a reduced form single equation. Lastly, the approach does not require all variables in the model to be integrated of the same order before proceeding with the analysis. The variables can be a combination of variables with an integration order of zero [I(0)] or integration order of one [I(1)] (Pesaran et al., 2001). However, the approach falls away if variables are integrated of a higher order than [I(1)] (Pesaran et al., 2001).

Unit root tests and cointegration tests are performed on the variables in Model 1 – where broad money is used as a proxy for financial development and other explanatory variables remain the same. Model 2 is where the total value of stocks traded as a percentage of GDP is used as a proxy for financial development as a dependent variable. A test for unit root is performed to confirm whether all the variables are stationary before proceeding to cointegration. While a test for unit

root ensures that the regression is not spurious, a test for cointegration establishes whether there is a long-run relationship among the variables in the two models. Results from the cointegration determine the next step in the analysis of the data. If a long-run relationship is found to exist, then an error correction model is estimated.

3.2. Definition of variables

The variables of interest in this study from Model 1 and Model 2 are tourism (TR), measured by tourist receipts as a percentage of gross domestic product (GDP), and financial development (FD) with two proxies – broad money (BM) and the total value of stocks traded as a percentage of GDP (STV). Tourism is expected to have a positive effect on financial development irrespective of the financial development proxy used. Financial development is proxied by broad money, which is a bank-based measure of financial development. Unlike other studies that focused only on bank-based measures, this study also included a market-based financial development indicator – total value of stocks traded as a percentage of GDP.

Other variables included in Model 1 and Model 2 to fully specify the model are GDP, trade openness (TOP) and real effective exchange rate (RER). The real gross domestic product is expected to have a positive impact on financial development. The higher the gross domestic product, the more the demand exists for a developed financial system. Trade openness is expected to have a positive impact on financial development. The more a country is open to trade with other countries, the more likely the host country will be to adopt better and more advanced financial systems. This is done partly to facilitate trade and also to attract more trade opportunities. The real effective exchange rate is expected to have a positive effect on financial development. A higher real effective exchange rate implies increased trade activities between the host country and other countries. This consequently gives an incentive to the host country to develop its financial system to facilitate trade with its partners.

3.3. Model Specification

Following Connonier and Burke (2017) with a modification of variables included in the model, a generic model specification is given in Equation 1 as:

$$FD_t = \alpha_0 + \alpha_1 TR + \alpha_2 GDP + \alpha_3 RER + \alpha_4 TOP + \alpha_5 CPI + \varepsilon_t \qquad (1)$$

Where FD is financial development – proxied by broad money and total value of stocks traded as a percentage of GDP. Each of the two financial development proxies enters the equation one at a time, but the control variables remain the same. TR is tourism receipts as a percentage of GDP, GDP represents real gross domestic product, RER is real effective exchange rate, CPI is inflation, captured by the consumer price index, and TOP is trade openness, expressed as a percentage of GDP.

Equation 2 gives the ARDL-bounds specification

ARDL model Specification for Equation 1 (FD, TR, GDP, RER, TOP, CPI)

$$\begin{aligned}\Delta FD_t = {} & \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta FD_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta TR_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta GDP_{t-i} + \sum_{i=0}^{n} \alpha_{4i} \Delta RER_{t-i} \\ & + \sum_{i=0}^{n} \alpha_{5i} \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta CPI_{t-i} + \alpha_7 FD_{t-1} + \alpha_8 TR_{t-1} + \alpha_9 GDP_{t-1} \\ & + \alpha_{10} RER_{t-1} + \alpha_{11} TOP_{t-1} + \alpha_{12} CPI_{t-1} + \mu_{1t} \end{aligned} \quad (2)$$

Where α_0 is a constant, α_{i1}–α_{6i} and α_7–α_{12} are regression coefficients for short run and long run variables, respectively, and μ_{1t} is an error term. All the other variables remain the same as defined in Equation 1.

3.4. Model Specification

A test for cointegration is performed to establish whether there is a long-run relationship among the variables in each model. If cointegration is confirmed then the estimation of the model is done in two steps. The first step involves estimating the long-run equations and obtaining the residuals which are incorporated into the short run equations. Thus, an estimation of the error correction model is done. The error correction term included in the short-run model shows the speed of adjustment to the equilibrium when there is a disequilibrium in the economy. The general ECM specification for Model 1 and Model 2 is given in Equation 3 as:

$$\begin{aligned}\Delta FD_t = {} & \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta FD_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta TR_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta GDP_{t-i} + \sum_{i=0}^{n} \alpha_{4i} \Delta RER_{t-i} \\ & + \sum_{i=0}^{n} \alpha_{5i} \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta CPI_{t-i} + \theta_1 ECM_{t-1} + \mu_{1t} \end{aligned} \quad (3)$$

where ECM is the error correction term; θ_1 is the coefficient of the ECM and all the other variables and characters are as described in Equations 1 and 2.

3.5. Data Sources

In this study, annual time series data from 1995 to 2017 is used to investigate the impact of tourism on financial development in Kenya. The data for broad money (BM), total value of stocks traded as a percentage of GDP (STV), trade openness (TOP), real gross domestic product (GDP) and inflation (CPI) were extracted from World Bank Development Indicators. Real effective exchange rate was extracted from United Nations Conference on Trade and Development (UNCTAD. Analysis of the data was done using Microfit 5.0.

4. RESULTS

Unit Root Test

Stationarity tests were done on all variables in Model 1 and Model 2 to ascertain the order of integration. Dickey-Fuller Generalised Least Squares (DF-GLS) and Phillip-Perron (PP) unit root tests were used in this study. The results of the tests are presented in Table 1.

Table 1: Unit Root Test Results

Dickey-Fuller Generalised Least Square (DF-GLS)					Phillip and Perron (PP) Root Test			
Variable	Stationarity of all Variables in Levels		Stationarity of all variables in First Difference		Stationarity of all Variables in Levels		Stationarity of all variables in First Difference	
	Without Trend	With Trend	Without Trend	With Trend	Without Trend	With Trend	Without Trend	With Trend
BM	-2.2259**	-2.9105*	-	-	-2.6439*	-3.4086*	-	-
STV	-2.0752**	-2.1970	-	-4.5121**	-2.0993	-2.0428	-4.3603***	-4.3030**
CPI	-0.5563	-1.6928	-2.5651**	-4.7142***	3.7106**	-1.0978	-	-4.4738***
TR	-14458	-2.5449	-4.2284***	-4.3029***	-1.4034	-2.4778	-4.2114***	-4.0730**
GDP	-0.2326	-1.1974	-1.9108*	-4.5086***	-8.5627***	-1.6834	-	-9.5830***
TOP	-1.1845	-2.0135	-3.3138***	-3.7999***	-2.0386	-2.7367	-4.1350***	-4.9929***
RER	0.3933	-1.8557	-4.6866***	-5.2844***	0.9223	-1.7965	-4.6909***	-6.3672***

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively

Source: Authors' survey

Table 1 shows the unit root test for the variables in Model 1 and Model 2 - broad money (BM), total value of stocks traded (STV), inflation (CPI), tourism receipts (TR), real gross domestic product (GDP), trade openness (TOP) and real

effective exchange rate (RER) are stationary in levels or in first difference. This also confirms the use of ARDL for further analysis on the relationship between tourism and financial development. The next step in the analysis is to test for a long- run relationship in Model 1 and Model 2. The results of the cointegration test performed are presented in Table 2.

Table 2: ARDL Bound Test to Cointegration Results

Dependent Variable	Function		F-Statistic		Cointegration Status	
BM	F (BM|TR, GDP, TOP, RER, CPI)		6.0795***		Cointegrated	
STV	F (STV|TR, GDP, TOP, RER, CPI)		3.3212*		Cointegrated	
Asymptotic Critical Values (unrestricted intercept and no trend)						
	1%		5%		10%	
Critical Values	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
	3.29	4.37	2.56	3.49	2.20	3.09

Note: *, ** and *** denote stationarity at 10%, 5% and 1 % significance levels, respectively.
Source: Authors' survey

Cointegration results presented in Table 2 for Model 1 and Model 2 confirm cointegration in both models. According to Pesaran et al. (2001) cointegration is confirmed if the calculated F-statistics is above the upper bound at 1%, 5% or 10% level of significance. If the calculated F-statistic is below the lower bound, no cointegration is confirmed. However, if the F-statistic falls in between the upper and the lower bounds, the results are inconclusive.

The results presented in Table 2 show that Model 1 – where broad money is a proxy for financial development – is cointegrated at 1% level of significance. Model 2 – where total value of stocks traded as a percentage of GDP (STV) is used as a proxy – also confirms cointegration, at 10% level of significance. The presence of cointegration implies a long-run relation in the two models.

To proceed with analysis, the first step is to estimate the long-run model and capture the error terms. The second step is the estimation of the error correction model where short-run estimates, together with the error term from the long-run model estimation, are regressed. The error term captures long-run relationship in the error correction model. The SBC was used for optimal lag length selection as it gave parsimonious results. For Model 1, ARDL (1,2,1,0,2,2) was chosen while ARDL (1,0,2,0,0,2) was selected for Model 2. The long-run and short-run results for Model 1 and Model 2 are presented in Table 3 and Table 4, respectively.

