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ЕКОНОМИКА

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МЕЂУНАРОДНИ ЧАСОПИС
ЗА ЕКОНОМСКУ ТЕОРИЈУ И ПРАКСУ И ДРУШТВЕНА ПИТАЊА



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2. Часопис су покренули Друштво економиста Ниша и Друштво инжењера и техничара Ниша (остало као издавач до краја 1964. године). Удружење књиговођа постаје издавач почев од броја 6-7/1958. године. Економски факултет у Нишу на основу своје одлуке броја 04-2021 од 26.12.1991. године постао је суиздавач “Економике”. Такође и Економски факултет у Приштини постао је суиздавач од 1992. године. Почев од 1992. године суиздавач “Економике” је и Друштво за маркетинг региона Ниш. Као суиздавач “Економике” фигурирали су у току 1990-1996. године и Фонд за научни рад општине Ниш, Завод за просторно и урбанистичко планирање Ниш и Корпорација Винер Брокер Ниш.

3. Републички секретариат за информације СР Србије својим Решењем бр. 651-126/73-02 од 27. новембра 1974. године усвојио је захтев “Економике” за упис у Регистар новина. Скупштина Друштва економиста Ниша на седници од 24. априла 1990. године статутарном одлуком потврдила је да “Економика” има статус правног лица. На седници Скупштине Друштва економиста Ниш од 11. новембра 1999. године донета је одлука да “Економика” отвори посебан жиро-рачун.

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GIIPS AND INFLATION CONVERGENCE, TWO DECADES AND FEW CRISIS LATER

Abstract

Paper analysis inflation convergence in Greece, Italy, Ireland, Portugal and Spain (GIIPS). These countries were severely hit by financial and debt crisis and had to undertake deflationary adjustment programs, thus we wanted to understand weather those conditions reduced imbalances in Eurozone. We used statistical indicators and indicators of σ -convergence to study the diversity of their inflation processes. Unit root test on the series of standard deviations of inflation differentials was used to check statistical significance of inflation convergence. Data was divided in two subperiods, from 1997-2008, and 2009-2022, to understand the influence of crisis and austerity measures on asymmetries and divergence of inflation. Results showed significant convergence until the crisis, than differences started to increase. This findings are important while inflation rises since 2021, and it again brought significant divergence between members' inflation rates. Should we fear of a new debt crisis, were the differences sufficiently reduced and imbalances removed?

Key words: GIIPS, inflation, nominal convergence, inflation dispersion

JEL classification: E310, E520, E580.

ГИИПС ЗЕМЉЕ И ПРОЦЕС КОНВЕРГЕНЦИЈЕ, ДВЕ ДЕЦЕНИЈЕ И ПАР КРИЗА КАСНИЈЕ

Апстракт

Рад анализа процес конвергенцији инфлације у Грчкој, Италији, Ирској, Португалу и Шпанији (GIIPS). Ове земље су биле озбиљно погођене финансијском и дужничком кризом и морале су да предузму програме дефлаторног прилагођавања. Зато смо желели да утврдимо да ли су ти услови смањили неравнотеже у еврозони. Ураду смо користили статистичке показатеље и индикаторе σ -конвергенције за анализирање хетерогености њихових инфлационих процеса. За проверу статистичке значајности конвергенције инфлације урађен је тест јединичног корена на серији стандардних девијација инфлаторних диференцијала. Подаци су подељени у два подпериода, од 1997-2008 и 2009-2022, да би се утврдио утицај кризе и мера штедње на асиметрије и дивергенцију инфлације. Резултати су показали значајну конвергенцију до кризе, али су након тога разлике почеле да се повећавају. Ови налази су значајни јер инфлација расте од 2021. године

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и поново је донела значајну дивергенцију стопа инфлације чланица. Да ли треба да се плашимо нове дужничке кризе, да ли су разлике довољно смањене и уклоњене неравнотеже?

Кључне речи: *GIIPS, инфлација, номинална конвергенција, дисперзија стопа инфлације*

Introduction

Until 2022, 19 European countries gave up their independent, national monetary policy, exchange rate and interest rate policy. Their monetary policy is now being managed by one supranational central bank, which goal is monetary stability, defined like annual inflation rate below but close to 2%. Inflation rate is significant criteria for joining EMU. This criteria is defined like the inflation rate which can not be higher than 1.5 percentage points than average inflation in three best performing member states (unweighted arithmetic average of inflation in 3 countries with the lowest inflation rate). So individual country must have sustainable, low and stable inflation rate measured by harmonized consumer price index. Although this is entry criteria, it has substantial meaning for successful membership both at individual country level and Eurozone level. It is very important for members to reach high level of convergence of their economic performances, so that common monetary policy can suit them. On the other side managing monetary policy for 19 economically heterogeneous countries with different needs is very problematic, it will be less successful and crisis might occur more often. For individual countries, economic convergence means higher benefits than costs of joining EMU. Monetary policy for 19 countries is common, meaning that European central bank can not adjust it to target specific needs of individual countries. It is managed at the average level. So inflation rate of given country should be very close to average inflation, and move in coordination with it to respond to different shocks and ECB policy measures. If a country has significantly higher or lower inflation, its interest rates significantly departure from other countries' interest rates, it has very active fiscal policy (higher government and public debt), its growth rates do not move in coordination to growth rates of other countries, than common monetary policy might bring series economic problems. Crisis that started in 2008 brought to the light built macroeconomic imbalances of some Eurozone members (Popović & Janković, 2016). In Eurozone financial crisis lasted longer, and it grew into economic, banking and sovereign debt crisis showing that original design of Eurozone had serious flaws which led to piling of serious imbalances.

This analysis is significant due to few reasons. It is possible to draw conclusions from previous experience of the first member countries that faced hard crisis because of lack of convergence process. It seems that there is a tendency for some countries to treat joining EU/EMU like political success and to expect to be flooded with a plenty of cheap money and just spend. So there is not substantial understanding what membership actually means and which consequences might occur if country doesn't fully respond to its obligations according to EU/EMU rules and economic laws. Beside, there are

countries that tend to join EMU like Croatia, which plans to become member from 2023 (Ammann, 2022). Which trap should be avoided, which reforms should be introduced, which path to follow, how to substantially satisfy convergence criteria and not just formally, so that membership is sustainable in a long term and will bring more benefits than costs? Beside this, inflation in 2021 and especially at the beginning of 2022 was very high, reaching unprecedented levels and there is still rising tendency. Will this lead to sizeable divergence of individual inflation rates which will even more complicate the management of common monetary policy? Should we fear of new debt crisis?

The old theory of optimal currency area identified criteria that countries wishing to join monetary union must fulfil to enjoy long-term net benefits of membership. Practice chose a bit different criteria- related to convergence of inflation rates, interest rates, budget deficit, public debt and exchange rate stability. However, all countries did not fully satisfy even these criteria. New theory of optimal currency area stressed that the environment of monetary union will gradually lead to higher integration and convergence of economic performances. So it is important that countries that joined monetary union move towards optimal currency area. But have those expectations really been met?

Paper analyses characteristics of inflation in peripheral or south Eurozone member countries, popularly called GIIPS (Greece, Italy, Ireland, Portugal and Spain). It builds further on the complex analysis of convergence process from Popović (2013), with focus on inflation rates. How different are inflation processes in those countries? They had very high inflation rates before joining EMU. Did membership bring some positive changes? Was there a progress since financial crisis, since they were forced to undertake deflationary measures to restore competitiveness lost due to higher inflation rates? Are there some positive news related to convergence towards EMU average? Do they form relatively homogenous group or differences tend to be even higher?

To answer those questions we will conduct statistical analysis of historical inflation rates to understand behaviour of average and median inflation rates. Analysing standard deviations and coefficient of variations (indicators of sigma convergence) will indicate if countries have inflation rates which are converging and respond in the similar way to different shocks and monetary policy measures or there is significant dispersion. Additionally Unit root test on series of standard deviation of inflation rates in comparison to EMU average will help us to check statistical significance of nominal convergence-towards average inflation and if there is a tendency for this group of countries to be more homogenous.

Literature review

According Popović (2013) all countries that formed euro area (in 1999 + Greece) did not fully satisfy convergence criteria set in the Maastricht agreement, so we can not say that Eurozone was an optimal currency area even in the moment of creation. It was expected that Monetary union will facilitate convergence of their economic performances. However although in some areas there has been progress towards higher convergence, destabilizing process of polarization occurred. Monetary union is divided on two group of countries, richer core countries, mostly from Northern Europe and poorer peripheral countries mostly from Southern Europe, popularly called GIIPS (Bošković, Popović &

Njegovan, 2013). These are countries with higher inflation rates, with consumption-driven model of growth, with strong rise in unit labour costs and indebtedness, constant decrease in competitiveness and rise in external debt.

Brinke, Enderlein, & Fritz-Vannahme (2015) stressed that euro area needs three types of nominal sigma convergence to avoid drifting apart: convergence in prices, competitiveness and external balance. Inflation convergence is necessary because ECB determines reference interest rate on the basis of average inflation for the whole EMU. If inflation rates are very diverse among member countries, they will be too low for countries with higher inflation and too high for countries with very low inflation, which means that single interest rate destabilizes Eurozone. That is why it is important that inflation differentials are very small. Besides, devaluations are no longer available as the tool of increasing or restoring competitiveness so exchange rates must be on a par with other member countries. It is also important that wages rise in correlation with the growth of productivity and not to be the source of lower competitiveness. Loss of competitiveness because of higher inflation and higher labour costs leads to large external imbalances, and that is not sustainable in the long term. The governance of convergence was not successful. Although a number of rules focused on nominal convergence, it appears that the architecture of euro area was not appropriate. Maastricht criteria are entry criteria, so there are strict rules to become a member. However when a country becomes a member, differences in inflation and long-term interest rates are not in the focus any more. The Stability and growth pact does not particularly deal with price stability and inflation differentials. But persistent inflation differentials lead to capital misallocation, boom-and-bust cycles and recessions. Some countries had export driven growth and they became net lenders while in others economy declined and they became net borrowers.

Since high inflation peripheral countries made significant effort to combat inflation to candidate for the membership in Monetary union, a number of papers studied the influence of the establishment of Monetary union on further convergence process. According Mongelli (2008) until 2007 inflation dispersion has been significantly reduced, especially having in mind short-term and long-term inflation expectations. Estrada, Gali & Lopez-Salido (2013) found that there are no proves that introducing euro lead to higher nominal convergence among member states, since there has been strong nominal convergence before 1999 among EMU members, but also among the group of advanced non-member countries. Franks at al. (2018) pointed out that prior the EMU significant convergence of inflation occurred, but after the establishment of Monetary union there was no further progress. Especially problematic is the fact that peripheral countries have very persistent inflation differentials, which reduced their competitiveness and increased real exchange rate gaps. Consolo (2021) discovered not just that process of nominal convergence since 1999 was insufficient, but also differences in price levels increased. Problematic South countries had inflation higher than average during 2000s. Auray & Eyquem showed that although there was significant inflation convergence until 1999, that process was not finished in following period, which led to significant differences in real interest rates. Barigozzi, Conti & Luciani (2013) stressed that monetary transmission mechanism is more homogenous with the single currency, but there are differences in transmission of monetary policy to prices and unemployment between core and periphery countries.

Weber & Beck (2005) discovered that β -convergence occurred before and after the advent of Monetary union, however convergence process is non linear and decreases with time. Beside, β -convergence does not mean also σ -convergence, overall dispersion of inflation rates was reduced in the first half of 1990s, in the second half no further progress occurred, while in the first half of 2000s it even increased. Authors also discovered that mean inflation rate should not fall below 1% while the significant part of the region will be under a large risk of deflation.

García-Hiernaux, González-Pérez & Guerrero (2020) found different price level patterns and lack of long-run price level convergence for majority of member countries. So common monetary policy does not affect all EMU members equally. Large and persistent inflation differentials could lead to increase in real interest rate differentials, influence the cost of credit and bring economic difficulties to firms and countries with low productivity. It can also influence the segmentation of financial markets in Eurozone.

Landmann (2011) stressed that weak currencies appear to be high-inflation currencies. Until 1999 inflation rates and interest rates converged towards levels in German, and GIIPS countries got more favourable access to long-term capital markets and stable long-term borrowing in Eurozone. They were more attractive investment destination also thanks to elimination of exchange risk which created asymmetric demand shock. There has been a divergence between spending and growth of output as well as divergence between production costs and price levels. While in Germany unit labour costs remained stable and demand was lower, in GIIPS countries they rose significantly, so although ECB managed its monetary policy to target inflation close but lower than 2% in GIIPS inflation rates were higher, leading to the loss of competitiveness.

Beker-Pucar & Glavaški (2021) showed that peripheral Eurozone economies had unstable economic growth and are more prone to sharp decline, they have higher unemployment and current account deficit and their fiscal position is worse, even in the period 2007-2018. So also in the period after the outbreak of crisis asymmetries and divergences are persistent.

According to Sinn (2010) introducing euro was not beneficial for all EMU members. Because of the lack of effective private and public debt constrains it facilitated growth in peripheral countries and caused overheating, while in Germany opposite was happening. Domestic saving was channelled towards peripheral countries and as consequence Germany had the smallest net investment rate. The root of economic problems in Eurozone are external imbalances between core and periphery. Interest rates in peripheral countries were higher before the advent of EMU reflecting inflation and devaluation risk, as well as higher transaction costs. Since exchange rate risk and transaction costs would be eliminated with joining euro area, interest rates started to converge towards rates in Germany when investors expected for certain country to become a member of Eurozone. It was also expected that members' inflation would be tied to German, bringing monetary stability. Inflow of cheap credit facilitated growth especially in construction, higher inflation and current account deficits.

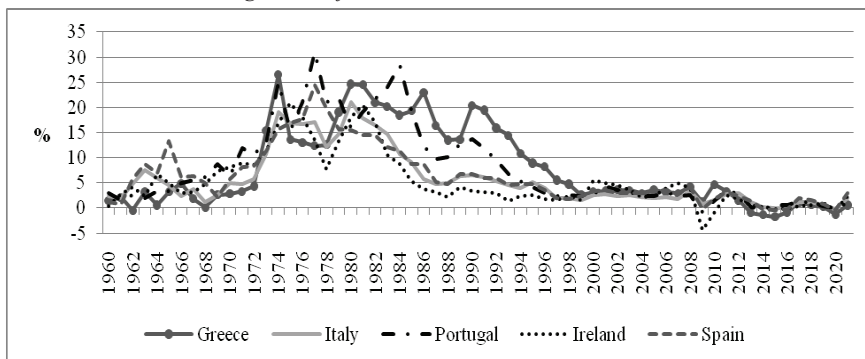
According to Cesaratto (2014) debtor countries (GIIPS) are not the only side to blame, creditor countries are equally guilty. Germany applied the strategy of keeping inflation lower than in trading partners (low wages in comparison to productivity and somewhat more restrictive fiscal policy) which together with fixed exchange rates brought higher competitiveness that boosted German economy. Flows of cheap credit

provided purchasing power to peripheral countries so that they could purchase the surplus of products from the core economies, which increased their indebtedness. Blanchard & Giavazzi (2002) stated that capital flows between core and periphery mean that richer core countries are lending money to poor peripheral countries to help them in catching up process, so integration must have effects on current account balance. However this growth was not sustainable, import grew with income, wages tended to converge to levels in core countries, demand rose as well as inflation reducing competitiveness of export. Thus Monetary union environment created significant imbalances among members, largely due to differences in productivity and inflation.