Table 3: Long-run Results -Model 1 and Model 2

Variables	Model 1 (dependent variable BM) ARDL (1,2,1,0,2,2)		Model 2 (dependent variable STV) ARDL (1,0,2,0,0,2)	
Regressors	Coefficient	T-ratio	Coefficient	T-ratio
C	26.6909*	2.3576	-29.9932***	-4.1248
TR	-0.1146	-1.3210	0.0043	0.0667
TOP	0.4414***	4.6948	0.2567***	3.3733
GDP	0.7946*	2.0240	0.9697***	3.5051
RER	0.0242	-0.6954	-0.0212	-0.9930
CPI	-0.2568**	2.5009	-0.1895***	-2.9776

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels, respectively.

Source: Authors' survey

The short-run results for Model 1 and Model 2 are presented in Table 4.

Table 4: Short- run Results for Model 1 and Model 2

Variables	Model1 (dependent variable BM) ARDL (1,2,1,0,2,2)		Model 2 (dependent variable STV) ARDL (1,0,2,0,0,2)	
Regressors	Coefficient	T-ratio	Coefficient	T-ratio
dTR	0.0740	0.8626	0.0041	0.0663
dTR(-1)	0.0926	0.8596	-	-
dTOP	0.2868**	2.8990	0.3700*	2.0805
dTOP(-1)	-	-	-0.0109	-0.1297
dGDP	0.7857**	2.2904	0.9292**	2.5974
dRER	0.0058	-0.2484	-0.0203	-1.1065
dRER(-1)	-0.0310	-1.1859	-	-
dCPI	-0.2078**	-2.3387	-0.1420**	-2.6040
dCPI(-1)	-0.3291**	-2.5971	0.0687	0.7030
ECM(-1)	-0.9888***	-4.8241	-0.9583**	-2.6802
R-squared	0.9092		0.8461	
R-bar squared	0.7406		0.7923	
S.E of Regression	1.0078		0.9084	
Mean of Dependent variable	0.0561		0.0280	
AIC	-32.4263		-30.9907	
F-stat	7.7889 (0.001)		3.2824 (0.002)	
SBC	-39.7379		-36.7356	
DW-statistic	2.4328		2.2946	
S.D of dependent variable	1.9788		1.0798	

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels, respectively

Source: Authors' survey

The results presented in Table 3 (long-run results) and Table 4 (short-run results) for Model 1 and Model 2 confirm that tourism does not have an impact on financial development. These results apply irrespective of whether the analysis was done in the long run or in the short run. These results were not expected as the Kenyan government has made tourism one of the six pillars for economic growth. The possible reason for the lack of significant impact of tourism on financial development could be the fact that tourism does not have a direct impact on financial development, but the effect could be seen through other variables such as economic growth. It could also be that although tourism is regarded as important to the Kenyan economy, a significant part of it lies in the informal sector of the economy and remains unrecorded; hence, its impact on the financial sector may be distorted. The results suggest that Kenya may need to be cautious when formulating policies targeting tourism and financial development.

Other results presented in Table 3 and Table 4, for both Model 1 and Model 2, further reveal that in Kenya, trade openness and economic growth have a positive impact on financial development, while inflation was found to have a negative impact on financial development, irrespective of the financial development measure used or the timeframe considered. Furthermore, real effective exchange rate was found to have an insignificant impact on financial development. As with the other results, this outcome was also financial development measure- and time-invariant. Thus, these results were found to apply regardless of whether bank-based or market-based financial development was used as a proxy, and irrespective of whether the regression was conducted in the long run or in the short run.

The positive relationship revealed between trade openness and financial development could be explained by Kenya's need to further develop financial markets to smoothen financial transactions between itself and its trading partners. On the same note, the positive impact of GDP on the financial development in Kenya is consistent with theory, where money growth is always in line with economic growth level, thus making financial development possible.

The explanatory power of Model 1 is 91%, while that of Model 2 was found to be 85%, implying that both models have high explanatory power and that they were correctly specified. The coefficient of the error correction term [ECM (-1)] in both models was also found to be negative and statistically significant, as was expected. According to the findings of this study, it takes slightly more than a year for Kenya to return to equilibrium when there is a shock in the economy, as evidenced by the error correction term of 99% and 96% for Model 1 and Model 2, respectively.

Table 5 reports the diagnostic results for Model 1 and Model 2.

Table 5: Diagnostic Test - Model 1 and Model 2

Diagnostic Test	Model 1	Model 2
Serial Correlation (CHSQ 1)	1.519 [1.161]	1.781[0.182]
Functional Form (CHSQ 1)	0.439 [0.518]	0.281[0.687]
Normality (CHSQ 2)	0.923[0.630]	2.143[0.342]
Heteroscedasticity (CHSQ 1)	0.431[0.512]	1.127[0.165]

Source: Authors' survey

As revealed by model diagnostic results reported in Table 5, the two models passed serial correlation, functionality, normality and heteroscedasticity tests. The plots of the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMQ) for both models confirm the stability of the models at 5% level of significance. The plots of CUSUM and CUSUMQ for both models are reported in Figure 3.

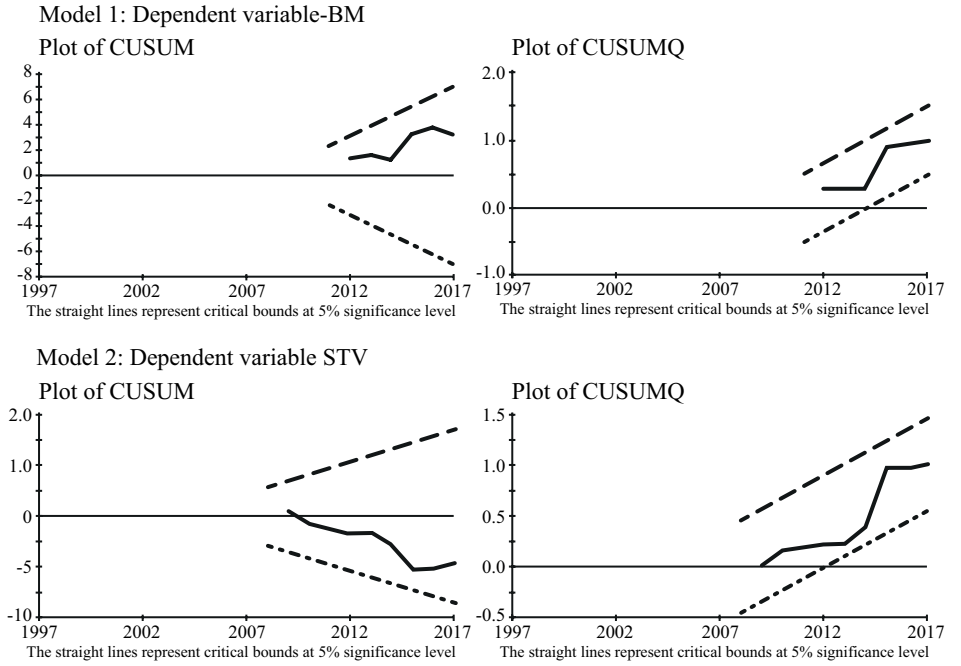

Figure 3: Plot of CUSUM and CUSUMSQ for Model 1 and Model 2

Note: Straight lines represent critical bounds at 5% level of significance

Source: Authors' survey

5. DISCUSSIONS AND CONCLUSIONS

In this study, the impact of tourism on financial development was investigated using annual time series data from 1995 to 2017. The study used two proxies for financial development, one being a bank-based financial development measure (broad money), and the other being a market-based financial development measure (total value of stock trade). To fully specify the model, real GDP, trade openness, real effective exchange rate and inflation were included as control variables. The study was motivated by the growing importance of tourism in Kenya, on the one hand, and the country's goal to further modernise and develop its financial system, on the other hand. In general, the study aimed to investigate whether Kenya can benefit from tourism in its financial development strategies. Using the autoregressive distributed lag (ARDL) bounds testing approach to cointegration and error correction model, the study found that tourism has no impact on financial development regardless of the time considered – long run or short run. The results also apply irrespective of whether the financial development is proxied by a bank-based financial development proxy (i.e., broad money) or market-based financial development proxy (i.e., stock market development). The results shed some light on the fact that although tourism has been selected as one of the six pillars to spearhead the transition of Kenya to an upper middle-income country, its impact on financial development is still minimal given the size and the depth of the Kenya's financial sector.

Conflict of interests

The authors declare there is no conflict of interest.

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ДА ЛИ ТУРИЗАМ УТИЧЕ НА ФИНАНСИЈСКИ РАЗВОЈ У КЕНИЈИ?

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САЖЕТАК

У овој студији истражујемо утицај туризма на финансијски развој у Кенији користећи податке временске серије од 1995. до 2017. године. Студија користи приступ тестирања са ауторегресивно-дистрибуираним кашњењем (АРДЛ) за коинтеграцију и модел корекције грешака да би испитала ову везу. Како би повећала поузданост резултата, студија користи два проксија финансијског развоја, односно новчану масу у ширем смислу (прокси финансијског развоја заснован на банкама) и укупну вриједност акција којима се тргује (прокси за финансијски развој заснован на тржишту). Резултати показују да туризам има безначајан утицај на финансијски развој у Кенији како краткорочно, тако и дугорочно. Резултати су релевантни без обзира на то да ли је финансијски развој представљен индикатором финансијског развоја заснованом на банкама или индикатором финансијског развоја заснованом на тржишту. Овај налаз указује на чињеницу да, иако је туризам један од главних извора спољне размјене у Кенији, он нема директан утицај на финансијски развој. Налази студије додају вриједност креаторима политике у Кенији откривајући безначајан утицај који туризам има на финансијски развој, иако је то у супротности са другим истраживањима која су пронашла позитиван допринос. На основу налаза, Кенија можда неће своју политику финансијског развоја усмјерити на туризам.

Кључне ријечи: *финансијски развој, финансијски развој заснован на тржишту, финансијски развој заснован на банкама, туризам, Кенија, АРДЛ приступ.*

INTERDEPENDENCE OF CONTROL ACTIVITIES AND MONITORING AS COMPONENTS OF THE INTERNAL CONTROL SYSTEM OF MANUFACTURING COMPANIES IN THE REPUBLIC OF SERBIA

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ABSTRACT

The subject of research in this paper is control activities and monitoring as components of the internal control system in manufacturing companies in the Republic of Serbia. The aim of this paper is to determine not only interdependence of control activities and monitoring, but also the interdependence of these components of the internal control system with indicators of ROA and ROE of a company. An additional goal of this paper is to examine the existence of differences in the assessment of the importance of control activities and monitoring applicable in manufacturing companies of different sizes. The research included a sample of manufacturing companies operating in the Republic of Serbia. The analysis was performed in the SPSS statistical program, where a correlation analysis was performed using the Pearson Coefficient, as well as the Kruskal-Wallis H test and the Mann-Whitney U test. The obtained results showed the existence of a strong positive link between control activities and monitoring, as well as weak links between control activities and monitoring, on one hand, and ROA and ROE indicators of the company, on the other hand. In addition, the results confirmed that there is no difference in the importance of the application of internal control systems, i.e. control activities and monitoring, in manufacturing companies of different sizes.

1. INTRODUCTION

The rapidly changing business environment puts enormous pressure on company executives to establish effective internal control systems in order to meet defined goals, i.e., adequate internal control systems will significantly affect the achievement of goals (Oppong et al., 2016, p. 110). Regardless of the quality of the designed internal controls, they cannot provide an absolute guarantee, but only a reasonable assurance regarding the achievement of the company's goals (Jovković & Dimitrijević, 2020, 165). The established system of internal control does not guarantee its success, and their consistent application by all employees in the organization is necessary. In order to enable the smooth implementation of planned activities and the achievement of the goals of the established internal control system, it is necessary to adequately establish the components that make up this system. First, it is necessary to create the basis and conditions in which the internal control system will be supported by employees, then identify risks that may hinder the achievement of company goals and accordingly set adequate procedures in order to ensure the achievement of goals. Also, it is necessary to enable uninterrupted flow of information and provide verification and evaluation of everything that has been implemented. The solutions that one company has do not have to be adequate for others, i.e. in accordance with their needs, business characteristics and environmental conditions, each company should design an appropriate system of internal control, define policies and procedures and provide conditions for their implementation. Today, internal control system is one of the most important instruments for ensuring security for all participants in the business arena, which contributes to the achievement of business goals and more reliable financial reporting (Aksoy & Mohammed, 2020, p. 205).

An efficient system of internal control enables the smooth performance of activities in the company and the achievement of set goals. Inadequately established components of the internal control system can jeopardize the results that the company will achieve. Neither the absence of relevant control activities, nor the existence of checks that will affect the elimination of existing deficiencies and prevent future irregularities can lead to losses and jeopardize the survival of the company in economic life. Manufacturing companies, taking into account their course of activity, from procurement, through production, to sales, need to establish a large number of policies and procedures that will accompany this process. In order to confirm the success of the established procedures, there is a need for monitoring. The market of the Republic of Serbia is developing, in connection with which the question of the importance of establishing an internal control system in companies in this market has been raised. In fact, the question is how in such conditions the application of the internal control system affects

the financial results of the company. The conclusion of a study conducted in Nigeria is that there is an impact of the internal control system on the financial results of small businesses (Olamide & Anastasia, 2018).

The subject of research in this paper is the system of internal control, i.e. control activities and monitoring, as components of the system of internal control in manufacturing companies in the Republic of Serbia. The internal control system is of great importance for the smooth implementation of company's business activities and the achievement of defined goals. The aim of the research is to present not only interdependence of control activities and monitoring, but also the interdependence of these components of the internal control system with the achieved financial performance indicators of manufacturing companies (ROA and ROE). Companies strive to achieve the best possible business results, which can be measured by the abovementioned financial indicators. These business indicators are used to assess the profitability of the company (Mitrović et al., 2021). As the internal control system helps to achieve the defined goals of the company, the goal is to determine the connection of its components with the previously mentioned financial indicators. An additional goal of the research is to determine the existence of differences in assessing the importance of applied control activities and monitoring in manufacturing companies of different sizes, i.e., to find out whether there are statistically significant differences in assessing the importance of research components of internal control systems in large, medium, small and micro companies.

2. LITERATURE REVIEW

Internal control is a very important part of the overall control mechanism of the company (Kewo, 2017, p. 294) and it consists of activities, processes, policies and control points that the company has designed and implemented. In order for internal controls to function smoothly and achieve defined goals, the full presence and coherence of the five components of this system is required (Vu et al., 2020, p. 1087). The Committee of Sponsoring Organizations of the Treadway Commission (COSO) describes how companies can design their internal control to best suit their specific characteristics and to influence the achievement of their set goals (Vu & Nga, 2021, p. 2). Management is responsible for establishing the internal control system, while all employees within the company are responsible for its implementation. Implementing internal control system will help companies reduce costs and improve performance (Tuan, 2020, p. 781), while establishing an effective internal control system helps companies gain a competitive advantage over others (Mamand & Alagoz, 2021, p. 265). Hence it

can be said that internal controls are of great importance for the very survival, but also for the development of the company (Li, 2020, p. 1). In addition, an efficient system of internal control in a company reduces the likelihood of criminal acts (Kulina, 2011, p. 153). The internal control system consists of five basic components, namely, control environment, risk assessment, control activities, information and communication, and monitoring (Jovković, 2021, p. 190). Control activities can be defined as necessary measures to identify risks, and policies and procedures that help achieve the defined goals of the company (Takahiro & Jia, 2012, p. 66). Control activities have been established to ensure that management directives are effectively implemented (Geiger et al. 2004, p. 28). In fact, control activities are the actions established through policies and procedures that help ensure that management's directives to mitigate risks to the achievement of objectives are carried out (COSO, 2013, p. 4). Monitoring, as the last component of the internal control system, involves assessing the effectiveness of the internal control system and making recommendations in order to improve its functioning (Kalmetova & Zhussupova, 2021, p. 98), and through assessing the design and functioning of controls, they confirm whether internal controls function as planned and whether they are tailored to changed business conditions (Ljubisavljević & Jovković, 2016, p. 136). Monitoring activities enable the efficient functioning of defined control activities (Rae et al., 2017, p. 38). Ongoing evaluations, separate evaluations, or a combination of the two are used to ascertain whether each of the five components of internal control is present and functioning (COSO, 2013, p. 5). Policies and procedures of internal control are a powerful instrument, and they were established to ensure the security of the defined goals. In fact, internal control is an indispensable form of supervision because it allows daily monitoring of all activities in the company, thus providing the opportunity to quickly eliminate all identified irregularities and avoid harmful consequences (Jovković, 2019, p. 140).

One of the previously conducted research (Pall, 2021) shows, among other things, the relationship between control activities and monitoring, i.e., the relationship between these components of the internal control system and ROA business indicators. This research refers to banks, and the obtained results show that there is a positive relationship between control activities and monitoring, i.e., relationship between these components of the internal control system and the return on total assets. A positive strong link between control activities and monitoring was also shown in a case study of an Egyptian company (Elshawarby, 2017, 56). On the other hand, there is a moderately positive, statistically significant relationship between the two components of the internal control system in the example of Vietnamese companies (Vu et al. 2020, 1093). A strong positive link between

monitoring and control activities was also shown in a study conducted in Finland (Agbejule & Jokipii, 2009, 509).

Wu & Nga (2021) conclude in their research, conducted on the case of small and medium-sized manufacturing companies in Vietnam, that there is a positive link between the system of internal control and profitability. After reviewing several studies, the authors Rapani & Malim (2020, p. 963) conclude that internal control as a system is significantly related to the achieved financial performance. Koutoupis & Malisiovas (2021) show a statistically significant positive relationship between control activities and profitability and a statistically significant negative relationship between monitoring and profitability of banks. Ndiaye et al. (2019) presented the existence of a link and the impact of the internal control system as a whole on profitability measured by ROA and ROE indicators. These authors observed the relationship between the internal control system, taking into account its components, and the profitability of the company.