Research Design and Methodology

The establishment of European monetary union brought very low inflation rates for GIIPS countries. Figure 1. shows that observed countries struggled with very high inflation rates in 1970s, 1980s and significant part of 1990s. EMU membership brought very low inflation rates, consistency and credibility of monetary policy which their national central banks did not enjoy. Obviously, in the second half of 1990s they made considerable effort to satisfy this Maastricht criteria and join Eurozone.

Figure 1: Inflation rates in GIIPS since 1960



Source: Worldbank, Data for 2021: ECB, 21.03.2022

At first glance it also seems that their inflation rates tend to move together. So ECB was successful in achieving monetary stability. That is why key hypothesis of this research is: common currency and monetary policy managed to reduce inflation differentials among peripheral member countries. Auxiliary hypothesis is: Financial crisis and austerity measures led to convergence of inflation rates among GIIPS countries.

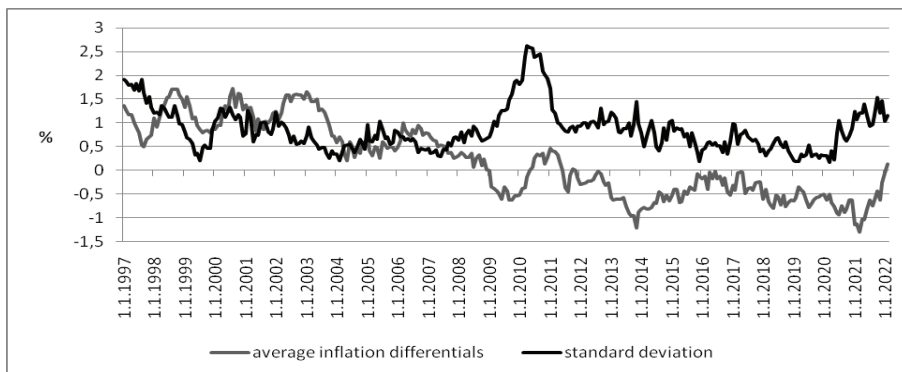
ECB was very successful in achieving low inflation rates and inflation differentials among member countries are significantly reduced. On the other side, inflation differentials still exist and they seem to be very persistent, which brings problems with managing common monetary policy and it will not suit countries with inflation significantly higher or lower than EMU average inflation. In the following part of the paper we will analyse if premises of new theory of optimal currency area proved in

practice, to understand if the environment of Monetary union facilitated the convergence process. Since peripheral countries had to undertake deflationary adjustment programs, we will also test the influence of financial crisis (and its consequences) on inflation convergence. After the analysis of statistical characteristics of inflation processes in GIIPS countries and indicators of sigma convergence we will conduct the Unit root test on the series of standard deviations of inflation rates to understand if there was a progress towards average inflation rates and if this group of countries has relatively homogenous characteristics and needs.

Research results and Discussion: Analysis of inflation differentials and convergence process

Figure 2. shows average inflation differentials and their standard deviations. Inflation differentials are calculated as the difference between inflation rate in a given country and EMU inflation rate for periods between January 1997 and February 2022, for which data are available on the monthly basis. Convergence occurred if average inflation differentials have decreasing tendency, and the optimal situation is a lack of significant differences between members 'inflation rates. If differences would tend to zero and if their variations would be correlated that would ease the conduct of common monetary policy and it will suit member countries. Outliers would face significant problems and economic disbalances. In economic literature sigma convergence is measured in different ways, standard deviations and coefficient of variation are most commonly used (Petrović & Gligorić Matić, 2021, p.53).

Figure 2: Inflation differentials in GIIPS countries



Source: Author's calculation based on data from ECB, 21.3.2022

Data for average inflation differentials (Figure 2) show diminishing tendency until the outbreak of financial crisis. After that average inflation differentials turned negative, showing that these countries have lower inflation rates than average. That is the consequence of deflationary adjustment measures they had to undertake to restore competitiveness. However if those countries face significantly lower inflation than the rest of Monetary union in longer term, common monetary policy might be too restrictive,

causing further contraction in demand and thus business activity and employment. So their business cycle might diverge from the rest of Eurozone. This data should be analysed together with standard deviations to understand if variability of inflation rates in GIIPS countries decreased so that they tend to be homogenous group of countries. Unfortunately, although there was some mild decreasing tendency until crisis, differences rose after 2008 and we can not say that they tend to diminish again. Statistical characteristics of inflation processes in given countries are presented in the Table 1.

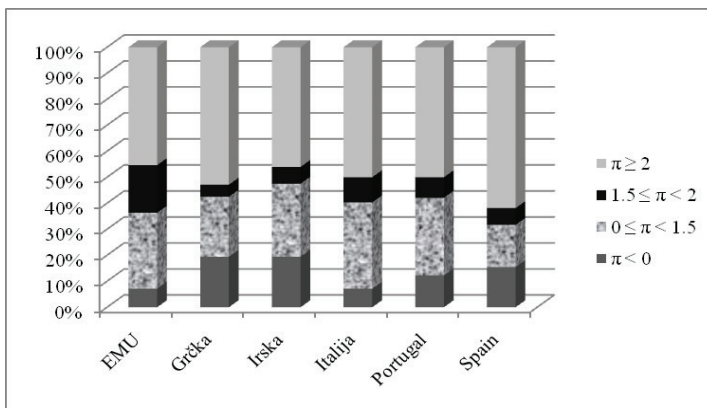
Table 1: Descriptive statistics of inflation rates in GIIPS countries, January 1999-February 2022

	Greece	Ireland	Italy	Portugal	Spain	EMU
Mean	1.8	1.7	1.7	1.8	2.1	1.7
Median	2.2	1.7	2.0	2.0	2.4	1.9
Maximum	6.3	5.9	6.2	5.1	7.6	5.9
Minimum	-2.9	-2.9	-1.0	-1.8	-1.5	-0.6
Standard deviation	2.0	2.0	1.2	1.5	1.7	1.0
Coefficient of variation	110.9%	119.1%	68.0%	82.9%	80.7%	61.3%

Source: Author's calculation based on data from ECB, 21.3.2022

Mean inflation in observed countries with exception of Spain is in line with the goal of ECB, it is lower but close to 2%. However median inflation is higher except in Ireland. This means those countries still struggle with higher inflation, because the value that is "in the middle" of data is higher than ECB goal, but in some periods inflation rates were very low, negative, decreasing average values. Variability of inflation rates is very large. Standard deviations and coefficients of variation are significantly higher than EMU average, especially in Ireland and Greece. Besides, coefficient of variation does not shows decreasing tendency. This brings higher inflation risk and unpredictability in long-term businesses. To understand variability of inflation rates in individual countries we conducted frequency analysis, which results are given in Figure 3.

Figure 3: Frequency analysis of inflation rates



Source: Author's calculation based on data from ECB, 21.3.2022

Figure 3 reveals some very problematic developments. It is not precisely defined what the goal of ECB means, but we assumed that is the inflation rate equal or higher than 1.5% but lower than 2% (black part of columns). Even ECB was not successful with its goal! In only 18% of cases inflation was within the goal limits. In more than 45% of observed periods it was equal or higher than 2%, in 7% of cases it was negative and in slightly less than 30% very low, but positive. Spain and Greece were the least successful in maintaining inflation within goal boundaries. In Spain inflation was above goal in almost 62% of cases, while in 15.5% it faced deflation. In only 6.5% it was at the goal boundaries. Greece was successful in less than 5% of time, while it struggled with deflation in almost 20% of period. Inflation was higher in 53% of time. In half of observed period Italy and Portugal had inflation higher than targeted. Portugal faced deflation in 12% and Italy in 7% of cases. Inflation was at targeted level in less than 10% of cases in Italy and less than 8% in Portugal. In Ireland in 46% of periods inflation was higher and in only 6.5% at the goal level. This country faced deflation in almost 20% of cases. We can not say that inflation indicators for GIIPS tend to follow indicators for European monetary union. This means that they are not close to average so that common monetary policy does not suit them. It might even cause departure of their economic performances away from Monetary union.

We conducted Unit root test on the series of standard deviations of inflation differentials. Unit root test show weather two or more variables are in the process of converging. If there was convergence process, inflation differentials will diminish over time and tend to zero. If inflation differentials between two or more countries present stationary process, it is converging to some value (it should tend zero) and its variance is finite (it should also diminish over time). If there is unit root, series does not have constant mean and finite variance. So inflation rates are not converging. Since our analysis showed that outbreak of financial crisis led to divergence of inflation rates we will conduct our analysis on two sets of data. The first is series of standard deviations of inflation differentials between January 1997 and end of 2008, and the second is the series of standard deviations of inflation differentials in period January 2009 to February 2022. So we will be able to test the significance of financial crisis to inflation convergence among GIIPS countries. Results are given in Table 2. and Table 3.

Table 2: Unit root test in levels for the series: Standard deviation of inflation differentials in GIIPS countries

Null Hypothesis: STANDARD_DEVIATION has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=13)		
		t-Statistic
		Prob.*
Augmented Dickey-Fuller test statistic		-3.376303
Test critical values:		0.0134
	1% level	-3.476472
	5% level	-2.881685
	10% level	-2.577591
*MacKinnon (1996) one-sided p-values.		
Augmented Dickey-Fuller Test Equation		

Dependent Variable: D(STANDARD_DEVIATION)
 Method: Least Squares
 Date: 03/22/22 Time: 18:26
 Sample (adjusted): 1997M02 2008M12
 Included observations: 143 after adjustments

Source: Author's calculation in Eviews, based on data from: ECB, 21.3.2022

Table 3: Unit root test in levels for the series: Standard deviation of inflation differentials in GIIPS countries, 2009-February 2022

Null Hypothesis: STANDARD_DEVIATION has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=13)		
		t-Statistic
		Prob.*
Augmented Dickey-Fuller test statistic		-3.376303
Test critical values:	1% level	-3.476472
	5% level	-2.881685
	10% level	-2.577591
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Date: 03/22/22 Time: 18:26		
Sample (adjusted): 1997M02 2008M12		
Included observations: 143 after adjustments		

Source: Author's calculation in Eviews, based on data from: ECB, 21.3.2022

Obtained results show that there is no unit root test in the series of standard deviation of inflation differentials for the period 1997-2008. The decision was made on the basis of Dickey-Fuller test, which tests the null hypothesis that a time series has a unit root. DF τ statistics was found to be equal to -3.38 , while the critical value (with intercept) was $\tau^k = -2.88$ at 5% confidence level. Also $p=0.0134$, so the probability that we will reject correct null hypothesis is very small. Model confirmed our previous analysis, GIIPS countries indeed made significant effort to reach monetary stability, fulfill nominal convergence criteria and maintain relatively low inflation rates after joining EMU.

Results of unit root test for the period January 2009 until February 2022 are given in the Table 3. Obtained results for the second period differ, we found that there is a unit root in the series of standard deviations of inflation differentials. DF τ statistics is -2.3 , while the critical value $\tau^k = -2.88$, and $p=0.1726$ which means that there is high probability that we will reject correct null hypothesis. So there was no statistically significant convergence of inflation rates in GIIPS countries after 2009. It appears that financial crisis has jeopardized the good results initially achieved. Those countries do not follow average EMU inflation path.

Conclusion

European central bank is responsible for the common monetary policy in 19 countries that differ in size, economic development, economic and political structure, while there is no fiscal union and fully integrated single market. It was expected that the environment of monetary union will lead towards higher convergence of economic performances among members, which is of crucial importance for the long-run success of monetary union. In the second half of 2000s there was a process of economic divergence and polarization, among two groups of countries according their economic results. This is a great challenge for the common monetary policy while it doesn't suit all member countries and might be the source of further destabilisation and imbalances.

We analysed the convergence of inflation rates among a group of peripheral countries (GIIPS), to understand if there was some progress towards monetary stability and larger homogeneity. These countries had significant macroeconomic problems before joining EMU and made significant effort to fulfil the entry criteria. Statistical analysis showed that although their average inflation rates decreased significantly, still they were above average, and there is no tendency of diminishing dispersion. Both standard deviation and coefficient of variations do not show long-term convergence- a reduction of inflation rates dispersion among observed countries. According to frequency analysis in majority of cases their inflation was not close to ECB goal, or average. Unit root test confirmed that the advent of Monetary union and common monetary policy facilitated reduction of inflation differentials in the period before the advent of Monetary union and at the very beginning of 2000s, but until the 2008 crisis it seems that the progress has stopped. For the following period test did not indicate further convergence process. Contrary these group of countries seems to be pretty heterogeneous and ongoing rise in inflation rates tends to foster further divergence. These results show that euro did not bring benefits to all member countries and structural reforms especially in product and labour markets are needed, as well as better governance of convergence.

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FERTILIZERS USE EFFICIENCY: WESTERN BALKAN

Abstract

In the case of the crisis, such as the current conflict in the Ukraine, the question of input effectiveness in agricultural production has become very important. In that context, the main objective of this paper is to find the level of fertiliser efficiency in the Western Balkan countries. The paper also aims to discuss health of the soil in the region and its dependence on fertilisers imports. Results showed that fertilizer use efficiency is higher in the region than in the EU. However, considering the high dependence on imports and the most likely prolongation of the crisis, certain suggestions for improving the situation were given. This conclusion can be useful for the creators of the agricultural policy as well as for agricultural producers.

Key words: *fertilisers efficiency, Ukrainian war, food, crisis*

JEL classification: *Q1, R11, Q24*

ЕФИКАСНОСТ УПОТРЕБЕ ЂУБРИВА: ЗАПАДНИ БАЛКАН

Апстракт

У кризним ситуацијама, као што је текући сукоб у Украјини, питање учинковитости инпута у пољопривредној производњи постаје врло значајно. У том контексту, главни циљ овог рада је утврђивање нивоа ефикасности примене ђубрива у земљама Западног Балкана. Истовремено, фокус овог рада је здравље земљишта у региону, као и зависност региона од увоза ђубрива. Резултати су показали да је ефикасност ђубрива већа у региону него у ЕУ. Међутим, с обзиром на високу зависност од увоза и највероватније продужење кризе, дати су одређени предлози за побољшање ситуације. Закључци овог рада могу бити од користи креаторима пољопривредне политике као и пољопривредним произвођачима.