Magu & Kibati (2016) monitored the impact of the internal control system on financial performance, observed through the variables control environment and control activities. This research revealed that there is a positive relationship between the internal control system and the financial performance of the company.

Muraleetharan (2011) came up with results showing that internal control has a significant impact on the financial performance of the company, and in terms of control activities and monitoring, it was concluded that they have positive effects on financial performance. Also, this research showed that internal control and achieved financial performance are positively related. The authors Kalmetova & Zhussupova (2021) examined the connection between the internal control system and the achieved performance on the example of US banks. The research also shows the correlation between ROA and ROE indicators of a company with the components of the internal control system. The link between the company's ROA and ROE indicators with control activities and monitoring is weak.

Based on the observed problem area, and in accordance with the defined subject and goal of the research, the baseline hypotheses and hypotheses tested in the paper are the following:

H1: There is a statistically significant positive relation between the assessment of applied control activities and monitoring, as a component of the internal control system.

H2: There is a weak link between the evaluation of applied control activities and monitoring, on one hand, and the ROA and ROE indicators of a company, on the other hand.

H3: There are no significant differences in the assessment of applied control activities and monitoring in manufacturing companies of different sizes.

3. MATERIALS AND METHODS

In order to determine the degree of significance of control activities and monitoring, as components of the internal control system, empirical research was conducted in manufacturing companies in the Republic of Serbia using the survey method. The research included 38 manufacturing companies from the Republic of Serbia. The questionnaire was sent to the e-mail addresses of 150 different manufacturing companies in the Republic of Serbia (response rate is 25.33%). The units in the sample were selected by the random sampling method. The sample units selected in this way are the basis for obtaining relevant research results. In addition, Pallant (2009, p. 225) states that in a situation where the sample has more than 30 cases, the SPSS also calculates the correction due to the interrelationships between the data. Based on the stated statement, it is considered adequate to use the previously mentioned sample. The questionnaire used to collect primary data contains 37 statements (questions) divided into three groups. The first group of questions refers to attitudes about the internal control system as a whole and the importance of this system for companies. The second group of questions refers to control activities as one of the components of the internal control system, and the third group of questions is related to monitoring, as the fifth component of the internal control system. Respondents stated the degree of their agreement with the statements in the questionnaire using the Likert five-point scale, where a score of 1 represents "absolutely disagree" and a score of 5 indicates "strongly agree". The survey was conducted in August and September 2021.

For the purposes of the research, publicly available secondary data from the financial statements of manufacturing companies included in the research were used, from the Balance Sheet and Income Statement for 2020. These official financial reports were downloaded from the website of the Business Registers Agency.

Systemic thinking was applied in the research. In accordance with the problems in the field subject to research, both quantitative and qualitative methodology was used. Based on the theoretical foundations of the research field, conclusions

were drawn about the importance of internal control systems in companies. Quantitative analysis was supplemented by the method of descriptive statistics. In order to determine the connection between the examined positions, namely control activities and monitoring, as components of the internal control system and ROA and ROE of the company, as financial indicators of the company's operations, a correlation analysis was performed. Using the Pearson correlation coefficient, the degree of linear dependence between the observed variables is shown.

The observed sample is divided into four groups, the first group consists of large companies, the second group consists of medium ones, the third group consists of small and the fourth group consists of micro manufacturing companies. The sample includes nineteen large manufacturing companies, nine medium-sized companies, four small manufacturing companies and six micro-sized companies. According to their size, companies can be divided into micro, small, medium and large according to the criteria defined by law (The Accounting Law, Article 6). These criteria refer to the average number of employees, operating income in the business year and the value of total assets. Data on the size of companies in the sample, on the basis of which they are classified into one of these four categories, are downloaded from the website of the Serbian Business Registers Agency (n.d.), for 2020. The purpose of this division is to determine possible differences in the assessment of the importance of the internal control system, i.e. control activities and monitoring in the manufacturing companies of the Republic of Serbia, which differ in size. In order to verify if there is a statistically significant difference between the observed groups, defined variables were assessed using the Kruskal-Wallis H test. As this test only shows whether there are statistically significant differences between the observed groups, but it does not show between which groups, Mann-Whitney U tests were used to supplement the knowledge.

Relevant methods of induction and deductions were also applied. Starting from individual companies, and based on the answers of respondents from the sample of manufacturing companies from the Republic of Serbia, a conclusion relating to the entire sector was made, while on the other hand we started from generally accepted theoretical basis to achieve individual characteristics.

Collected data from the questionnaire, as well as publicly available financial statements were prepared for analysis in Microsoft Excel. The data sorted in this way were imported into the SPSS statistical program, version 26, where further analysis was conducted.

4. RESULTS AND DISCUSSIONS

The results of the conducted analysis are presented according to descriptive statistical analysis, where in Table 1, Table 2 and Table 3 arithmetic means and standard deviations were presented for each of the statements (questions) contained in the questionnaire. Table 4 shows descriptive statistics for ROA and ROE indicators. The degree of linear dependence of the examined variables is shown in Table 5, as well as Kruskal-Wallis H test results in Table 6, which compares the variables of control activity, monitoring and internal control system according to different sizes of production companies.

Table 1: Descriptive Statistics – internal control system

Questions in the questionnaire	$\bar{X}$	Standard deviation
Internal control is extremely important for the company.	4.74	0.554
Internal control contributes to more reliable financial statements.	4.63	0.675
Internal control makes it easier to comply with regulations.	4.53	0.603
Internal control helps improve a company's business reputation.	4.32	0.933
Internal control influences better decision-making.	4.61	0.638
Internal control prevents errors.	4.21	0.963
Internal control detects errors.	4.55	0.555
The costs of conducting internal control are lower than benefits.	4.11	1.290

Source: Authors' calculation

Analyzing the sample, regarding the first group of questions from the questionnaire, based on the answers received from the respondents, it can be concluded that employees in manufacturing companies understand the importance of internal control. The most favorable attitude is present in the claim that internal control is extremely important for the company. The highest level of agreement in manufacturing companies, measured by the amount of standard deviation, is related to the above statement, while the lowest level of agreement is present in the statement that the costs of internal control are lower than the benefits it brings.

Establishing internal controls entails costs, which should be lower than the benefits that these controls will bring. Certainly, when considering costs and benefits, companies should consider the possible costs that would arise if internal controls were not implemented.

Table 2: Descriptive Statistics – control activities

Questions in the questionnaire	$\bar{X}$	Standard deviation
There is an adequate division of duties in the company.	4.18	0.834
The division of the duty between keeping assets/property and records of assets/property has been applied.	3.92	1.050
There is a division of the authority to authorize transactions from custody of assets.	4.16	1.053
There is a distinction between business responsibility and record keeping responsibility.	4.03	1.000
There is a distinction between the duties of IT and user staff.	4.21	0.935
Appropriate approvals of transactions and activities are present.	4.61	0.755
The transaction must not be performed unless it has been previously approved.	4.63	0.751
For routine transactions (often repeated) there are established procedures that are followed.	4.74	0.503
Approval is required for non-routine activities each time.	4.50	0.688
There is adequate physical protection of assets and records.	4.13	1.143
Protection from physical access to property is provided by the use of security locks, alarm systems, etc.	4.16	1.027
Protection against access to accounting records is provided by using passwords.	4.71	0.768
The control of documents enabling the use of property is performed.	4.53	0.647
Documents and records are appropriate.	4.66	0.481
The documents are adequately numbered.	4.74	0.503
Documents are compiled in a timely manner.	4.39	0.755
Documents are designed to be easily understood.	4.37	0.786
Transactions are recorded in a timely manner.	4.63	0.714
An independent assessment of business performance is conducted.	4.13	0.991
The assessor is independent and objective.	4.00	1.115
Business performance is adequately assessed.	4.16	1.027

Source: Authors' calculation

Analyzing the second group of questions from the questionnaire, the highest average score is present with the claim that for routine transactions, there are procedures established and followed, and that the documents are adequately numbered. The highest level of agreement, measured by the amount of standard deviation, is evident when the documents and records are appropriate. The lowest mean value of the received answers is present in relation to the claim that division of duty regarding keeping property and keeping records of such property has been applied, while the lowest level of agreement, measured by the standard deviation, is present in the claim that there is an adequate physical

protection of assets and records. In their research, Magu & Kibati (2016, p. 795), among other things, showed the existence of a clear division of duties in the observed companies. This agrees with the results of this research, namely the division of duties in both studies was assessed as very good.

Table 3: Descriptive Statistics – monitoring

Questions in the questionnaire	$\bar{X}$	Standard deviation
Performance quality assessments are included in day-to-day activities.	3.92	1.075
These assessments are performed by employees as part of their regular duties.	3.95	1.114
Corrective measures are taken in a timely manner.	4.03	1.078
Monitoring enables the adjustment of the internal control system to changes in business conditions.	4.26	0.950
Employees in charge of monitoring have adequate knowledge and skills.	4.03	1.000
The internal control system is also monitored by internal auditors.	3.47	1.484
Internal auditors make recommendations for improving the internal control system.	3.50	1.484
Information from external sources is used for monitoring purposes.	3.89	1.085

Source: Authors' calculation

Observing the answers provided to the third group of questions from the questionnaire, it is concluded that the answers given by the respondents were lower than the answers given to questions related to control activities, i.e., there are slightly lower mean values for questions related to monitoring. The lowest mean value is recorded for the statement that the internal control system is also supervised by internal auditors (3.47), while the highest mean value is for the statement that monitoring enables the adjustment of the internal control system to changes in business conditions. Measured by the amount of standard deviation, the aforementioned statement has the highest level of agreement between the respondents, i.e., manufacturing companies in the Republic of Serbia.

Oussii & Boulila Taktak (2018, p. 464) showed that internal audit activities are significantly related to the quality of internal control in the company. On the other hand, looking at manufacturing companies in the Republic of Serbia, it is concluded that the lowest average scores obtained from respondents are precisely related to the statements regarding relations between internal control and the work of internal auditors.

Table 4: Descriptive Statistics – ROA, ROE

Variable name	$\bar{X}$	Minimum	Maximum	Standard deviation
ROA	0.05	-0,234	0.277	0.086
ROE	-0.18	-16.135	2.757	2.722
Large manufacturing enterprises				
ROA	0.05	-0.234	0.277	0.110
ROE	-0.61	-16.135	2.421	3.802
Medium manufacturing enterprises				
ROA	0.04	0.004	0.1132	0.039
ROE	0.37	0.018	2.757	0.895
Small manufacturing enterprises				
ROA	0.07	0.039	0.075	0.033
ROE	0.15	0.075	0.255	0.078
Micro manufacturing enterprises				
ROA	0.02	-0.113	0.118	0.078
ROE	0.15	0.000	0.409	0.160

Source: Authors' calculation

In the analyzed sample, the mean value of the ROA indicator is positive (0.05), while the mean value of the ROE indicator is negative (-0.18). The lowest mean value of the ROA indicator occurs in micro-sized enterprises, while it is the highest in small enterprises. The mean value of the ROE indicator is the highest in medium-sized enterprises, and the lowest in large manufacturing enterprises.

Table 5: Peason's Correlation Matrix

	SIK	KA	M	ROA	ROE
Internal control system (SIK)	1				
Control activities (KA)	0.370*	1			
Monitoring (M)	0.414**	0.580**	1		
ROA	-0.019	0.109	0.108	1	
ROE	-0.032	-0.184	-0.159	0.330*	1

Note: Statistically significant correlation of the level 0.01(**)
Statistically significant correlation of the level 0.05(*)

Source: Authors' calculation

Pearson coefficient values show the level of linear dependence between model variables. The obtained results of correlation analysis, which are shown in Table 5, show a positive strong and statistically significant relation between control

activities and monitoring, as components of the internal control system. If the relation between control activities as a component and the internal control system as a whole is observed, the results show a statistically significant positive moderate relation. On the other hand, looking at the internal control system as a whole and monitoring as one of the components of this system, there is a positive moderate statistically significant relation. The obtained results in terms of the direction of the relations between control activities and monitoring, coincide with some of the previously conducted research (Elshawarby, 2017; Vu et al., 2020; Agbejule & Jokipii, 2009).

Looking at the relationship between control activities and monitoring, as components of the internal control system, and the financial performance of ROA and ROE, it can be concluded that the relations are poor, ranging from positive to negative. In fact, the ROA indicator is positively and weakly related to control activities and monitoring, i.e., the ROE indicator is negatively and poorly related to the observed two components of the internal control system.

One of the previous studies (Chowdhury, 2021) showed a moderate positive statistically significant relation between control activities and monitoring, i.e. a moderate relation between control activities and ROA indicators and a strong positive relation between monitoring and ROA indicators. The differences that occur in relation to the mentioned research are evident in the strength of the relation between control activities and monitoring, i.e. in the strength of the relation between control activities and monitoring, on the one hand, and ROA indicators, on the other hand. The reasons for this can be found in the different sectors in which the surveyed companies operate, as well as in the different economies in which the research was conducted.

In a study examining, among other things, the relations between internal control system components and ROA and ROE indicators of company (Kalmetova & Zhussupova, 2021), the authors showed a poor negative relation between ROA indicators and control activities, as well as ROA and monitoring. Also, a poor positive relation between ROE indicators and control activities was presented, i.e. a poor negative relation between ROE and monitoring. In connection with the above, the results obtained on the example of manufacturing companies in the Republic of Serbia show agreement in the form of weak links between these components of the internal control system and ROA indicators, but there is disagreement in the direction of the relations. On the other hand, there is a compliance in the results related to the relations between ROE indicators and monitoring, but also the strength of the relations between ROE indicators and control activities.

Table 6: Results of Kruskal-Wallis H test – enterprise size and control activities; enterprise size and monitoring; enterprise size and internal control system

	Chi-Square	df	Sig.	Median for large manufacturing enterprises	Median for medium manufacturing enterprises	Median for small manufacturing enterprises	Median for micro manufacturing enterprises
Control activities	8.891	3	0.031	4.6667	4.3810	3.8810	4.1190
Monitoring	4.47	3	0.215	4.2500	3.8750	3.3750	3.4375
Internal control system	0.086	3	0.994	4.6250	4.5000	4.5625	4.5625

Source: Authors' calculation

Table 6 shows the results of the Kruskal-Wallis H test. The obtained results present that there is a statistically significant difference in the assessment of applied control activities in manufacturing companies of different sizes. The median for large manufacturing companies is the highest, while it is the lowest for companies that are small in size. If we observe monitoring as a component of the internal control system, results show that there is no statistically significant difference in the assessment of monitoring in manufacturing companies of different sizes. In this case, the median is highest in large manufacturing companies, while the lowest value of the median is in small companies. If we look at the test results of the internal control system as a whole, it can be said that there is no statistically significant difference in the assessment of the importance of the internal control system of manufacturing companies of different sizes.

The Kruskal-Wallis H test only indicates whether there is a statistically significant difference, but not in which groups such difference is present (Jovković et al. 2021, 211). In order to determine in which groups of manufacturing companies this difference exists, Mann-Whitney U tests are applied between micro and small manufacturing companies, micro and medium manufacturing companies, micro and large manufacturing companies, small and medium manufacturing companies, small and large manufacturing companies, and medium and large manufacturing companies. According to Pallant (2009, 231), in order to avoid type I errors when interpreting the results, the Bonferoni correction of the alpha value was applied, $\alpha = 0.05 / 6 = 0.008$.

Table 7: Results of Mann-Whitney U test – enterprise size and control activities

Mann-Whitney U	Z	Sig.	r
Micro and small			
7.000	-1.066	0.286	0.337
Micro and medium			
23.000	-0.472	0.637	0.122
Micro and large			
33.000	-1.530	0.126	0.306
Small and medium			
11.500	-1.011	0.312	0.280
Small and large			
9.500	-2.316	0.021	0.483
Medium and large			
42.000	-2.147	0.032	0.406

Source: Authors' calculation

Based on the Mann-Whithey U test, results were obtained indicating that between manufacturing companies of different sizes, i.e. between micro and small manufacturing companies, micro and medium manufacturing companies, micro and large manufacturing companies, small and medium manufacturing companies, small and large production enterprises, medium and large production enterprises, there is no statistically significant difference in the assessment of the importance of control activities as a component of the internal control system. That is, the distribution of variable control activity does not differ in manufacturing companies of different sizes in the Republic of Serbia, at a stricter level $\alpha = 0.008$. If we take into account the theoretical foundations, i.e. the views of various authors who have dealt with the issue of internal control, it can be said that the absence of statistically significant differences in the assessment of control activities and monitoring of companies of different sizes is the expected result.

5. CONCLUSIONS

The internal control system in companies, if properly set up and applied consistently, can bring numerous benefits and help achieve the set goals. Based on the conducted research, which included manufacturing companies in the Republic of Serbia, it can be concluded that hypothesis one (H1) is confirmed, i.e., there is a statistically significant positive relation between the evaluation

of applied control activities and monitoring, as a component of the internal control system. This further confirms the view that only adequately harmonized components of the internal control system contribute to the successful functioning of the internal control system as a whole.

The results of the correlation analysis show that there is a weak link between the assessment of applied control activities and monitoring, on the one hand, and the ROA and ROE indicators of the company, on the other hand. This confirms the second hypothesis (H2) which was the starting point of the paper.

The third hypothesis (H3) that was tested in the paper was confirmed on the basis of the conducted analysis, i.e. there are no significant differences in the assessment of applied control activities and monitoring in manufacturing companies of different sizes. The results of the Kruskal-Wallis H test showed that there is no statistically significant difference between production companies of different sizes in terms of assessment of the application of monitoring, while the same test showed a significant difference in the assessment of applied control activities. In order to determine in which enterprise groups this difference exists, the Mann-Whitney U test was applied, using a stricter level to assess the differences and to avoid possible errors. Under this assumption, it was found that there are no differences in the assessment of the application of control activities of companies of different sizes. The obtained results confirm the position on the importance of implementing internal control systems in companies, but it is further emphasized that there is no difference in the importance of implementing internal control systems, especially control activities and monitoring in companies of different sizes, from micro to large.