Кључне речи: *ефикасност ђубрива, рат у Украјини, храна, криза*

Introduction

Historically, agricultural production was inconceivable without fertilizers that serve to ensure sustainable and stable production. But at the same time they fraught with some problems also - they facilitate large-scale monocultures and act as disrupters of ecosystems especially during the boom-and-bust season (Van Sundert, et al., 2021). Over time, the

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fertilizers market showed explosive growth. It amounted to more than 193 billion US dollars in 2021, an increase of roughly 12 percent in comparison with the previous year. It is forecast that it will surpass 240 billion US dollars by 2030 (Statista, 2022).

However, the current global crisis has had a significant impact upon most industries, including the fertilizer industry. Although the fertilizer industry showed a high degree of “immunity” to the COVID-19 pandemic (Ilinova et al., 2021), fertilizer prices increased by 80% during 2021 driven by surging energy costs, supply curtailments, and trade policies (Baffes et al., 2022). The Russia-Ukraine crisis substantially elevates the risk of disruptions in the global fertilizer trade and longer-term complications in the food system (Ben Hassen & El Bilali, 2022). The war has both short and long-term impacts on global food security. Immediate effects include logistic blockages, restrictions on exports, increase in prices (energy/gas, fertilizers, food), inflation, etc. Among other, indirect and cascading impacts include economic recession, income and purchasing power losses, political instability and unrest, increase in malnutrition, deterioration in the diet quality, panic buying, delayed sowing/cultivation, and decrease in yield due to lower fertilizers use.

All three mineral fertilizers, nitrogen (N), phosphate (P), and potash (K) that are crucial for agricultural productivity (Hebebrand et al., 2022) are sold in global markets, and their production is geographically concentrated and dominated by a handful of miners (P and K) and a somewhat larger group of chemical companies (N) (Rabobank, 2022). The Russia-Ukraine conflict and the subsequent sanctions have instantly disconnected global markets from Russian and Belorussian fertilizers. Russia and Belarus are a key mining and production region for potash. Russia accounts for 20.66% of global exports, 19.01% of production, while Belorussia accounts for 20.51% of exports, and 17.48% of potash production, according to Rabobank research (2022). Russia also plays a significant role in the nitrogen fertilizer market. According to the same source, Russia is responsible for global export of 22.71% of ammonia, 2.54% ammonium-sulphate, 45.81% ammonium-nitrate, and 4.14% calcium-ammonium-nitrate. Russia's role in the market for phosphate fertilizers is also not negligible. It accounts for 9.18% of phosphate rock exports, 14.52% of mono-ammonium phosphate exports, and 8.24% of di-ammonium phosphate exports. In addition, Russia is a key supplier of natural gas, which is critically important for the EU and India, as those countries' nitrogen production depends on imported raw material. As a result of the drastic rise in natural gas prices, ammonia production in Europe significantly decreased and several factories were forced to halt work (The Guardian, 2022). China, a major producer of phosphate fertilizers, through its export restriction from July 2021 through June 2022 put additional pressure on the volatile fertilizer market (Benton et al., 2022).

Such disruptions in the market put in focus fertilizers use efficiency as a critically important concept for evaluating crop production systems (Fixen et al., 2015). Efficient fertilizer use that can be defined as maximum returns per unit of fertilizer applied (Mortvedt et al., 2001) is the result of interactions between plant genotype and the environment, including both abiotic and biotic factors (Barlóg et al, 2022). In its recent report a Food and Agricultural Organization (FAO) recognized importance of fertilizer's effectiveness and urged for it within a framework of long-term sustainable solutions to avert the risk of deepening the existing crisis (FAO, 2022).

There is a general lack of literature about fertilizers efficiency in the Western Balkan region (Table 1). Thus, this paper aims to provide some new empirical evidence of this issue.

Table 1. Literature review

Paper	Material and methods	Main results
Lampietti et al. (2009)	This reports analysis the challenges facing rural and the agri-food sector in the Western Balkan using different indicators.	A key part of adaptation to climate change in Western Balkan will be promotion of more efficient use of fertilizers and pesticides.
Mizik (2011)	Analysis of the Western Balkan countries' agriculture using different indicators.	The results showed that unsatisfactory level of fertilizer use could be the reason of lower maize and wheat yields than in the EU.
Custovic et al. (2012)	Analysis of the climate change effects on Western Balkan's agriculture	Among a numerous short-term adaptation measure to climate change authors suggested prudent use of fertilizers.
Lovre (2016)	Three indicators: output per unit of labour, output per unit of land, and the aggregate total factor productivity were used to determine the agricultural productivity of the Western Balkan countries.	Out of all Western Balkan countries the highest growth rate of total factor productivity (TFP) was registered in Bosnia and Herzegovina thanks to the substantial intensification of agricultural production, among other the high use of mineral fertilisers.

Source. The authors' composition.

Materials and Methods

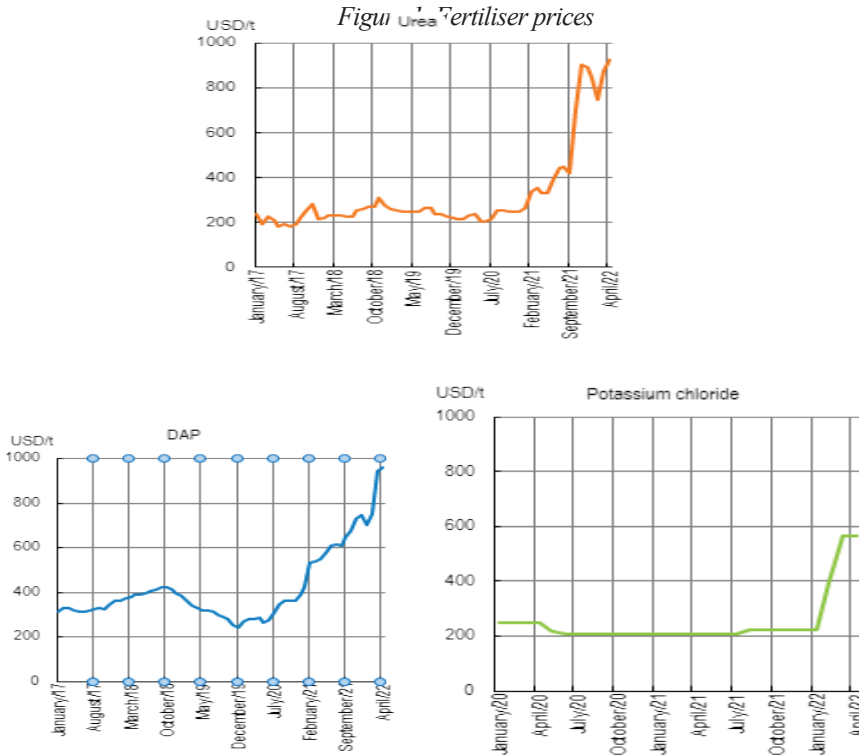
The sample is made up of five countries of the Western Balkan region (Albania, Bosnia and Herzegovina, North Macedonia, Montenegro, and Serbia) over a 14-year period (2006-2019).

In the first step, we presented global fertilizers prices using OECD/FAO (2022) data. Then, Western Balkans policy decisions related to the Ukrainian crisis were shown. Third, the soil health in the region was analysed based on a recently published report (Zdruli et al., 2022). Fourth, using ICT (2022) data, an analysis of the dependence of the countries of the Western Balkans on the fertilisers imported from Russia and Belarus was done. Fifth, the efficiency is expressed as a ratio between the cereal production and fertilizers' application (Liu et al., 2015). For that purpose, we used annual FAOSTAT data.

Global Fertiliser Prices

The Ukrainian war stimulates further increase of already high levels of fertiliser prices (Figure 1). High fertiliser prices are caused by five key drivers: strong fertilizer demand, supply chain disruptions, high raw material prices, domestic policies, and geopolitical risks (Cross, 2022). The spike in natural gas prices due to its pivotal role in the production of nitrogen fertilizers is especially concerning. Adverse weather conditions around the world hampered the production of renewable energy and coal, leading to higher gas demand and a sharp increase in the prices of natural gas in 2021. The EU introduced post-war sanctions, the reduction in fossil fuels imported from Russia

and reduced gas flow to Europe ramped up prices. As a consequence, six months into the Russia-Ukraine war, natural gas prices in Europe increased by about 127.6% (Anadolu Agency, 2022).



Source: OECD/FAO (2022)

Disturbances in the fertilizer supply chain cause disruptions throughout the whole food system (CNBC, 2022). The most endangered are emerging market economies, meaning further deepening of the gap between rich and poor. Poorer countries will likely cut fertiliser usage in response to the price hikes, which threaten to reduce food production and deepen the global food crisis. High fertilizer prices will prevent farmers from expanding domestic production, and grains (and fertilizers) may become too expensive for the population. Disruption to the supply of fertilisers (and foods), together with COVID-19 pandemic consequences and droughts in many regions, could even cause social unrest (Financial Times, 2022). Hunger and possibly starvation will follow.

Western Balkans policy decision related to the Ukrainian crisis

The countries of the Western Balkans face skyrocketing inflation, with fears of food shortages and social unrest. The highest pressure is on the poor, who spend on food,

bills and energy the biggest share of their incomes. Food inflation in Serbia rose by 20.4 percent year-on-year in September of 2022; 28.70 percent in North Macedonia; 26.90 percent in Montenegro, 25.62 percent in Bosnia and Herzegovina (August); and 14.90 percent in Albania (August) (Trading Economist, 2022). Western Balkans governments have issued varying measures in response to the Ukrainian crisis (Table 2).

Table 2. Policy decision

Country	Policy classification	Policy direction	Initial date
ALB	Unspecified social policy measures/ Fuel resources for production	Introduction	3/12/2022
ALB	Institutional reform measure	Introduction	3/18/2022
BIH	Tax on fuel/water Fuel resources for production	Introduction	3/18/2022
BIH	Value added tax (VAT)	Decrease	3/17/2022
MKD	Value added tax (VAT)/ Tax on fuel/water	Introduction	3/09/2022
MKD	Export ban	Introduction	3/10/2022
MNE	No data available		
SRB	Fuel resources for production/ Export ban	Introduction	3/11/2022

Source. Fapda (2022).

However, these measures did not significantly improve the position of agricultural producers in the region. That's why dissatisfied farmers often organize some kind of protests, among other kinds, because of rising prices for mineral fertilizers (Fertilizer Daily, 2022). While fertilizer use in the Western Balkans (as in many other countries) is likely to decline due to price hikes, a solution in line with FAO (2022a) recommendation could be the use of fertilizers more efficiently by cutting their use while optimizing yields. To that aim, it is necessary to use soil maps to identify the best blending of N, P, K fertilizers just as the Ethiopian producers did within the frame of the Ethiopian Soil Information System following the FAO standards. Unfortunately, the current data about many soil issues in the region is scarce. There are only partial results of the Joint Research Centre (JRC) - the European Commission's science and knowledge service that are presented further in the text.

Soil health in the Western Balkans

On their way to the EU, Albania, Bosnia and Herzegovina, North Macedonia, Montenegro, and Serbia are required to adapt their national legislations and to bring them into line with EU legislation in the area of agriculture and ecology.

The aforementioned is emphasized in the region's Green Agenda aimed to transition to a sustainable food system. It is designed through plans to cope with the climate change, clean energy transition, biodiversity, innovative solutions for smart and sustainable mobility, sustainable production and consumption, depollution of the air, water and soil, etc. The soil condition is incorporated in the Zero Pollution Action, Circular Economy Action Plan, the EU

Climate Law, Farm2Fork Strategy, Soil Mission, and all other important EU’ plans aimed to ensure healthy ecosystems and living environments (Zdruli et al., 2022).

The ratio between the soil without intensive farming and crop land in the Western Balkans is very favourable – 80 : 20 (Table 3). However, it does not imply perfect soil management practices.

Table 3. Land use/land, Western Balkans, 2020

Country	Pop. (mill)	Area (km ²)	Agricultural land (against total territory)						Organic farming (against total agric. land)	
			Cropland		Permanent crops		Total		km ²	%
			km ²	%	km ²	%	km ²	%		
ALB	2.8	28748	6143.5	21.4	846.5	2.9	6960.0	24.3	6.5	0.1
BIH	3.3	51130	12288.6	24	54.6	0.1	12343.3	24.1	9.0	0.1
MKD	2.0	25436	4130.5	16.2	401.3	1.6	4531.8	17.8	39.6	0.2
MNE	0.6	13888	92.1	0.7	26.6	0.2	118.7	0.8	8.7	7.3
SRB	6.9	88407	25699.3	29.1	2062.3	2.3	27761.6	31.4	212.6	7.7
Total	17.4	218609	51463.7	19.9	3597.9	1.5	55031.6	21.4	2780	2.6

Source. Zdruli et al., 2022 composition based on National Statistics

The Western Balkan’ soil is susceptible to the following problems: over fertilization, diminishing carbon stocks, water and soil erosion, land taking for housing, salinisation, desertification, pollutions due to mining and other industrial activities, etc (Zdruli et al., 2022). For instance, 45% of the total land is affected by erosion and about 10% by salinization, while more than 5% of agricultural land is overfertilized. Clearly, there is a need for urgent governments’ actions to prevent further deterioration of the land. Some of the measures recommended by international organizations are the adoption and widening of sustainable, environmentally friendly technologies, such as organic farming. In order to reach the goal outlined in the European Green Deal - 25% of organic farming, the region will have to increase the area under this type of production by 10 times (Table 3).

Dependence on fertilisers import

From the available data on fertiliser statistics, it is quite clear that the Western Balkans are not an important player in the world market for fertilisers (Statista, 2022). China is the country with the largest production of nitrogen fertilizer, followed by the United States and India. Russia is the main exporter of agricultural fertilisers worldwide, followed by China and Canada, while Brazil, the United States and India are the main importers. China is the world’s largest consumer of fertilisers, followed by India and the United States.

According to IFASTAT (2022) data about the total N + P2O5 + K2O production and imports in 2020, Serbia produced 151.9 thousand tonnes, but imported 401.2 thousand tonnes of these fertilisers. Bosnia and Herzegovina produced 7.7 thousand tonnes and imported 44.7 thousand tonnes. No production was recorded in Albania and North Macedonia. In 2020 those countries imported 51.6 and 29.3 thousand tonnes, respectively, of the total N + P2O5

+ K2O. The total consumption of NPK fertilisers was in Serbia, Bosnia and Herzegovina, Albania, and North Macedonia: 470.9, 51.0, 51.6, and 29.2 thousand tonnes, respectively. There is no fertilizers self-sufficient country in the region. All are relying on import to a greater or lesser extent. Three countries - Montenegro, Albania, and North Macedonia do not have a company capable of their manufacturing. Serbia imports about 70% of its needs, and Bosnia and Herzegovina even more, about 85%.

As could be seen from Table 4, out of all Western Balkan countries, the highest level of dependence on fertilizers imported from Russia and Belarus is expressed in Serbia. In 2020 Serbia imported 39.2% of nitrogen fertilisers, 85.1% of complex fertilisers, and 53.3% of potassic fertilisers from Russia. The significant participation of Russia and Belarus was shown in North Macedonia and Bosnia and Herzegovina, also. North Macedonia imports 42.7% and 15.6% of its potassic fertilizers from Russia and Belarus, respectively. In addition, the country imports 39.4% of the complex fertilisers from Russia. The participation of Russia and Belarus in the total potassic fertilisers imports of Bosnia and Herzegovina was 71.3% in 2020.