The scientific contribution of this paper is reflected in the expansion of existing knowledge about the importance of internal control systems, with special emphasis on control activities and monitoring. Numerous studies that have addressed the issue of internal control have shown a link between control activities and monitoring. The contribution of the conducted research is reflected in the extension of this knowledge to the case of manufacturing companies operating in the Republic of Serbia. The weak link between the internal control system and financial indicators of operations is shown, but it is definitely important to emphasize that the benefits brought by internal control system, in the form of preventing losses, may indirectly affect this segment. This knowledge was supplemented by examining the differences between companies of all sizes, which indicates the importance of implementing internal control systems in all companies. Companies of different sizes may have different procedures, policies,

supervision in place in different manners, but the importance of the existence of internal control is not disputed.

The results of the research can serve as an aid to the responsible persons in companies for recognizing the importance of the internal control system and importance of compliance of its components. In addition, the management of smaller companies can point out the importance of this system and the need for its development and continuous improvement. The existence of a successful internal control system allows the company to put greater trust in many market participants, as well as the assessment of lower levels of risk by external auditors, which further improves the reputation of the company itself.

The potential subjective views of the respondents can be mentioned as a limitation of the conducted research. Namely, as one respondent represented one production company, the answers received may be influenced by personal attitudes, satisfaction with the current situation in the company. The size of the sample used can be mentioned as a limitation of the research, i.e., through the examination of a larger number of companies, or a larger number of respondents within one company, a broader insight into the observed problem area could be achieved.

The research conducted could be expanded in future. Future directions of research may include examination of other components of the internal control system, i.e. the assessment of the control environment, risk assessment, information and communication, and their relationship, as well as their position in companies of different sizes and companies from other sectors.

Conflict of interests

The authors declare there is no conflict of interest.

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МЕЂУЗАВИСНОСТ КОНТРОЛНИХ АКТИВНОСТИ И МОНИТОРИНГА КАО КОМПОНЕНТИ СИСТЕМА ИНТЕРНЕ КОНТРОЛЕ ПРОИЗВОДНИХ ПРЕДУЗЕЋА У РЕПУБЛИЦИ СРБИЈИ

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САЖЕТАК

Предмет истраживања у раду јесу контролне активности и мониторинг као компоненте система интерне контроле у производним предузећима у Републици Србији. Циљ рада јесте утврђивање постојања међузависности контролних активности и мониторинга, али и међузависности ових компоненти система интерне контроле са показатељима РОА и РОЕ предузећа. Додатни циљ рада јесте испитивање постојања разлике у оцјени значаја примијењених контролних активности и мониторинга у производним предузећима различите величине. Истраживање је обухватило узорак производних предузећа која послују у Републици Србији. Анализа је извршена у СПСС статистичком програму, гдје је спроведена корелациона

анализа примјеном Пеарсоновог коефицијента, као и Крускал-Валисов Х тест и Мен-Витнијев У тест. Добијени резултати показали су постојање јаке позитивне везе између контролних активности и мониторинга, као и слабе везе између контролних активности и мониторинга, с једне стране, и показатеља РОА и РОЕ предузећа, с друге стране. Додатно, резултати су потврдили да не постоји разлика у значају примјене система интерне контроле, односно контролних активности и мониторинга у производним предузећима различите величине. Добијени резултати истраживања потврђују постављене хипотезе Х1, Х2 и Х3. Као закључак спроведеног истраживања наводи се велики значај имплементације система интерне контроле у предузећима без обзира на њихову величину, при чему је од изузетне важности адекватност успостављеног система и његова континуирана примјена.

Кључне ријечи: *систем интерне контроле, контролне активности, мониторинг, финансијске перформансе, производна предузећа.*

THE CASE OF DISPOSAL OF NUCLEAR WASTE IN TRGOVSKA GORA IN THE REPUBLIC OF CROATIA: ECONOMIC AND LEGAL CONSEQUENCES FOR BOSNIA AND HERZEGOVINA

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ABSTRACT

The storage of nuclear waste planned by the Republic of Croatia in Trgovska gora, located on the border with Bosnia and Herzegovina in its northern part, causes controversy and has far-reaching consequences for the population, flora and fauna, and the environment itself. In parallel with these consequences, it will affect the economic development of 13 municipalities in the Una basin. Croatia has already carried out part of the research, examined the terrain and moved on to geological research. In addition, an environmental impact study is planned and should be completed by 2023. Bosnia and Herzegovina has committed itself to find a solution through diplomatic channels with the Republic of Croatia and the application of international legal standards in this area, as well as legal options available to BiH to protect its interests and mechanisms to deter Croatia from disposing nuclear waste at the site. In the event that Croatia implements this project and builds a nuclear waste dump in Trgovska gora, in addition to environmental consequences, it will affect the economy of municipalities in the Republic of Srpska in terms of a fall in real estate prices, jeopardize agricultural land and create a significant outflow of population.

1. INTRODUCTION

Croatia has failed to find a solution with Slovenia regarding the joint storage of nuclear waste from the Krško Nuclear Power Plant located in Slovenia. That is why Croatia has planned to do that on the location of the former barracks Čerkezovac in Trgovska gora in the Municipality of Dvor. At the time of the

construction of the Krško NPP in 1979, the construction of a dozen nuclear power plants and a central RAW landfill was planned within the former Yugoslavia. At that time, 13 locations for RAW landfills were planned. (Veinović, 2016: 422). Trgovska gora, i.e. Čerkezovac, were not foreseen by that plan in Yugoslavia for the RAW landfill. In 1988, Croatia began to independently search for a location for RAW disposal. As early as 1993, 7 potential areas for RAW landfill sites were identified: Petrova gora, Trgovska gora - Zrinska gora, Moslavačka gora, Bilogora, Papuk-Krndija, Psunj and Požeška gora. (Čerškov Klika, 1998: 116).

Trgovska gora is geographically located between Bosnia and Herzegovina and Croatia, i.e. on the border between the Una River and its tributaries. On the Croatian side, its slopes are located in the area of Banija and lean on the southern hills of Zrinska gora, and some classify them into the area of Prekounska krajina - hills east of Velika Kladuša and Bužim - with hilly-mountain elevations average of 400-550 meters above sea level, and with the highest point Radač (629 m above sea level). Therefore, this is a site where the disposal or storage of nuclear waste from the Krško NPP (Slovenia) is planned. On the other hand, municipalities interested in this issue are located near the border in Bosnia and Herzegovina. One of the biggest challenges is that the planned disposal of nuclear waste can have a detrimental impact on human health and the environment, as the barracks are located in immediate vicinity of the population on both sides of the border. Also, the question is how it will affect the use of agricultural land in municipalities in the Republic of Srpska.

There is also a debate in the public discourse about whether it is a warehouse or a landfill for low- and intermediate-level nuclear waste, a distinction which is necessary to be made. It is emphasized that the storage is temporary, from 10 to 30 years, and that it includes institutional supervision and state monitoring of the environment. Also, the landfill is permanent and the site, where waste decomposes to natural levels after 300 years, is permanent. A warehouse cannot simply be turned into a landfill, because these are physically different facilities. (Abramović, 2020).

There are geological, seismic and hydrological dangers in Bosnia and Herzegovina, and according to some expert estimates, the location of Trgovska gora endangers 7/8 of the territory of Bosnia and Herzegovina and 1/8 of the territory of Croatia, which makes it very unfavorable for Bosnia and Herzegovina.

Nowadays, the issue of Croatian nuclear waste disposal at the Trgovska gora site has become a first-class issue addressed by the legal profession in terms of legal possibilities to implement the plan of the Republic of Croatia, application of international legal standards in this area, and legal options available to Bosnia

and Herzegovina in order to protect its interests and mechanisms to deter Croatia from disposal or storage of nuclear waste. This topic provoked great reactions from the public, both general and professional, and represents a complex political issue. (Popović, 2021, 447).

In addition, this issue has a significant impact on the economic aspects of municipal development in the territory of BiH, and primarily in the territory of the Republic of Srpska and part of the territory of the Federation of Bosnia and Herzegovina.

2. ECONOMIC AND LEGAL CONSEQUENCES OF NUCLEAR WASTE DISPOSAL IN TRGOVSKA GORA

The Croatian government has decided to cede the former military barracks Čerkezovac, built by the Yugoslav People's Army, to the Fund for Financing the Decommissioning and the Disposal of Radioactive Waste (RAW), located at Trgovska Gora, about 900 meters as the crow flies from Bosnia and Herzegovina. This is a political decision and has not been harmonized with Bosnia and Herzegovina. This has disturbed the population that lives or has property in this area. Survival in this area is also uncertain, considering that nuclear waste and its disposal at this location could cause inconceivable damage and consequences to the economy and the population.