The situation is further complicated by the following facts: Serbia is the leading supplier on which the food security of the entire region largely depends (Brankov, 2022); after the bankruptcy of Azotara Pancevo, only one company in Serbia produces mineral fertilizer - Elixir Group (SerbiaBussines, 2020); there is no proper competition on the market since Elixir Group, the leading producer of fertilizers was also the leading importer in 2017 and 2018, but it was replaced in that position in 2019 by the PROMIST; and fertilizer prices showing a growing trend.

The average import price of nitrogen fertilizers (code: 3102) increased over three years (2019-2021) from 261 to 346 US dollars per ton, an increase of 32.6%. In the same period of time, the average import price of fertilisers containing two or three fertilising elements (N, P, K) (code: 3105) increased by 19.9% (ITC, 2022).

Table 4. Imports of fertilizers from Russia and Belarus (in parenthesis), 2020 (%)

Country	Code 3102: Nitrogen fertilisers (%)	Code 3103: Phosphatic fertilisers (%)	Code 3104: Potassic fertilisers (%)	Code 3105: fertilisers containing two or three of the fertilising elements N, P, K
ALB	27.3 (0)*	0 (0)	0 (0)	0 (0)
BIH	1 (0)	0 (0)	58.2 (13.1)	18.8 (0)
MKD	8.2 (0)	0 (0)	42.7 (15.6)	39.4 (0)
MNE	7.0 (0)	0 (0)	0 (0)	4.7 (0)
SRB	39.2 (0)	0 (0)	53.3 (1.3)	85.1 (0)

Source. The authors' composition based on FAOSTAT

Conclusion

The objective of this study was to estimate the Western Balkan region's level of fertilizer efficiency. It was found that fertilizer use efficiency is higher in the region than in the EU. However, this is no reason to remain "business as usual", because changes in global markets require adjustments.

The Russian-Ukrainian conflict has caused enormous disruptions in the global food system. Russia is the world's top exporter of natural gas and nitrogen fertilisers, the second leading exporter of potassic fertilisers, and the third leading exporter of phosphorous fertilisers. As the agri-food sector is highly-energy intensive, rising energy and fertiliser prices are translating into higher production costs and contributing to food price increases. Rising input (and food) prices are raising concern about global food security.

Considering the likeliest scenario that the grain and fertilizer crisis will last for at least another couple of years, the high dependence of the Western Balkans on fertilizer imports is raising concerns about declining economic access to food. Thus, the most sustainable long-term solution would be the recovery of the domestic fertilizer industry. The second solution is, certainly, the continuation of current efforts to diversify fertiliser suppliers. Third, the appropriate government's support of farmers (e.g., fuel and fertilizer subsidies) is extremely important. No less important is to improve the efficiency of fertilizer use and to critically review our energy policy.

Nonetheless, the Western Balkans should follow and adopt good European practices regarding soil health.

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DETERMINANTS OF BANKS' NET INTEREST INCOME - THE EXAMPLE OF SERBIA

Abstract

Net interest income represents one of the main indicators of banks' profitability. In practice, return on assets (ROA) and return on capital (ROE) indicators are most often used as indicators, but the topic of this study is the investigation of determinants, that have the greatest impact on the net interest income of banks in the Serbian market. The research is based on numerous previous analyzes of factors that have effects on the profitability of banks in many countries. This study covers the period from 2014 to 2021 and includes a total of 22 banks currently operating in the Serbian market. The data used for the purposes of the research were taken from the financial reports of the banks themselves, as well as the World Bank database. In the research, the authors take Net Interest Margin (NIM) as a dependent variable, while as independent variables they take indicators of Net Non-Interest Margin (NNIM), Liquidity (LIQ), Debts (LOAN), Bank Size (SIZE), Non-performing loans (NPL) and Unemployment (UNEM). In the analysis, the authors analyzed the correlation matrix, the Levin, Lin & Chu unit root test, the variance inflation index, as well as the derivation of regression models based on fixed and random effects. The findings showed a negative effect of liquidity and bank size factors on direction of net interest margin, while debt and unemployment indicators showed a positive influence.

Keywords: Banks, Net interest margin, Profitability, the Serbian Banking industry

JEL classification: G20, G21, G33

ДЕТЕРМИНАНТЕ НЕТО КАМАТНОГ ПРИХОДА БАНАКА – ПРИМЕР СРБИЈЕ

Абстракт

Нето приход од камата представља један од главних показатеља профитабилности банака. У пракси се као индикатори најчешће користе индикатори приноса на активу (ROA) и приноса на капитал (ROE), али је тема ове студије истраживање детерминанти, које имају највећи утицај на нето приход од камата банака у 2012. години. српско тржиште. Истраживање се заснива на бројним досадашњим анализама фактора који утичу на профитабилност банака у многим земљама. Ова студија обухвата период

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од 2014. до 2021. године и обухвата укупно 22 банке које тренутно послују на српском тржишту. Подаци коришћени за потребе истраживања преузети су из финансијских извештаја самих банака, као и базе података Светске банке. У истраживању аутори узимају нето каматну маржу (NIM) као зависну варијаблу, док као независне варијабле узимају индикаторе нето некаматне марже (NNIM), ликвидности (LIK), дугова (LOAN), величине банке (SIZE), Ненаплативи кредити (NPL) и Незапосленост (UHEM). У анализи су аутори анализирали матрицу корелације, Левин, Лин & Цху јединични корен тест, индекс инфлације варијансе, као и извођење регресионих модела заснованих на фиксним и случајним ефектима. Налази су показали негативан утицај фактора ликвидности и величине банке на смер нето каматне марже, док су показатељи дуга и незапослености показали позитиван утицај.

Кључне речи: Банке, Нето каматна маржа, Профитабилност, Банкарска индустрија Србије

Introduction

Banks serve as financial intermediaries, transferring money from individuals or businesses with excess capital to those who need the money to perform a specific economic activity. One of the main duties of central banks is to implement monetary policy to bring about price stability and aid in managing economic swings. Monetary policy is the term used to describe the central bank's macroeconomic strategy. Profit is the cheapest type of capital and, on a micro level, is essential for a competitive banking firm. Besides being the result of greater competition in financial markets, it is necessary for efficient banking. The idea of managing and allocating funds in modern times is still evolving as the role of the banking system as a financial intermediary becomes more and more important (Saksonova, 2014). People, companies, and the state are economic actors that appear on both the surplus and deficit sides of the narrative. As the bank pays the deposit, collects the active interest on the placements it issues, and pays the deposit interest. The differential between the active and passive interest rates is where the bank derives the majority of its earnings. (Salem, Baidoun & Walsh, 2019). The development and establishment of financial mechanisms in the domains of production, distribution, exchange, and consumption in all social relationships are made possible by the banking system, which is a distinctive element of a wider economic system. (Andjelic & Vesic, 2017). Finding the elements that influence bank performance is a crucial sign of an unstable economy and can assist shareholders and bank management in presenting expert strategies and moving closer to long-term objectives. Positive shocks are more likely to be withstood by a strong banking sector, ensuring the stability of the financial system. It's vital to recognize the crucial factors that influence bank performance and profitability, among other things, in order to improve internal bank management and implement banking regulations. (Chen & Liao, 2009). The study includes four chapters, in the first part of the study, the authors present a literature review of many pieces of research related to the factors that effect the profitability of the banking sector of many countries. The next chapter includes the methodology in which the authors derive the basic hypotheses as well as the model of

the study itself. The formulas used by the authors in the diagnostic tests performed in the analysis are also presented. The next chapter includes tabular representations of the author's findings as well as the final predictive model as a result of the research. The study aims to better understand the main determinants and their impact on the net interest margin as a representative of banks' profitability.

Literature review

There are much older but also new studies related to the research of the determinants of banks' net interest margins. Some studies cover a larger number of countries, as well as studies that only investigate the banking market of one country. On the other hand, in a large number of studies, the influence of various factors on the net interest margin is investigated through the influence of those same factors on other indicators of the bank's profitability. This study focuses only on the net interest margin as a representative of the success of banks' operations. In one of the older studies, using panel data from the banking industries of 14 OECD countries, Hawtrey and Liang (2008) investigated the factors affecting banks' interest margins and found that market power, operating costs, risk aversion, interest rate volatility, credit risk, the volume of loans, implied interest payments and quality of management have an impact on the interest margins of the national banking industry. In addition, Bitar, Pukthuanthong, and Walker (2017) investigated whether imposing higher capital rates is effective in reducing risk and increasing the efficiency and profitability of banking institutions using a sample of 1,992 banks from 39 OECD countries between 1999 and 2013. It was shown that risk-based capital ratios reduced bank risk while risk-free capital ratios increased bank productivity and profitability. On the other hand, Fungatsova and Poghosian (2011) conducted empirical research using panel data on interest margin factors in Russian banking, with a focus on the ownership structure of banks. While operating expenses and risk aversion have similar effects across bank ownership forms, they discovered that other characteristics, such as market structure, credit risk, liquidity risk, and size of operations, had varied effects on a variety of commonly used metrics.

One of the studies examined factors affecting banks' net interest margins in Bangladesh, India, Nepal, and Pakistan from 1997 to 2012 using panel data from 230 banks. It was found that relative bank size, market dominance, and economic growth had opposite effects on net interest margins, while liquidity and capital position, required reserves, and operating expenses on total assets had a positive effect (Islam and Nishiyama, 2016). One study looked at factors affecting non-traditional banking activities and banking net interest margin between 1997 and 2004 in a group of 28 financially liberalized countries. For the years 1997 to 2002, a negative correlation between net interest margin and non-traditional banking was shown, which was statistically significant. For the following period from 2003 to 2004, an overall favorable but statistically insignificant correlation between net interest margin and non-traditional banking was revealed (Nguyen, 2012). A study by Tarus, Chekol & Mutol (2012) used panel data from 44 Kenyan banks covering the years 2000 to 2009. The results demonstrated that credit risk and operating expenses significantly and favorably impacted Kenyan commercial banks' net interest margins. The study also discovered that market concentration and expansion were detrimental to the net interest margin while inflation and growth were beneficial.

Examining the key factors affecting bank profitability in five selected Central and Eastern European countries, Capraru and Ikhnatov (2014) observed that banks with higher capital adequacy are more profitable and that bank size has a negative correlation with net interest margin, indicating that the bigger the bank, the lower the level of net interest margin. Another research by Horobet, Radulescu, Belescu & Dita (2021), focused on the determinants of bank profitability in selected countries of Central and Eastern Europe. Eleven countries in Central and Eastern Europe were included in the study, which spanned a nine-year period. Profitability indicators such as return on assets, return on equity, and net interest margin were used as proxies, and it was discovered that the unemployment rate, inflation, budget balance, non-state loans, non-performing loan rates, concentration rate, and capitalization rate all have a negative impact on bank profitability in a few Central and Eastern European countries. One of the more recent studies sought to identify the variables affecting the profitability of the banking sector in 13 post-Soviet countries. Panel regression with fixed effects and the GMM technique was used to examine annual data for the period of ten years. According to the definition, the ratio of non-interest income/interest income has a favorable impact on the profitability of banks in post-Soviet countries. It was decided that not relying exclusively or mainly on interest income was the best course of action for post-Soviet banks. It suggested that banks prioritize innovative revenue streams such as commissions and credit card fees (Yuksel, Mukhtarov, Mammadov & Ozsari, 2018). In their study, Topak & Talu (2017) looked into the macroeconomic issues affecting Turkish commercial banks between 2005 and 2015. It was discovered that net interest margin, as measured by total operating expenses, relative size, and the ratio of interest on loans to interest on deposits, had a favorable impact on bank profitability. In addition, Acaravci & Calim (2013), conducted a study of the impact of macroeconomic and bank-specific factors on the profitability of banks in Turkey, where the Net interest margin was taken as one of the representatives of profitability. Javaid (2016) conducted a study on the profitability of the Pakistani banking industry. In the period from 2006 to 2013, he examined the impact of both internal and external factors on bank profitability. The results showed a significant positive relationship between bank size and non-interest income and bank profitability. In one of the articles, the productivity and profitability of Indian public and private sector banks are examined concerning banking and corporate governance-related variables. The findings showed that the productivity and profitability of public sector banks are mainly explained by bank-specific factors, including diversification, net interest spread, and size (Narwal & Pathneja, 2016).

Leikun (2016) examined the variables affecting the net interest margins of the Commercial Bank of Ethiopia from 2005 to 2014 when the bank's net interest margin increased. According to this study, the key factors affecting the net interest margins of Ethiopian banks were capital adequacy, credit risk, operating costs, degree of competition and deposit growth rate. The effects of the COVID-19 pandemic on the profitability of the Ugandan banking sector were the subject of a study by Katusiime (2021). As measures of bank profitability, return on assets, return on equity, and net interest margin were utilized. It was discovered that the ratio of non-performing loans, the liquidity ratio, and the risk of market sensitivity had a negative influence on the bank's profitability in the near run, although the interest rate and the borrowing rate in government bills had a noticeably beneficial impact. The investigation came to the conclusion that the COVID-19 pandemic

only significantly harmed bank profitability over the long term. In order to measure and evaluate the factors affecting return on assets, Puspitasari, Sudiatno, Hartoto & Vidati (2021) employed net interest margin as a moderating variable. Their study focused on 27 financial institutions that were listed on the Indonesia Stock Exchange from 2015 to 2018. The moderating variable, net interest margin, was found to have not affected how capital adequacy affects return on assets. The impact of the loan-to-deposit ratio on the return on assets ratio, however, could be mitigated by the net interest margin. It was clear from the findings of the study that banks with high net interest margins have a loan-to-deposit ratio that increases along with the return on assets ratio. One study examined the impacts on commercial banks' net interest margin in Vietnam between 2008 and 2018. According to the findings, operating expenses and credit risk had a positive impact on NIM, while risk aversion, management caliber, trading income, and deposit percentage had a negative impact. (Suu, Luu, Pho & McAleer, 2020). Angori, Aristei, and Gallo (2019) examined the factors that affected net interest margin in the Eurozone between 2008 and 2014. Together with the main factors that affect net interest margin at the bank level, such as market power, capitalization, interest rate risk, and level of efficiency, the authors also took into account the regulatory and institutional context. The results showed that banking margins for conventional activities have decreased, mostly as a result of the rise in non-traditional activities and the various levels of efficiency that distinguish banking systems across the Eurozone. The regulatory environment was also shown to have a significant impact on net interest margins, which remained lower in countries with higher capital requirements and greater supervisory authority.