Republic of Srpska and the Federation of Bosnia and Herzegovina would lose the Una Nature Park and the Una National Park, which were the mainstay for the development of tourism, agriculture and the production of healthy food. Without the population living in this area, it could not survive, because it relies exclusively on these economic activities. Economic survival as well as the real potential danger posed by the storage of radioactive nuclear waste would cause the eviction of over 650,000 people living in this area, while those who remained there would risk being affected by the aftermath of Hiroshima and Nagasaki after the atomic bomb and Chernobyl after a failure at a nuclear power plant (Popović, 2021: 447). Since certain radioactive materials have a very long half-life, it is necessary to control radioactive waste over a very long period of time, measured in centuries. (Ciraj-Bjelac & Vujović, 2017: 8).

Croatia needs to take over its share of 2,000 tons of radioactive waste from the Krško NPP. Selected location, Čerkezovac barracks as a possible nuclear waste disposal site is located at an altitude of more than 50 meters in relation to watercourses and water supply sources of about 250,000 inhabitants of Republic of Srpska and the Federation of Bosnia and Herzegovina, so in case of

any incident of watercourse contamination it would mean pollution of the entire water basin that flows into the river Una. Una, as one of the most beautiful natural pearls in Europe, flows into the Sava River, the Sava into the Danube, and the Danube into the Black Sea, which could cause unforeseeable consequences not only for the residents in the immediate vicinity of this landfill but much wider. It should be noted that the Republic of Croatia stated that one of the main reasons for discussing the disposal of this waste at the Vrbina site in Slovenia, which served as the Krško NPP landfill, was that Vrbina is located along the Sava and could pollute the water intake supplies in Zagreb. This is another proof that the choice of the location at Trgovska gora is a political decision of Croatia without taking into account the environmental impact of the municipalities in Bosnia and Herzegovina and the economic consequences that will result from it.

With the announcement of the construction of this landfill and the beginning of works by the Republic of Croatia, there was a complete decline in the economic value of property in this area and interest in any investment in its increase not only by locals but also by foreign investors, to other states or other areas of the Republic of Srpska and the Federation of Bosnia and Herzegovina, which in the long run reduces this area to a minimum for the possibility of survival. The importance of foreign investments is manifold, and with the very announcement of the construction of RAW landfills, they have fallen in Bosnia and Herzegovina. Investments affect the volume, structure and direction of international trade, as well as the position of companies in which investment funds are invested and the location of their business. According to statistical data, foreign investments are mostly invested in countries in transition because those markets are the most attractive to them, which includes Bosnia and Herzegovina (Jović, 2016: 138).

The place where the construction of this landfill is planned is one of the worst chosen from the aspect of geology, hydrology and seismology. The terrain is composed of limestone, and in the lower layer of alluvial deposits of sand from the Una and other watercourses. These are permeable layers. Such facilities are built on impermeable terrains of clay and granite. In addition, Čerkezovac is located between the seismic areas between Banja Luka and Zagreb and it is not possible to predict the impact of future earthquakes on this facility (Subašić, 2020).

The territory where the construction of this landfill is planned, as well as parts of the territory that could affect the consequences of this construction, is mostly inhabited by Serbs and Bosniaks, so the question is justified by refusing to dispose of nuclear waste at the Vrbina site in Slovenia, located next to the Sava River, which could pollute the water intake of this river and endanger the

inhabitants of Zagreb fed from the Sava River, and could not pollute the water intake of the Una River and its tributaries from which the population of Novi Grad, Dvor na Uni, Kostajnica, Dubica, Gradiška, Cazin, Bužim, Krupa, Potok and other places and settlements. There are too many inhabitants who could be endangered in this way (Popović, 2021: 449). This is a very seismic area, which is confirmed by the fact that this area was hit by a series of earthquakes in 2020. The earthquake continued in 2021 and probably will in the future. The consequences of the disposal of nuclear waste at the specified location would absolutely jeopardize the survival of not only the population but also the flora and fauna, without which this population could not survive in the specified area. All road infrastructure in this area is mainly located along the Una River and its tributaries, and the transport that would transport waste from NPP Krško would take place mainly by road and any accident during this transport would directly endanger the Una River Basin and beyond, therefore the potential dangers and risks are not only related to the landfill itself but also to the transport of the said nuclear waste.

The sources and the mentioned research agree with the hypothesis that the construction of a radioactive waste storage facility in Trgovska gora is economically, legally and especially ecologically unsustainable and harmful for Bosnia and Herzegovina.

In addition to these, there are other reasons that justify the fact that Croatia, as the neighboring state of Bosnia and Herzegovina, which has the longest border with it, should respect and immediately suspend all work and activities on the construction of the landfill. In that direction, by the decision of the Council of Ministers, BiH has formed a legal team that is working on the Methodology for drafting a legal strategy. Documents from certain municipalities on the territory of Republic of Srpska are also important, such as the Resolution on opposition to the activities of construction of low and medium radioactive waste dumps in the Municipality of Dvor - Republic of Croatia at Trgovska gora, adopted by the Municipality of Novi Grad in 2015.

3. RESULTS

Decommissioning of NPP Krško, disposal of radioactive waste (RAW) and spent nuclear fuel of NPP Krško are regulated by an intergovernmental agreement between the Government of the Republic of Croatia and the Government of the Republic of Slovenia on regulating status and other legal relations related to investment, exploitation and decommissioning of NPP Krško. Croatia has been

the co-owner of NPP Krško since 2002. The Spatial Planning Program of the Republic of Croatia from 1999, with the changes from 2013, determined the location of Trgovska gora as a space for the construction of a landfill. In this regard, Croatia has adopted strategic documents and regulations, established institutions and practically started the legal procedure related to the disposal of nuclear waste. Regulations on the part of the Republic of Croatia concerning this matter are informative: Law on Radiological and Nuclear Safety, Law on Transport of Dangerous Substances, Law on Environmental Protection, Law on Fund for Environmental Protection and Energy Efficiency, Law on Fund for Financing Decommissioning and Disposal of Radioactive waste and spent nuclear fuel NPP Krško, Strategy for Disposal of Radioactive Waste, Spent Sources and Spent Nuclear Fuel, as well as various bylaws (Popović, 2021: 450).

The Republic of Croatia, as a member of the European Union, and Bosnia and Herzegovina as a signatory to the Stabilization and Association Agreement, are signatories to a number of international conventions and a number of other legal instruments regulating nuclear waste disposal and binding them as such. The most important international documents that are important for solving the problem of nuclear waste landfills are: Vienna Convention on Nuclear Safety, 1994; Vienna Joint Convention on the Safety of Spent Fuel Management and Disposal of Radioactive Waste, 1997; Convention on Environmental Impact Assessment in a Transboundary Context, the so-called ESPO Convention, 1991; Protocol to the so-called ESPO Convention on Strategic Environmental Assessment, Kiev, 2003; Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, 1998. In addition, for Croatia as a member of the European Union, the Council Directive 2011/70/EURATOM from 2011 on the establishment of a framework for responsible and safe management of spent fuel and radioactive waste is also important.

The international sources of law mentioned above promote mutual cooperation of states, timely information, and mutual consultation, and enable the public of border states to participate in the debate, etc. The procedure of choosing this location by the competent authorities of the Republic of Croatia lasted more than 20 years, and in that sense the Republic of Croatia not only did not provide any official data and information to BiH as a border state, but it turned a deaf ear to it even after the election of Trgovska gora or the former barracks Čerkezovac as a landfill for this waste.

Namely, according to Article II of the Convention on Nuclear Safety, nuclear safety lies with the state that has jurisdiction over the nuclear facility and it must achieve and continuously implement a high level of nuclear safety worldwide

by promoting national measures and international cooperation. Article 17, paragraph 1, indent iv) of the same Convention stipulates that "each Contracting Party shall take measures to ensure that procedures for consultation with the Contracting Parties in the immediate vicinity of the proposed nuclear installation are carried out, to the extent that they are endangered by that installation, and to provide, upon request, the necessary information to those Contracting Parties to enable them to assess and make their own assessment of the safety impact on their territory of that nuclear installation. The Aarhus Convention provides the right of all natural and legal persons (regardless of nationality or seat) to request information on the environment without emphasizing a legal interest (Articles 4 and 5). The Aarhus Convention prescribes the right of the public to participate in environmental decision-making, but with the obligation that the interested public must be informed at an early stage of the environmental decision-making process.... (Article 6). The Aarhus Convention also guarantees the right of access to justice in the event of a violation of the aforementioned two rights (Article 9)."

Article 2, paragraph 6 of the ESPO Convention (Convention on Environmental Impact Assessment in a Transboundary Context) prescribes the obligation of the country of origin to provide the public with an opportunity in areas that could be affected to participate in the environmental impact assessment and the affected countries should do the same. Article 3 of the Convention stipulates that the country of origin should inform each signatory as soon as possible of the planned activity (which it considers may be affected) and at the same time inform its public. Article 6 of the Joint Convention affirms the obligation of the contracting parties to establish procedures for assessing all relevant location factors that may affect the safety of a spent fuel management facility, for assessing the impact of such a facility on persons, society and the environment, and providing information on the safety of such a facility available to the public and for consulting the contracting parties in the vicinity of such a facility.