There are also many studies related to a better understanding of the impact of numerous factors on the banking market of Serbia, based on which the authors base this study. Studies like (Bukvic, 2020; Pekovic, Pavlovic & Zdravkovic, 2020; Spahic & Tomic, 2015; Vesic, Gavrilovic & Petronijevic, 2019; Radojicic, Jemovic & Dragijevic, 2021; Vesic, Ravic & Djekic, 2019; Malenkovic, 2022, Marcikic, Horvat, Milenkovic, Radovanov, Zelenovic & Milic, 2022). There is also a study by Fidanovski, Choudhry, Davidovic & Sergi (2017), who investigated the factors influencing bank profitability of Croatian banks.

Research Tasks and Hypothesis

The methodology chapter presents an overview of the dependent and independent variables used in the analysis, as well as a tabular overview of the used variables. The paper includes a time series from 2014 to 2021, where the authors analyze panel data of 22 commercial banks operating in the Republic of Serbia. The statistical software Eviews was used in the data analysis. Also presented are the main formulas and models used in the research along with the hypotheses that the authors derived. In the following chapter of the paper, the authors present the descriptive statistics of the used variables as well as the correlation matrix. In addition to the correlation matrix, the multicollinearity test was also used in the paper with the help of the variance index factor to satisfy the conditions for performing a valid regression model. In the same section, the common unit root test is presented, which was performed with the help of the Levin-Chu model to establish the stationarity of the data used. At the end of the chapter, the regression model was analyzed with the help of fixed and random effects, as well as the Hausman

test to establish the adequacy of the applied models. The table below shows the used variables as well as their expected impact. In the paper, the authors used the indicator of Net Interest Margin (NIM) as a dependent variable, while the indicators of Net Non-Interest Margin (NNIM), Liquidity (LIQ), Debt (LOAN), Non-performing loans (NPL), Size (SIZE) and unemployment (UNEM) used in the analysis as independent variables.

Table 1: Variables

Symbol	Variable	Proxy	Expected
NIM	Net interest margin	Net interest profit / Assets	
NNIM	Non-interest margin	Net non-interest profit / Assets	+
LIQ	Liquidity	Loans/Deposits	-
LOAN	Loans	Loans/Assets	+
SIZE	Size	Logarithm of assets	+/-
NPL	Non-performing loans	Change of non-performing loans in the banking sector	+/-
UNEM	Unemployment	Yearly unemployment rate	+

Source: World Bank (2022), National bank of Serbia (2022)

Based on the used dependent and independent variables, the authors derive the following regression model:

$$y = \alpha + \beta_1 NNIM_{it} + \beta_2 LIQ_{it} + \beta_3 LOAN_{it} + \beta_4 SIZE_{it} + \beta_5 \Delta NPL_{it} + \beta_6 UNEM_{it} + \varepsilon$$

Where:

- Y stands for the dependent variable NIM
- $NNIM_{it}$ stands for Non interest income i at time t
- LIQ_{it} stands for liquidity of bank i at time t
- $LOAN_{it}$ stands for Loan/assets indicator of bank i at time t
- $SIZE_{it}$ stands for size log changes of bank i at time t
- ΔNPL_t stands for Non-performing loans at time t
- $UNEM_t$ stands for Unemployment rate at time t

Based on the model, the following assumptions were made:

H0: The independent variables do not affect the net interest margin

H1: The independent variables have an impact on the net interest margin

Panel data are often used for econometric research because they enable the integration of spatial and temporal dimensions. Specifically, panel data consist of numerous independent instances of the same observation unit. One of the requirements on which the econometric analysis of time series is based is stationary data, which is the most important requirement for the econometric approach (Musdak, 2011). It talks about the mean and variance of a time series as constant values. The Levin, Lin & Chu common unit root test is used in this analysis to determine whether the data are stationary. The following assumptions are part of this test:

H0 : The data are not stationary (have a unit root)

H1: The data are stationary

When the data in the analysis has a p-value greater than 0.05, non-stationarity of the data is present. The unit root test is performed to remove non-stationary data because using non-stationary data can result in an unwanted regression model (spurious regression).

In addition, the multicollinearity test, which shows whether there is a high degree of correlation between independent variables, is one of the key tests for determining the validity of the data. In accordance with Lin, Foster, & Ungar (2011), the VIF test was used for the analysis, and the results were calculated as follows:

$$VIF = 1/(1 - R_j^2)$$

Where:

- VIF – Variance inflation factor
- R_j^2 – R square of the regression model

The test includes the following hypotheses:

H0 : Multicollinearity exists

H1: Multicollinearity is not present

Data must be eliminated from the regression model if the variance inflation factor is greater than a threshold value of 10, indicating the presence of multicollinearity.

One of the most important tests in panel analysis is the Hausman test, which allows one to choose between fixed-effects models and labor-effects models that are more appropriate. The Hausman test can be expressed as a formula as shown below (Hahn, Ham, & Moon, 2011):

$$H = (\beta^{FE} - \beta^{RE})' [Var(\beta^{FE}) - Var(\beta^{RE})]^{-1} (\beta^{FE} - \beta^{RE})$$

Where:

- β^{FE} – Fixed effects model estimates
- β^{RE} – Random effects model estimates

The Hausman test includes the following assumptions:

H0: The random model is adequate

H1: The Fixed Effects model is adequate

If the p-value of the Hausman test is greater than the threshold of 0.05, the null hypothesis is accepted; otherwise, a fixed effects model is preferred.

Research results and Discussion

Six independent variables in the study were computed using the financial statements of 22 Serbian banks that operate banks. The study period covers eight years and includes 172 observations. The table below shows a description of the indicators used. Indicators with the highest level of standard deviation are indicators of liquidity and bank size, which means that these two indicators have the largest difference between the minimum and maximum amount of data.

Table 2: Descriptive statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev	Obs
NIM	0,0357	0,0326	0,1267	0,0002	0,0206	172
NNIM	0,0110	0,0095	0,1694	0,0000	0,0131	172
LIQ	2,4139	2,0600	11,2000	1,1100	1,3743	172
LOAN	0,6323	0,6621	0,9201	0,0118	0,1523	172
SIZE	17,8712	18,2353	20,3162	14,4381	1,3424	172
NPL	10,6621	5,6964	21,5841	3,5741	7,4138	172
UNEM	0,1337	0,1273	0,1922	0,0901	0,0343	172

Source: author's calculation

By deriving the correlation matrix below, the relationship of the variables used is noticeable. As the first test for the presence of multicollinearity, the correlation matrix is used to identify the presence of a large correlation between certain variables used in the analysis. The condition for the presence of excessive correlation, which can result in multicollinearity of the data, is the presence of a correlation that is greater than 0.50. In the analysis, it is noticeable that the highest level of positive correlation exists precisely between the Net Interest Margin (NIM) and the debt indicator (LOAN), which is 0.3308, while it can be concluded that there is no excessive correlation between the variables used. Further analysis of the correlation matrix shows a positive correlation of the dependent variable Net interest margin (NIM) with the independent variables of liquidity (LIQ), debt (LOAN), non-performing loans (NPL), and unemployment rate (UNEM), while with the variables of net non-interest margin (NNIM) and size (SIZE) have a negative correlation.

Table 3: Correlation matrix

Variable	1	2	3	4	5	6	7
NIM	1	-0,1845	0,1614	0,3308	-0,0124	0,0385	0,2774
NNIM	-0,1845	1	-0,1432	-0,2833	-0,1071	-0,0565	0,0566
LIQ	0,1614	-0,1432	1	-0,1947	-0,3023	0,0982	0,0725
LOAN	0,3308	-0,2833	-0,1947	1	0,2188	-0,0864	-0,0905
SIZE	-0,0124	-0,1071	-0,3024	0,2188	1	0,0154	-0,1021
NPL	0,0385	-0,0565	0,0982	-0,0864	0,01541	1	0,282
UNEM	0,2774	0,0566	0,0725	-0,0905	-0,1021	0,282	1

Source: author's calculation

After calculating the correlation matrix, the authors used the variance index factor to run a multicollinearity test to check for the presence of multicollinearity between the independent variables. One of the key reasons why panel regression models are inaccurate is the presence of multicollinearity. Since the cut-off value for multicollinearity is 10, the authors can reject the null hypothesis that multicollinearity exists based on the analysis finding that the average VIF (Variance Index Factor) is 1.1535. As a result, we conclude that

there is no multicollinearity between the independent variables. Descriptive variables are not multicollinear, so the authors in the next section of the study perform the remaining necessary tests before running the regression model.

Table 4: Multicollinearity test

Variable	Coeff. variance	Centered VIF
NNIM	0,0130	1,1607
LIQ	0,0000	1,1945
LOAN	0,0000	1,1890
SIZE	0,0000	1,1105
Δ NPL	0,0000	1,1600
UNEM	0,0018	1,1060
Average VIF		1,1535

Source: author's calculation

The existence of stationarity is another prerequisite for a true regression model. The authors conducted the study using the Common unit root test with the Levin, Lin & Chu panel unit root test to determine whether the stationarity of the given variables was present. We discussed the absence of a unit root as a null hypothesis in the Methodology section. Based on the analysis, the authors determined that no variable contains a unit root, that is, that there is stationarity of the data at the level. The stationarity of the data used allowed the authors to reject the null hypothesis of the non-stationarity of the data.

Table 5: Levin, Lin & Chu panel unit root test

Variable	t statistic individual intercept	Prob.	Critical values	t statistic individual intercept and trend	Prob.	Critical values
NIM	-2,2114	0,0135	Level	-8,9916	0,0000	Level
NNIM	-4,7651	0,0000	Level	-2,0683	0,0193	Level
LIQ	-8,2840	0,0000	Level	-97,3645	0,0000	Level
LOAN	-15,0105	0,0000	Level	-10,1478	0,0000	Level
SIZE	-84,2106	0,0000	Level	-1,4969	0,0492	Level
Δ NPL	-6,1804	0,0000	Level	-54,1096	0,0000	Level
UNEM	-11,0397	0,0000	Level	-25,1242	0,0395	Level

Source: author's calculation

After the diagnostic tests have been performed, the basis for performing a valid regression model is created. In the analysis, the authors use panel regression with the help of fixed and random effects in order to establish a valid regression model. The table below

shows the results of the analysis showing the impact of certain variables on the net interest margin (NIM). There is a noticeable statistically significant influence of indicators of liquidity (LIQ), debt (LOAN), and unemployment rate (UNEM), while there is also an approximately statistically significant influence of bank size (SIZE). The variables net non-interest margin (NNIM) and non-performing loans (NPL) did not show a statistically significant effect. Also, indicators of liquidity (LIQ) and size of banks (SIZE) showed a negative effect on the net interest margin, while indicators such as debt (LOAN) and unemployment (UNEM) showed a positive effect. Based on the results of the regression model, the authors can conclude that certain variables really have an impact on the net interest margin, so the null hypothesis that the independent variables have no impact can be rejected. The negative liquidity impact (LIQ) can be interpreted as every 1% change in the liquidity ratio causes a decrease in the net interest margin (NIM) ratio by 0.0020%. Similarly, a change in the size of the bank by 1% leads to a decrease in the value of the net interest margin by 0.0019%. A change in the debt and unemployment indicators by 1% leads to an increase in the net interest margin by 0.0169% and 0.1497%. The authors also performed a Hausmann test to establish a more adequate model. In the methodology section, a threshold value of 0.05 is defined, by which it can be concluded that the fixed effects model is more acceptable in this example. The fixed effects model showed an R² of 0.91, which further supports the fact that the fixed effects model is more adequate than the random effects model.

Table 6: Fixed and Random effect

Variable	NIM			
	RE Model	Prob.	FE model	Prob.
NNIM	0,0432	0,4430	0,0421	0,4642
LIQ	-0,0016	0,0169	-0,0020	0,0048
LOAN	0,0195	0,0060	0,0169	0,0210
SIZE	-0,0016	0,0938	-0,0019	0,0800
ΔNPL	-0,0039	0,2125	-0,0039	0,2166
UNEM	0,1521	0,0000	0,1497	0,0000
C	0,0347	0,0773	0,0417	0,0441
R ²	0,42		0,91	
Prob*	0,0000		0,0000	
Observations	172		172	
Hausman test	15,7594		0,0151	

Source: author's calculation

Conclusion

Determinants of bank profitability are one of the most important indicators of the success of bank operations. The net interest margin for the bank is an indicator of the success of the placement of banks in the form of an important element of each bank's assets, namely loans. This study included six determinants in the analysis of the effects

of certain factors on the bank's net interest margin. The study covered all banks operating in Serbia and a period of eight years. The results indicated a statistically significant effect of indicators of liquidity, debt, bank size, and unemployment rate on net interest margin, while indicators such as net non-interest margin and non-performing loans did not show a significant impact. While debt size and the unemployment rate were shown to have a positive impact, bank liquidity and size were shown to have a negative impact on net interest margin. Understanding the determinants of the net interest margin can be of key importance for creating an adequate strategy for the placement of the bank's assets. The limitations of the study are the period covered in the study as well as the use of only six predictable variables, which can be seen through the statistically significant effect of the random factor C. The authors recommend further study in the form of a comparative examination of the regional banking sectors and a comparison of Serbia's banking system with advanced banking systems.

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EMPIRICAL RESEARCH ON THE IMPACT OF HOTEL SERVICE QUALITY ON GUEST LOYALTY AND SATISFACTION: A CASE STUDY SERBIAN HOTEL INDUSTRY

Abstract

The paper deals with the analysis of the implication of Total Hotel Service Quality (THSQ) on customer satisfaction and loyalty, as well as with identifying the key dimensions of Total Hotel Service Quality which significantly affect customer satisfaction and loyalty. The analysis was performed in the context of the national characteristics of the respondents (dimensions of national cultures determined by Hofstede) and the context of the demands of modern tourists. The empirical research included 175 participants who all were the hotel visitors. The results prove that the hypothesis of the significantly positive impact of THSQ on customer satisfaction and loyalty is valid. Also, the Assurance, Tangibility, and Empathy emerge as the key dimensions of quality while determining the level of satisfaction and loyalty of customers. The obtained results were verified using the Dufour Monte Carlo Simulation test procedure.

Key words: service quality, servqual, satisfaction, loyalty, Dufour test procedure

JEL classification: L83.

УТИЦАЈ ДИМЕНЗИЈЕ СЕРВОУАЛ НА САТИСФАКЦИЈУ И ЛОЈАЛНОСТ КУПАЦА: ЕМПИРИЈСКО ИСТРАЖИВАЊЕ ИЗ СРПСКЕ ХОТЕЛСКЕ ИНДУСТРИЈЕ

Апстракт

Рад се бави анализом импликација укупног квалитета хотелских услуга (ТХСК) на задовољство и лојалност купаца, као и идентификовањем кључних димензија укупног квалитета хотелских услуга које значајно утичу на задовољство и лојалност купаца. Анализа је изведена у контексту националних карактеристика испитаника (димензије националних култура које је одредио Хофстенде) и контекста захтева савремених туриста. Емпиријско истраживање је обухватило 175 учес-

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*ника који су сви били посетиоци хотела. Резултати доказују да хипотеза о значајно позитивном утицају ТХСК-а на задовољство и лојалност купаца важи. Такође, осигурање, опипљивост и емпатија појављују се као кључне димензије квалитета, истовремено одређујући ниво задовољства и лојалности купаца. Добијени резултати су верификовани поступком испитивања *Difour Monte Carlo Simulation*.*

Кључне речи: квалитет услуге, задовољство, лојалност, Дуфоур тест процедура

Introduction

With the overall increased competition in the field of hotel management and more sophistication of potential guests, the quality of the service appears to be a condition of sine qua non-success of the business of hotel companies. The focus of the hotels on improving the quality of service comes with the desire to increase the core values of hotel services and provide their customers with a unique touristic experience. Quality service is provided by hotels that possess the capacity to adequately respond to the expectations of their guests. The appearance of service providers, attitude towards guests, readiness to respond to guest demands in a short time, reaction to the request to change bedding, are just some of the examples of aspects of quality (Cheng and Rashid, 2013). Since the image of the hotel is the result of a guest's perception of the functional, symbolic and experiential benefits achieved while staying at the hotel, it can be noted that good functional and corporate quality will be able to compensate for possible shortcomings in the physical aspects of the service. Kind staff, who meets the guest's needs at any moment, will leave a stronger impression in relation to not so comfortable bed. Interpersonal relations, as an immaterial element of the service, are not subject to standardization, cannot be copied, and therefore are a critical success factor in relation to the competition. Achieving a high quality of service should not be a goal per se, but a tool for achieving the satisfaction and loyalty of the guests. Customer satisfaction with hotel services influences his behaviour in the context of future visits.

In particular, it can be assumed that the high - quality service provided at the hotel will increase the loyalty of guests if after several visits the hotel has managed to fulfil the expectations and requirements of the guest. Satisfied and loyal guests are the most important investment for the hotel, which provides returns in the form of long-term profitability and sustainable competitive advantage. Accordingly, big hotels have to pay special attention to the quality of service, satisfaction and loyalty of guests, especially in big communities, where guests are overwhelmed by various hotel offers.

Satisfying all aspects of service quality is an extremely complex and expensive endeavour, especially when it comes to three- and four-star hotels, as they focus on clients who have lower purchasing power. For this reason, it is important to recognize which are the key dimensions of quality important to this type of guest. Given that the characteristics of national culture significantly influence the attitudes, values and behaviours of guests, it is important, generally speaking, to understand which dimensions of national culture affect which hotel guest requirements in terms of quality of hotels services requirements.

Hence the aim is to examine the dimensions of hotel service quality in the context of the characteristics of national guest cultures.

The paper has the following structure: The first section contains the introduction. In the second part of the paper, the research methodology was presented. In section four the final empirical research can be found with the presentation of the outcomes. The final section summarizes the conclusions.

1. Review of the scientific literature

1.1. Concept of service quality

Recently, the quality of service has been in the spotlight of practitioners, managers and researchers (Seth and Deshmukh, 2005). It has become a key success factor in highly competitive sectors such as the hotel sector. In this industry, the perception of service quality is formed based on guest attitudes (Cheng and Rashid, 2013). Zeithaml et al. (1990) define the perceived quality of services as an assessment of the customer's overall excellence or service superiority. The quality of services is not a unique but multidimensional phenomenon (Ladhari, 2009). The quality is a solid base that ensures the loyalty of the customers and attracts new guests, along with increasing the reputation and income of the hotel. According to UNVTO (2015), the number of stars allotted to a hotel is a good indicator of the quality of service despite the absence of the standards of the global classification. There should be a causal relationship between the hotel's attributes and the number of stars. Therefore, the category of the hotel reflects the level of commitment and quality of the hotel service. The hotel classification is the highest common and accessible indicator of hotel quality.

The higher the category of the hotel, the higher the cost for hotels to meet the standard of quality. Hotels offering higher value can also demand higher prices (Mohsin and Lengler, 2015). In addition, while investigating determinants of price elasticity Bolton and Myers (2003) concluded that the quality of services affected the price elasticity. The results of the study have shown that users who receive more appropriate services are less sensitive to a higher price than clients who receive less appropriate services.

Evaluation of the quality of the service from the consumer aspect includes the feelings of the guests that appear before, during and after using the service, which are the consumer expectations and the perception of the service (Gallarza et al., 2019). Consumers have expectations and beliefs that they will receive the service of the appropriate quality. Various factors affect consumers' expectations, such as previous consumer experience, a recommendation from their acquaintances, marketing activities and the image of the service provider (Cheng and Rashid, 2013). Contrary to expectations, perception is the feeling of a consumer-created during and after using the service. In the context of expectations and perceptions, the service will be assessed as of good quality only if the perceived performance of the service fulfilled or exceeded the expectations of the consumer. When consumer expectations go beyond perception or real experience, the service is of lower quality (Gallarza et al., 2019).

A consumer approach to defining the quality of service significantly impedes the ability to provide services of pre-determined quality (Ristova Maglovska, 2020).

Also, the question arises whether consumers make a final quality decision based on an overall assessment of the experience or individual service quality dimensions. To fulfil the expectations of different guest profiles, it is necessary to achieve superiority in all aspects of service.

The previous discussion shows that the quality of the service is a complex concept, which contains a large range of dimensions. The quality of services is difficult to measure objectively, especially since services are described as intangible, heterogeneous and inseparable. The ultimate customer judgment about the quality of service is a result of estimating different service dimensions. In a significant number of research papers, the measurement of service quality is based on the SERVQUAL model (Zeithaml et al., 1990). It is a multi-dimensional framework that considers quality as the synthesis of five key dimensions: tangibility, reliability, responsiveness, assurance and empathy. The model was developed based on the inconsistency between the expected and the perceived quality of services. This model compares the service with real performance as well as the perception of the guest about the quality of service and the willingness to recommend the company (Zeithaml et al., 1990). Boulding et al. (1993) consider that there are positive relationships between service quality and readiness to recommend a service. Saleh and Rian (1991) conducted a study in the hospitality industry and highlighted five dimensions of service quality that are different from those in the SERVQUAL model: socializing, tangible things, guarantees, avoiding sarcasm and empathy.

A generally accepted view is that there is a positive relationship between service quality and satisfaction (Batista et al., 2014). Also, theorists consider that the quality of services and satisfaction can lead to loyalty. In addition to having a direct impact on satisfaction, the quality of service indirectly affects customer loyalty (Vujić, et al., 2019). For example, some authors claim that the relationship between the quality of service and intent in behaviour is entirely determined by customer satisfaction. Their studies suggest that the perception of quality and customer satisfaction is an important determinant of customer loyalty (Khudri et al., 2015., Bihamta et al., 2017).

Luo and Qu (2016) were analyzed the impact of service quality in hotels with three and five stars in China. They find that quality of service is more difficult to define, measure, and manage than manufacturing products due to the unique characteristics of services. Hotels have to continually improve the level of customer satisfaction because it is a path leading to loyalty. Keshavarz and Jamshidi (2018) tested tourists staying at least one night in hotels with four and five stars in Kuala Lumpur. They conclude that customer loyalty depends on the customer's satisfaction with the offered quality of service. Some researchers have found a little impact on the customer's satisfaction on loyalty (Hultman et al., 2015, Park and Jang 2014)

1.2. Concept of customer satisfaction

The satisfaction of guests, although one of the most important items in a successful business, is often ignored in studies on the efficiency of hotel operations. Guest satisfaction can be defined as his/her perception of expectations of a product or service (Anderson and Fornell, 2000). Expectations relate to the perception of the level of service that consumers expect to receive from the hotel. At the assessment stage, the customer compares the service level with the level of expectation, which can result in satisfaction

or dissatisfaction. Also, satisfaction is in the function of expectation (pre-purchase) and received performance (after purchase). It is a concept of the paradigm of disconfirmation of expectations (Oliver, 1990). If the guest is dissatisfied, i.e. service performance is significantly below consumer expectations, a negative disconfirmation occurs. Matching guest expectations and service performance produce neutral disconfirmation or customer satisfaction. Positive disconfirmation arises as a result of performances that have significantly exceeded the expectations of the guest. This situation is the most favourable because it represents the highest degree of satisfaction, which can be transformed into loyalty (Heesup et al, 2018).

Satisfied guests are the most important investment for the hotel whose positive results can be expected in the medium or long term period (Crotts and Magnini, 2010). In order to initiate guest satisfaction, it is necessary to engage significant resources, which will be in the function of collecting data on the perception of guests, analysing the data and identifying, understanding and meeting the needs of guests. Satisfaction of guests is one of the important generators of income and profit, which the hotel will realize in the future because, without satisfied guests, hotels are not able to overcome their competitors (Gao and Lai, 2015). For this reason, hotels must pay great attention to a detailed analysis of the customer's satisfaction to identify their strengths and weaknesses, as well as the real needs and requirements of the guests, so that they can satisfy their own interests.

Johnson and Weinstein (2008) define satisfaction as a result of the immediate experience that the consumer experiences through the purchase and use of products or services. Satisfaction is a feeling that happens in the evaluation stage after the purchase and consumption of the product can be demonstrated in many ways. Firstly, it can be realized as a confirmation that a quality product or service has been purchased. Second, it can be seen as satisfaction with the performance of the purchased product and service. In addition, satisfaction can be expressed as a delight if the product's characteristics exceed consumer expectations (Gao et al., 2015). It is a position that can be measured as total satisfaction with different components of products and services (Bastič and Slavka, 2012). It represents an emotional reaction to the experience in relation to expectations. Wong (2004) sees satisfaction as a unity of cognitive and emotional reactions. Anderson and Fornell (2000) suggest that customer satisfaction is an after-consumption experience comparing perceptions of quality with expected quality, while the quality of services relates to a global assessment of the provision of hotel services.

Hotel guests can experience different levels of satisfaction. The first level is satisfaction when routine services in the hotel are delivered in a satisfactory manner. The second level is enjoyment when the experience of staying at the hotel makes the guest happy. The third level is excitement, when the guest is positively surprised and when his experience is above expectations. The fourth level is relief when the delivered service allows for overcoming some delicate situation and leads to satisfaction (Torres and Kline, 2006).

For many years it was considered that satisfied customers are loyal customers, but a recent study disputes the validity of such a claim (Gallarza et al., 2019; An and Shin, 2019). Skogland and Siguav (2004) argue that satisfied customers do not always have to be loyal. Customer satisfaction is not enough to keep customers, but it is one of the most important factors for retaining satisfied customers (Torres and Kline, 2006). The relationship between satisfaction and loyalty is not always directly conditioned. If the

consumer is satisfied with the specific product or service of a particular company, one should expect to re-purchase the same product or service or to transfer loyalty to other brands of the same company. However, this does not always happen, because a consumer can be satisfied with a product or service until a competitive product or service that better meets his expectations does not appear on the market. Therefore, a satisfied consumer is still able to change the company. Consumer satisfaction may decline over time as a result of higher expectations or weakening of the service company's performance. This is especially true in the hotel industry and tourism. For example, although a consumer is satisfied with his stay in a particular destination or hotel, he wants to try something new and go to another destination or a hotel. Other consumers find the price important, so they will look for the best offer, while some who do not find changing a hotel a problem, will look for the best offer for their money. Many researchers find that quality of service is the same as the consumer satisfaction. One group of authors finds that the quality of service is a pre-requisite for increasing satisfaction, the second argues that satisfaction is a pre-requisite for increasing the quality of service, while others emphasize that quality and satisfaction are independent from one another (Gallarza et al., 2019; Heesup et al., 2018; Chew Ging and Shi-Min, 2019). The literature is dominated by the view that the quality of service affects the creation of satisfaction and that satisfaction has a significant impact on the consumer's intent to purchase (Chew Ging and Shi-Min, 2019, Miletic et al. 2020).

In recent years, the excitement of the consumers in hotel industry has been given a special attention. Namely, the question arises how the guest reacts when satisfaction and expectations are exceeded. One view suggests that exceeding expectations can lead to enthusiasm, while in the second view enthusiasm is a separate category (Chew Ging and Shi-Min, 2019). Most researchers in recent literature suggest that consumer satisfaction and customer enthusiasm are separate concepts (Chew Ging and Shi-Min, 2019; Gayane, 2019; Cakici et al, 2019). Crotts and Magnini (2010) questioned whether surprise is necessary to delight the consumer. It has been found that surprise is an essential component of enthusiasm and is strongly associated with consumer loyalty. The enthusiasm of consumers is the highest level of experienced experience for the hotel guests. Delighted guests are those who had an extraordinary experience in the hotel, making their stay unforgettable.

1.3. Concept of customer loyalty

Loyalty can be defined as a commitment to a brand, object or supplier that is based on a strong positive attitude and is reflected in repeated purchases (Gursoy et al., 2018). This definition highlights two important dimensions on which loyalty is based: attitude and behaviour (Oly Ndubisi, 2007). If the consumer does not have a clear attitude and does not respond towards a particular brand of the product, it is clear that he will not be loyal. Poor attitude means that the consumer has no habit of buying a given product, and unresponsive behaviour indicates that the consumer is buying sporadically. If the consumer has a weak attitude, and the strong behaviour is doubtful loyalty. In this situation, although a consumer often makes purchases of a particular product, he does not have a strong attitude towards it, so in the long, a hotel cannot count on this consumer. On the contrary, the consumer may have a strong attitude and unresponsive behaviour. This

means there is latent loyalty when a consumer does not buy a particular product even if he/she has a strong attitude. High prices of services that are characteristic of certain hotel brands make potential guests decide not to stay in these hotels despite the strong attitude towards them. Strong loyalty to a particular brand of a product is a process in which the consumer has a strong positive attitude and strong responsive behaviour in relation to the purchase of a given product or service. Numerous studies have shown that customers re-use the hotel service if they were previously satisfied (Gao and Lai, 2005). Loyalty is the likelihood of a consumer returning, re-buying and using the products and services of a particular company, as well as disseminating positive experiences of products or services to their friends and acquaintances. In this way, loyal consumers contribute to the stability of operations and increase a company's income, which ultimately contributes to a better competitive position of the company on the market. Loyal consumers help service companies to achieve leading positions in the market because they primarily represent a stable source of demand and possess continuity in earning profits (Mohsin and Lengler, 2015).

One of the main objectives of marketing activities is to increase consumer loyalty and maintain a permanent relationship with them (Gursoy et al., 2018). In theory, there is Pareto's rule according to which 80% of the company's revenue comes from 20% of its consumers, which implies that the costs of retaining the existing identified consumer are much lower than the costs of acquisition of a new customer (Gursoy et al., 2018). One of the basic goals in the business of a hotel or a restaurant is to meet the expectations of guests, although in practice this is not always the case. Therefore, their satisfaction or lack of satisfaction directly influences the decision whether to use a certain service or not and in a longer period of time it influences building higher levels of loyalty of guests (Ndubisi, 2007). The loyalty of guests influences the increase of income, due to repeated purchases versus classical sales, in which communication with the consumer is interrupted by payment or delivery of a product or service (Kotler et al., 2009, Marcetic, 2016).