The European Union Directive, such as Council Directive 2011/70/EURATOM 2011 on establishing a framework for responsible and safe management of spent fuel and radioactive waste that directly obliges the Republic of Croatia to apply it, also prescribes a number of obligations of the Republic of Croatia to Bosnia and Herzegovina. From all the above, it follows that the Republic of Croatia was obliged much earlier, i.e. before February 10, 2016, as the date of selection of Trgovska gora as the site for nuclear waste disposal, inform Bosnia and Herzegovina about the site selection procedure, taking into account the time when Bosnia and Herzegovina ratified the above-mentioned international conventions. If it had acted in the stated way, Bosnia and Herzegovina would have had the opportunity to make its own assessment of the security impact

on its territory and to provide arguments to the Republic of Croatia why the location of Čerkezovac in Trgovska Gora is not a good choice for Bosnia and Herzegovina. On the contrary, the Republic of Croatia not only disobeyed the stated norms and prescribed standards of international conventions, but also carried out the procedure and started the construction of the said nuclear waste dump in Trgovska gora, which further caused insecurity in the region and its uncertainty in survival. In other words, Croatia continued to act on the principle that it is its territory and that it does not have to consult with anyone, not only regarding the obligations under international conventions, but also ignoring the fact that such consequences will mostly affect the population living in this area.

Having in mind the fact that the previous attempt and effort of Bosnia and Herzegovina as an affected country to participate together with Croatia in the work and all activities related to the construction of the landfill, to protect its environment and the interests of citizens living in this area, BiH is forced to change the current behavior and start looking for other solutions in order to put pressure on Croatia to definitely give up the location in Trgovska gora (Popović, 2021: 452).

In addition to legal arguments, an adequate economic study on the consequences in BiH has not been conducted yet, especially on the economy of Republic of Srpska and its northern municipalities bordering the Croatian municipality of Dvor, where Trgovska gora and Čerkezovac barracks are located. It is certain that there will be a decline in real estate values and a further decline in foreign investment in these municipalities.

4. DISCUSSIONS

The problem with Croatia and BiH can be resolved through negotiations, diplomatic and peaceful means in the mutual interest of both the Republic of Croatia and Bosnia and Herzegovina. In this way, the Republic of Croatia would make it clear to the international community that it respects all international norms and standards contained in international conventions, EU directives and other regulations governing this area and at the same time represent a good neighbor of Bosnia and Herzegovina with which it has the longest border and a safer and brighter future that should be nurtured in the mutual interest.

However, it is obvious that the behavior of the Republic of Croatia so far has not only not gone in this direction in terms of providing any information and cooperation, but Croatia has started and continued with the construction of the landfill as if it does not concern anyone except it. Such behavior not only represents

a serious precedent in international law, but will further disrupt relations with Bosnia and Herzegovina in the long run, and the eventual completion of works and the beginning of radioactive waste disposal will cause inconceivable harmful consequences for Bosnia and Herzegovina in this area.

As an alternative, Bosnia and Herzegovina has the option of resolving the dispute before arbitration or an international tribunal. Thus, Article 15, paragraph 1, of the ESPO Convention explains that "if a dispute arises between two or more Parties concerning the interpretation or application of this Convention, they shall seek a solution by negotiation or by any other method of dispute settlement acceptable to them. Paragraph 2 (a) and (b) of this article provide the possibility of referring a dispute to arbitration or to an international tribunal, depending on the signatory's statement to the Depositary of the Convention as to which the method of resolving the dispute the signatory accepts. Since the activities of the Republic of Croatia so far unequivocally have confirmed that this disputed issue cannot be resolved through negotiations, the only remaining option is to resolve this disputed issue through arbitration or an international court.

Also, Bosnia and Herzegovina citizens living in this area, whose property or any other rights violated by the European Convention for the Protection of Human Rights and Freedoms and its Protocols, could initiate appropriate proceedings against the Republic of Croatia before the European Court of Human Rights in Strasbourg. This would certainly imply their obligation to seek protection of their rights for human rights violations before the competent courts of the Republic of Croatia and to exhaust all legal remedies available to them as a condition for applying to the European Court of Human Rights in Strasbourg. However, having in mind previous experiences, it is realistic to expect that Croatian courts would not accept to resolve these human rights violations to the detriment of their country or would procrastinate with this resolution. The appellants would be obliged to prove in Strasbourg that in the Republic of Croatia they are not able to exercise effective legal remedies, so that this court can approach the resolution of their appeals. However, the Republic of Croatia has not given any statement to the Depositary of the Convention on the Acceptance of Disputes before Arbitration or an International Court of Justice, so litigation of citizens before the European Court of Human Rights would be the final solution.

Bosnia and Herzegovina can take deterrence mechanisms in order for the Republic of Croatia to give up the construction of a nuclear waste storage facility in Trgovska Gora. It can make a reciprocal decision on the basis of which it will build this or a similar warehouse on the border with the Republic of Croatia in the part where the smallest population of BiH lives, choosing this location in

the manner and under the conditions of the Republic of Croatia (Popovic, 2021: 454). Having in mind the legal documents and political positions, it is certain that there will be a dispute with Croatia and that lawsuits will be filed with the International Court of Justice in The Hague or individual lawsuits with the European Court of Human Rights in Strasbourg.

In any case, Bosnia and Herzegovina should declare Una Nature Park and Una National Park a protected area, thus preventing Croatia from further work related to the construction of RAW landfills in Trgovska Gora.

5. CONCLUSIONS

Radioactivity is a process in which the nuclei of unstable atoms decay spontaneously, their decay produces other nuclei and releases energy in the form of radiation. The process is random and it is not possible to know exactly when individual nuclei will disintegrate. Therefore, the potential disposal of radioactive waste in Trgovska Gora, on the border with Bosnia and Herzegovina, causes controversy and possible far-reaching consequences for the population, economy, flora and fauna, and the environment itself, and it poses a legal problem.

In terms of mutual cooperation of states and their timely information, mutual consultation and enabling the public of border states to participate in the debate, there are a number of international documents and Croatia should take them into consideration. Bosnia and Herzegovina has at its disposal several options, such as the filing of lawsuits or the application of various deterrent mechanisms. BiH has approached this problem through expert teams and finding the best legal option and mechanism. However, the final effects are questionable, bearing in mind that there is no functional structure in BiH that would complete the task of protecting Bosnia and Herzegovina in this case.

So far, the Council of Ministers of Bosnia and Herzegovina has not proven itself in these activities as a body that could and should lead activities with the Republic of Croatia in connection with the construction of a landfill in Trgovska Gora, especially, having in mind the decision-making process in which the existence of a consensus of all three constituent peoples is required for a whole series of issues. Analogously, it is not possible to expect or demand a more efficient way of working and functioning from the commissions formed by the Council of Ministers.

The Republic of Croatia continues unhindered with the construction of this warehouse, i.e. landfill, neglecting its international obligations determined by

international standards and conventions, as well as good neighborly relations with Bosnia and Herzegovina.

Since the management of this dispute falls within the competence of the Presidency of Bosnia and Herzegovina, it should exclude these activities from the Council of Ministers, i.e. the Ministry of Foreign Trade and Economic Relations, and take all possible actions in accordance with its activities. Otherwise, the Republic of Croatia will complete the construction of the said warehouse, i.e. landfill, and start disposing of radioactive waste to the detriment of Bosnia and Herzegovina.

The economic consequences are already being felt, but over time their impact will become more pronounced.

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Conflict of interests

The authors declare there is no conflict of interest.

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СЛУЧАЈ ОДЛАГАЊА НУКЛЕАРНОГ ОТПАДА НА ТРГОВСКОЈ ГОРИ У РЕПУБЛИЦИ ХРВАТСКОЈ: ЕКОНОМСКЕ И ПРАВНЕ ПОСЉЕДИЦЕ НА БОСНУ И ХЕРЦЕГОВИНУ

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САЖЕТАК

Складиштење нуклеарног отпада које има у плану Република Хрватска на Трговској гори која се налази на граници са Босном и Херцеговином у њеном сјеверном дијелу, изазива контроверзе и повлачи могуће далекосежне посљедице за становништво, биљни и животињски свијет, односно за саму животну средину. Паралелно са овим посљедицама одразиће се и на економски развој 13 општина унског слива у Босни и Херцеговини. Хрватска је већ извршила дио истраживања, испитала терен и прешла на геолошка испитивања а у плану је и студија утицаја на животну средину која треба да се заврши до 2023. године. Босна и Херцеговина се ангажовала да дипломатским путем са Републиком Хрватском нађе рјешење насталог

проблема путем примјене међународних правних стандарда у овој области, правних опција које стоје на располагању Босни и Херцеговини ради заштите њених интереса и механизама одвраћања Хрватске од реализације одлагања нуклеарног отпада на том локалитету. У случају да Хрватска реализује овај пројекат и направи одлагалиште нуклеарног отпада на Трговској гори поред еколошких посљедица, одразиће се и на привреду општина у Републици Српској у виду пада цијена некретнина, довешће у питање обрадивост пољопривредног земљишта и настаће значајан одлив становништва.

Кључне ријечи: *нуклеарни отпад, економски и правни аспекти, животна средина, међународни односи, Трговска гора*.