Today, many hotel companies offer their loyal guests various benefits under the loyalty program that depend on the frequency of their visits. Returning to the hotel brings points to the guests which can be used for a certain type of service (free nights, use of room with additional services, personal butler service, resort packages etc). This reward-and-benefit system works on the principle that every spent euro in the hotel is one point. Many programs rank guests in relation to the volume of services used. Those at the top of the list are entitled to lower prices and other benefits (Rauyruen and Miller, 2007). Many hoteliers use loyalty programs to give guests a bonus proportionally spent (Gursoy, 2018). Such programs can be considered limited because they offer fewer opportunities to develop an individual marketing relationship with each guest, so the likelihood of developing effective loyalty is less likely.

2. Research methodology

This research deals with three-star and four-star hotels in the Republic of Serbia. For collecting primary data for the research, the survey method was used. Questionnaires were sent to the addresses of 8 hotels with three stars and 5 four-star hotels. Empirical

research was conducted in the period July - October 2019. In the observed period, a total of 184 respondents completed a questionnaire, of which 175 were filled incorrectly. Out of the total number of respondents, 35% are women, and 65% are men. The educational structure of the respondents is as follows: 60% are college-educated, 10% with a high school and 30% with completed secondary school. All respondents are from the countries of the former Yugoslavia and members of the so-called baby boom generation.

Previous research in this area was consulted in order to create suitable statements for the questionnaire. The questionnaire consists of four parts. The first part of the questionnaire consists of 22 statements for assessing expectations about service quality dimensions. The second part lists 22 findings for assessing perceptions of service quality dimensions. The third part contains of two statements for determining the level of satisfaction and loyalty of guests. The last, fourth part of the questionnaire refers to identifying the demographic characteristics of the respondents. The questionnaire was modelled on the original SERVQUAL model, with certain modifications according to the needs of this research. All the findings were measured through Likert's five-point scale: 1 (I completely disagree) - 5 (I completely agree). Respondents were asked to round off one of the five responses offered.

The subject of the research will be to test six research hypotheses: The basic hypothesis (H1), from which the paper started is the statement that Total Hotel Service Quality has a significant and positive impact on customer satisfaction and loyalty. In addition to this hypothesis, certain sub-hypotheses have been set: (H1a) - tangibility has a significant and positive impact on customer satisfaction and loyalty; (H1b) - reliability has a significant and positive impact on customer satisfaction and loyalty; (H1c) - assurance has a significant and positive impact on customer satisfaction and loyalty; (H1e) - empathy has a significant and positive impact on customer satisfaction and loyalty.

3. Results and discussion

Verification of the reliability of the variables for further measurements was made using Cronbach's Alpha. For some variables to be reliable, Cronbach's Alpha value should be bigger than 0.6. The Cronbach's Alpha value for the variables in Table 1 ranges from 0.721 to 0.940, which implies that all tested variables are reliable for further observations.

Table 1: Cronbach's Alpha

Hotel Service Quality dimensions	Cronbach's Alpha	No. of items
Tangibility (E)	.721	4
Reliability (E)	.760	5
Responsiveness (E)	.750	4
Assurance (E)	.740	4
Empathy (E)	.814	5
Tangibility (P)	.860	4
Reliability (P)	.902	5

Responsiveness (P)	.867	4
Assurance (P)	.894	4
Empathy (P)	.895	5
Satisfaction	.915	2
Loyalty	.940	2

Source: Authors` calculation

To verify the reliability of the variables, in addition to the Cronbach's alpha coefficient, in the paper, Principal Component Analysis (PCA) was used. PCA was performed on the assumption that it is interval data, thus satisfying the assumption of normal distribution. This is important, because the PCA technique, when evaluating the parameters, relies on the technique of maximum likelihood. It is important to note that respondents who participated in the variable validation study were not involved in data collection on the impact of variables on satisfaction and loyalty. In this way, efforts were made to avoid bias in responses. As many as 120 respondents participated in the examination of the validity of the variables. A common rule of thumb is that a researcher at least needs 10-15 participants per item. The smaller the sample, the bigger the chance that the correlation coefficients between items differ from the correlation coefficients between items in other samples (Field, 2009). Since the sample size, in this case, is 120, to examine the adequacy of the sample size, the paper was used the Kaiser-Meyer-Okin measure of sampling adequacy (KMO).

To identify principal factors, Promax rotation (with Kaiser normalization) was used, which rotates the orthogonally rotated solution again as well as enabled correlations between factors. Based on this rotation, 5 principal factors of service quality were identified. Table 2 gives the percentage of explained variance of the extracted factors. It can be seen that the retained 5 factors corresponding to the aforementioned dimensions of quality of service explain about 88.267% of the total variance.

Table 2. Number of extracted factors and total variance explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	% of Variance	Cumulative %	Total	Total	% of Variance	Cumulative %	Total
1	26.518	30.747	30.747	26.518	30.747	30.747	15,736
2	6.007	18.888	49.635	6.007	18.888	49.635	14,656
3	5.329	17.504	67.139	5.329	17.504	67.139	12,272
4	5.029	14.889	82.028	5.029	14.889	82.028	10,197
5	4.793	6.240	88.268	4.793	6.240	88.268	15,245

Source: Authors` calculation

However, analysis of the matrix of components⁴ shows that there is a significant mixing of items in factors 2, 4 and 5. For this reason, the scores, which were used in the further analysis, were calculated on the basis of factor analysis and not on the basis of the original items.

Table 3 shows the gaps between perception and expectations for each of the five dimensions of service quality and for the overall quality of service. The difference between perception and expectation is negative in all dimensions of service quality, as well as in the overall quality of service. The guests have the highest expectations regarding dimension *Assurance* (M = 4.6425), *Responsiveness* (M = 4.4975) and *Reliability* (M = 4.484). Some weaker expectations of the guests have the dimensions of *Empathy* (M = 4.104) and *Tangibility* (M = 4.2625). After staying at the hotel, the guests rated the highest perception of quality for dimension *Assurance* (M = 4.1825), *Responsiveness* (M = 4.0775) and *Reliability* (M = 4.054), while the perceptions of quality for determinants were *Tangibility* (M = 3.9725) and *Empathy* (M = 3.912). The highest negative gap was recorded in the dimension of security, followed by reliability, responsibility, and the lowest negative gap was recorded by the dimensions of tangible and empathy. The overall quality of service quality is negative and is -0.3584.

Table 3. Hotel service quality dimension gap and Total Service Quality Gap

Hotel service quality dimension	Perception (P)	Rank	Expectations (E)	Rank	Total service quality gap (P-E)
Tangibility	3.9725	4	4.2625	4	-0.29
Reliability	4.054	3	4.484	3	-0.43
Responsiveness	4.0775	2	4.4975	2	-0.42
Assurance	4.1825	1	4.6425	1	-0.46
Empathy	3.912	5	4.104	5	-0.192
Total service quality gap	4.0397		4.3981		-0.3584

Source: Author's calculation

In the next step, tests of the normal distribution data Kolmogorov-Smirnov and Shapiro-Wilk were conducted in order to choose between parametric and non-parametric correlation. The significant values of these two tests (sig <0.05) imply that the data are not normally distributed, so in this case the nonparameters of the Spearman's coefficient of correlation technique is used. Otherwise, when sig > 0.05 there is a normal distribution of data, then the parametric correlation technique Pearson's coefficient of correlation is applied. From Table 4, the sig values for all variables are less than 0.05, which implies that data is not normally distributed, so Spearman's coefficient of correlation is required in the next step.

Table 4. Normality tests

Variables	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	Sig	Statistic	Sig
Tangibility (P-E)	0.198	0.000	0.918	0.000
Reliability (P-E)	0.165	0.000	0.888	0.000
Responsiveness (P-E)	0.192	0.000	0.931	0.000

⁴ The matrix of components is not shown, due to the volume of the paper. For the same reason, the matrix of scores is not presented in the paper.

Assurance (P-E)	0.195	0.000	0.872	0.000
Empathy (P-E)	0.177	0.000	0.898	0.000
Total Hotel Service Quality (P-E)	0.088	0.002	0.948	0.000

Note: *, **, *** indicate significance on 1%, 5% and 10% respectively.

Source: Author's calculation

Table 5 presents the results of the correlation analysis using the Spearman's coefficient of correlation, because these are data whose distribution is non-normal. There is statistically significant and positive correlation between all observed independent and dependent variables since $\text{sig} < 0.01$ for all variables and all Spearman's coefficient values are positive. Based on Spearman's correlation coefficient, it can be concluded that all the dimensions of quality of the hotel service positively correlate the customers loyalty and satisfaction ($\text{sig} < 0.01$; $0.3 < \text{coef correl} < 0.5$). Between the total hotel service quality, satisfaction and loyalty, there is a positive and very strong correlation ($\text{sig} < 0.01$; $0.5 < \text{coef correl} < 0.9$).

Table 5. Spearman's coefficient of correlation

Hotel Service Quality dimensions	Satisfaction	Loyalty
Tangibility (P-E)	.420**	.365**
Reliability (P-E)	.474**	.444**
Responsiveness (P-E)	.485**	.461**
Assurance (P-E)	.525**	.461**
Empathy (P-E)	.443**	.478**
Total Hotel Service Quality (P-E)	.753**	.729**

Note: *, **, *** indicate significance on 1%, 5% and 10% respectively.

Source: Author's calculation

By applying the method of a simple regression analysis, the impact of Total Hotel Service Quality on customer satisfaction and loyalty has been analyzed (Table 6). Total Hotel Service Quality has a significant, positive and strong impact on customer satisfaction ($\text{sig} < 0.01$; $B = .767$). This model (Model 1) explains for 58.8% of the consumer's satisfaction variability ($R^2 = .588$). According to the Model 2 Total Hotel Service Quality significantly, positively and strongly affects customer loyalty ($\text{sig} < 0.01$; $B = .734$). The Model 2 explains for 53.9% of consumer loyalty changes ($R^2 = .539$). The Models 1 and 2 neither have problem with multicollinearity ($\text{VIF} < 10$) nor with autocorrelation ($d_u < \text{Durbin-Watson} < 4 - d_u$).

Table 6. Simple regression analysis (dependent variables: customer satisfaction – Model 1 and loyalty – Model 2)

Variable	Model 1 (Satisfaction)				Model 2 (Loyalty)			
	Beta	R ²	VIF	Durbin-Watson	Beta	R ²	VIF	Durbin-Watson
Total Hotel Service Quality	.767**	.588	1.000	2.154	.734**	.539	1.000	2.110

Note: *, **, *** indicate significance on 1%, 5% and 10% respectively.

Source: Author's calculation

In the next step, using the multiple regression analysis method, simultaneous testing of the common impact of all five dimensions of the quality of the service on satisfaction and consumer loyalty was carried out (Table 7). The results of the analysis show that only three dimensions have a significant and positive effect on the satisfaction of guests (Model 3): *Assurance* (**B = .356; sig <0.01**), *Tangibility* (**B = .216; sig <0.01**) and *Empathy* (**B = .192; sig <0.05**). The remaining two dimensions, *Reliability* and *Responsiveness* do not have any significant effects. R Square for this model is 0.492, which means that 49% of the variability of satisfaction is explained by the changes in five dimensions of the quality of the service. In Model 4, where guest loyalty depends on the variable, *Assurance* (B = .309; sig<0.01), *Empathy* (B = .283; sig<0.01), and *Tangibility* (B = .201; sig<0.01) are the only dimensions that have significant and positive implications. For this model, the value of R² = 0.495, which implies that 49% of the variability in guest loyalty is explained by the changes in five observed service quality dimensions. Model 3 and Model 4 do not have problem with multicollinearity (VIF<10), and with autocorrelation ($d_u < \text{Durbin-Watson} < 4-d_u$).

Table 7. Multiple regression analysis (dependent variables: customer satisfaction – Model 3 and loyalty – Model 4)

Hotel Service Quality dimensions	Model 3 (Satisfaction)				Model 4 (Loyalty)			
	Beta	R ²	VIF	Durbin-Watson	Beta	R ²	VIF	Durbin-Watson
Tangibility	.216**	.492	1.672	2.077	.201**	.495	1.672	2.125
Reliability	.022		2.400		.048		2.400	
Responsiveness	.040		2.804		.025		2.804	
Assurance	.356**		2.920		.309**		2.920	
Empathy	.192*		2.316		.247**		2.316	

Note: *, **, *** indicate significance on 1%, 5% and 10% respectively.

Source: Authors' calculation

Since the application of OLS estimators in linear regression models is questionable, when it comes to ordinary data (for more details see Radivojevic et al, 2019), to verify the validity of estimates of model parameters 1, 2, 3 and 4, in the paper the Dufour

(2006) Monte Carlo testing technique was used for this purpose. Dufour (2006) proposed the Monte Carlo test procedure which allowed to obtain the null distribution of tests statistics infinite sample setting. The method has a great advantage of providing accurate tests based on any statistics whose finite sample distribution is intractable but can be simulated (Malecka, 2014). The procedure was performed on 10,000 simulations where the sample size equals the actual sample (N = 175). The results of the Dufour Monte Carlo test procedure are shown in Table 8.

Table 8. The results of the Dufour Monte Carlo test procedure

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
<i>Coefficient (beta)</i>	<i>p-value</i>	<i>p-value</i>	<i>p-value</i>	<i>p-value</i>
<i>Total Hotel Service Quality</i>	.034**	0.042**	/	/
<i>Tangibility</i>	/	/	.013**	.018**
<i>Reliability</i>	/	/	.059	.091
<i>Responsiveness</i>	/	/	.072	.106
<i>Assurance</i>	/	/	.009**	.002**
<i>Empathy</i>	/	/	.021*	.051**

Note: *, **, *** indicate significance on 1%, 5% and 10% respectively.

Source: Authors` calculation

The results confirm the findings that those only three dimensions have a significant and positive effect on the satisfaction of guests and guest loyalty. The results confirm the findings that those only three dimensions have a significant and positive effect on the satisfaction of guests and guest loyalty. This result is consistent with the research of Bulchand-Gidumal et al. (2013), Smith (2014), Heo and Hyun (2015), Tribe and Mkono (2017), Zaid and Law (2019). The results of these studies show that these three dimensions are statistically significant regardless of the category of hotel. However, the results of this study are not consistent with the findings of González-Mansilla (2019), Ahani et al. (2019), An and Shin (2019) and Gallarza et al. (2019), who found that the significance of the quality dimension depends on the hotel category. Although there are studies that have studied the dimensions of quality in the context of service appropriations, such as studies conducted by Kang and Gong (2019) and Kim et al. (2016), there are no studies that have interpreted the previously mentioned results in the context of the dimensions of national cultures.

It can be pointed out that the obtained results are expected when analyzed in the context of the national characteristics of the respondents (four Hofstede dimensions of national culture). Namely, the inhabitants of the countries that emerged from the disintegration of Yugoslavia are characterized by a high degree of avoidance of uncertainty, a high distance in power, women’s values, and a strong sense of belonging (collectivism). A high degree of avoidance of uncertainty means that guests from these countries are not willing to take risks, but to like to feel safe in hotels, that they feel safe in their transactions with the hotel, that employees of the hotel tell them exactly when services will be performed etc. These are all items that describe Assurance. Hence, it is not surprising that Assurance has been identified as a key dimension of hotel service quality. By the same principle, a connection can be established between women’s values

and collectivism and empathy. Members of nations with strong female values and a sense of belonging are characterized by caring for others, respect for the collective spirit and strong identification with certain groups. In other words, this means that guests from these countries like when the hotel has employees who give them personal attention understand their specific needs, who are willing to help guests, who are never too busy to respond to guest request etc. A sense of belonging influences the fact that guests from these countries strongly identify with the hotel. As all of these are items that determine empathy, it is therefore not surprising that Empathy has been identified as a key dimension of hotel service quality. Members of nations with strong female values express feelings for aesthetic values, hygiene, tidiness, cleanliness, pleasant ambience, and the like. Hence, it can be pointed out that this dimension of culture influences the identification of Tangibility as a significant dimension of the quality of hotel service. However, this could be explained by the fact that hotel products are intangible and as such guests used those aspects of the service, they could see to assess the hotels' service quality.

Having in mind the above, it can be concluded that the dimensions of national culture significantly determine the importance of different dimensions of hotel service quality. This implies that depending on which national culture the guests belong to, emphasis should be placed on the dimensions of the quality of hotel service.

Conclusion and discussion

In modern business conditions, service quality is an important aspect in getting ahead of the competition and improving the overall business performance of hotels. Recently, there has been an increasingly obvious demand for the quality of products and services in the tourism market. Among the many demands of today's consumers in the tourism industry, the quality of service is increasingly recognized as a critical success factor. Customers represent excellent sources of information for managing and organizing the provision of quality services. The quality of the service is based on the delivery of an optimal service offer, which will fully meet the requirements and expectations of the guests. The achieved results in the field of quality service improvement will be reflected in the increase in the number of satisfied and loyal guests. It is highly probable that those guests who are satisfied with the hotel, its services and overall cooperation, will become loyal to the hotel. Hotels can expect significant positive effects due to an increase in the number of satisfied and loyal guests who are willing to pay more for the new contents and services that the hotel has to offer; to share positive impressions of the hotel to their friends and family; give constructive suggestions on possible improvements to some of the hotel's service dimensions. The loyalty of guests is an important determinant of maximizing profits. Therefore, the cost of keeping the base of loyal guests is significantly lower than the cost of searching for new guests. Therefore, the issues of quality of service, satisfaction and loyalty of guests are becoming an important segment of the business strategy of successful hotel companies.

The discussion presented in this paper presents strong arguments for measuring satisfaction in service delivery in hotels, which will enable hotels to monitor the efficiency of operations and determine the future direction in the management of products and services. Analyzing insights about factors contributing to the loyalty of guests, it has

been concluded here that there is a positive relationship between the quality of the service process, the loyalty of the guests and the behaviour related to loyalty. It has also been proved that the key determinants of loyalty to guests are intangible elements of quality and diversity of supply.

The results of the empirical research imply that the modern and comfortable furniture, the attractive interior and exterior of the hotel, the comprehensibility and the picturesque nature of the materials related to hotel services and other tangible elements of the service positively influence the satisfaction and the intention of the guest to visit the hotel again, which confirms the first hypothesis H1a of the research.

Creating the atmosphere in which the guests will feel safe and have full confidence in the hotel transactions additionally improve the quality of the delivered service. Taking into account this fact, the H1d hypothesis can be accepted. Adapting the working time to the needs of guests, paying attention to the individual needs and wishes of guests, the readiness to hear the complaints of each guest and to make an apology after the mistakes, are just some of the dimensions of the empathy, which the guests have positively evaluated. This implies that the H1e hypothesis is accepted. The H1b and H1c hypotheses cannot be accepted as true because of the extremely low values of the standardized Beta coefficient and the values $\text{sig} > 0.05$.

By the method of simple regression analysis, the influence of Total Hotel Service Quality as a synthesis of five dimensions was tested on customer satisfaction and loyalty. The results obtained confirm the importance of Total Hotel Service Quality for improving customer satisfaction and loyalty.

The applied regression analysis method shows that Total Hotel Service Quality is essential customer satisfaction and loyalty predictor, but in Total Hotel Service Quality, dimensions of Assurance, Tangibility and Empathy are particularly distinguished in their impact. Besides the tangible elements of hotel services such as the comfort of accommodation, lobby appearance, food quality, drinks, the entire exterior and interior etc., in contemporary conditions, it appears that non-material aspects of the service are given greater attention. It is due to the assumption that the material elements are on the same or similar level in all hotels of the same category. In this paper, the dimensions of Assurance and Empathy were particularly emphasized, which implies that the competence, kindness, and willingness of the staff always to meet the requirements of the guest play an important role in assessing the quality of the hotel's service. Hotel management has the task to train staff further by organizing seminars and training to ensure the high quality of the service process. In addition, the improvement and maintenance of the quality of the service are based on the continuous improvement of contacts with the guests and the identification of the quality dimensions that are of key importance for the guests during their stay in the hotel.

The conducted research has several limitations that can be eliminated in subsequent studies. The research was carried out in a short period of time over different respondents, with the sample relatively small. In the future, studies in this area should include more guests and observe the behaviour of the same guests over a longer period, in order to more accurately measure the implications of the quality of hotel services to the behaviour of guests, especially in the domain of loyalty. In addition, it is necessary to apply additional methods of statistical analysis to obtain a clearer picture of the relations between the variables. The use of factor analysis should verify the validity of the statements used to

describe the selected elements of the quality of hotel services, while the application of the SEM model would enable the identification of direct and indirect relations between the observed variables.

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WAREHOUSE RECEIPT FINANCE IN THE AGRICULTURAL SECTORS – LESSONS LEARNED IN SERBIA

Abstract

Aim of this paper is to analyse the role of warehouse receipts in the agribusiness sector, as well as prerequisites for successful public warehouses system. Warehouse receipt emerge as a promising financial instrument for farmers and other owners of agricultural products to provide loan against warehouse receipts. Warehouse receipts also offer alternative investment opportunities for banks by creating a new asset class. The paper analyses the experiences of the Serbia, which introduced the system of public warehouses in 2009. Applied research methodology includes literature review, comparison analyses and Indemnity fund' data analyses. According to the results of this paper, Serbian legal framework can be good example for other countries aiming to establish public warehouses system as a system consisting on all necessary prerequisite to establish successful public warehouse system. After positive experiences in the initial years, the development of the public warehouse system in Serbia came to a standstill in 2015., when two frauds in the public warehouse system occurred, which led to a loss of confidence in public. An important lesson learned in Serbia is that in addition to complete legislation based on the experience of successful public warehouse systems, it is necessary to implement legal provisions in practice. According to the results of the paper, the main cause of the crash of public warehouses in Serbia is despite the legal provision on the establishment of a special inspection for public warehouses, this most important link has never been established in practice. Lessons learned in Serbia can be a useful experience for other countries, j the process of establishing this important system for agribusiness sector. This paper provides first comprehensive analyses of the public warehouse system in the Serbia.

Key words: Warehouse receipts, Public warehouses, Agricultural loans. Indemnity fund

JEL classification: G24, C22, C52, C53

ФИНАНСИРАЊЕ НА БАЗИ РОБНИХ ЗАПИСА – ЛЕКЦИЈЕ НАУЧЕНЕ У СРБИЈИ

Апстракт

Циљ овог рада је да анализира улогу робних записа у агробизнис сектору, као и предуслове за успостављање ефикасног система јавних складишта. Робни записи

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појављује се као обећавајући финансијски инструмент за пољопривреднике и друге власнике пољопривредних производа за обезбеђивање кредита који као залогу има ускладиштену робу. робни записи такође омогућавају алтернативне могућности улагања за банке стварањем новог финансијског инструмента. У раду се анализирају искуства Србије која је 2009. године увела систем јавних складишта. Примењена методологија истраживања укључује преглед литературе, упоредне анализе и анализу података Компензационог фонда. Према резултатима овог рада, српски правни оквир може бити добар пример другим земљама које теже успостављању система јавних складишта као система који се састоји од свих неопходних предуслова из најбоље праксе интернационалних система јавних складишта. После позитивних искустава у почетним годинама, развој система у Србији застао је 2015. године, када су се догодиле две преваре у систему јавних складишта, што је довело до губитка поверења у јавна складишта. Важна лекција научена у Србији је да је поред комплетног законодавства заснованог на искуству успешних система јавних складишта, потребно применити и законске одредбе у пракси. Према резултатима рада, главни узрок неуспеха јавних складишта у Србији је да, упркос законској одредби о успостављању посебне инспекције за јавна складишта, ова најважнија карика система никада није успостављена у пракси. Лекције научене у Србији могу бити драгоцено искуство за друге европске земље, земље у развоју и све друге у циљу успостављања овог важног система за пољопривредни сектор. Овај рад даје прве свеобухватне анализе система јавних складишта у Србији.

Кључне речи: Робни записи, Јавна складишта, Пољопривредни кредити, Компензациони фонд

Introduction

Insufficient funding is a major constraint for the agribusiness industry. A large number of countries around the world are helping to solve this problem through the establishment of the public warehouse systems that allow farmers to use the certificate of storage of commodity in public warehouse (warehouse receipts) as collateral to provide short-term loans (Muhović et al., 2019). Warehouse receipts are proved to be suitable solution for farmers, traders, processors to obtained finance (Mahanta, 2012).

Public warehouses are emerged more than hundred years ago and agribusiness sector in USA, Canada, India, Bulgaria, Hungary etc. are benefiting from this system.

In 2009, Serbia established a public warehouse system for agricultural products with the assistance of the FAO, World Bank, and USAID. This was implemented through the enactment of the Law on Public Warehouses.

The Serbian public warehouse system has achieved significant milestones, including issuing licenses for warehouses that handle cereals, oilseeds, and frozen fruits. These licensed warehouses are required to make contributions to the Indemnity Fund, as noted by Zakić et al. (2014). Moreover, public warehouses in Serbia have the authority to store their own commodities or those of third parties.

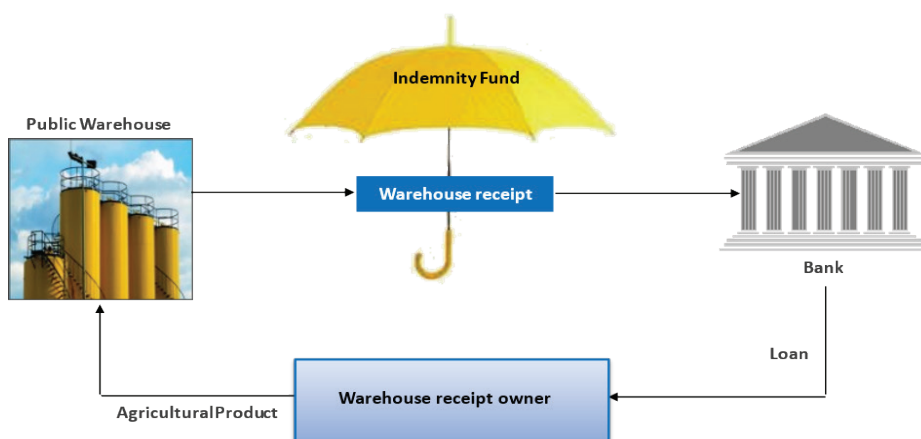
Due to the fact that existence of the stored commodities are guaranteed, the warehouse receipt can serve as collateral for short-term loans or be traded, Coulter and Onumah (2002).

Theoretical backgrounds and Literature review

With public warehouse system farmers have the option to store their products in public warehouses instead of selling in harvest time when prices are typically low. By using warehouse receipts as collateral, they can secure short-term loans to meet their financial requirements. When the market price is higher, farmers can sell their products and use the proceeds to pay off their short-term loans. In addition, Serbia is allowing public warehouses to issue warehouse receipts for stored agricultural products and obtain favourable short-term loans to fulfil their financial needs

Both benefits for the owner of the warehouse receipts, i.e., higher price for commodity stored in a public warehouse in case of sale, as well as the possibility of using the commodity as collateral for a loan, are conditioned by the trust of banks and merchants in the system. Security of delivery of commodity according to the commodity record arises from three rounds of trust built into the system: (1) Only warehouses having required business indicators, storage capacity, and equipment can be granted licenses as reliable storage facilities; (2) the existence of a special inspection service that regularly and extraordinarily monitors commodity in public warehouses and (3) the existence of the Indemnity Fund which, in case the owner of the commodity cannot take it from the public warehouse, compensates the owner of the commodity out of court within five days and initiates proceedings against the public warehouse. Due to such mechanisms for guaranteeing the delivery of commodity, banks that approve loans against warehouse receipt have lower risk (Vasiljević et al., 2015).

Scheme 1. Collateralized Loans Using Warehouse Receipts



Source: Kovačević and Zakić, 2016.

As depicted in Scheme 1, the warehouse receipt financing system can effectively decrease risks and transaction costs associated with collateralized financing, resulting in low-cost loans and a shorter turnaround time for loan issuance. However, to fully reap the benefits of this system, a proper legal framework and institutional setup must be established to instil trust among financiers and commodity market participants, as noted by Höllinger and Lamon (2009).

Attempts to build private warehouse receipts systems based on the contractual obligations (i.e. Russia, Turkey, Kazakhstan) organised mostly by the banks and commodity exchanges are proven to be less effective compared to the legally establish public warehouse systems.

Legal framework in Serbia is based on the proven worldwide foundations (Zakić et. Al, 2014).

The Ministry of Agriculture, Forestry, and Water Management of the Republic of Serbia is responsible for the licensing and supervision of public warehouses. Additionally, the Indemnity Fund of the Republic of Serbia has been established to indemnify owners of warehouse receipts through a fast out-of-court procedure in the event of public warehouse default.

In addition to established legal framework, it is also crucial to establish a favourable business environment for the public warehouse system. Serbia provides an excellent example of supportive central bank policies regarding lending against warehouse receipts. In 2011, the National Bank of Serbia introduced an “Adequate credit rating” for loans against warehouse receipts. This decision had a twofold effect: firstly, commercial banks are required to pay only a 5% deposit to the NBS when issuing loans that use a commodity pledge as collateral, which enables lower interest rates due to reduced commitment of funds. Secondly, this decision signals to commercial banks that the commodity record is a first-class security.

Support of the interest rate when lending against post or pre-harvest financial instruments is often and effective practice. European Bank for Development and Reconstruction granted 50.000.000 euros throughout risk share program to three Serbian banks as a support for lending against warehouse receipts in 2011.

Other support measures providing the advantages to the public warehouses are found to be important. One of such measures is Commodity directorate reserves of the Republic of Serbia in 2011 decision to grant automatic status of government warehousemen to the public warehouses. With the loss of the privileged status in 2013, the public warehouses came to the situation to first submit bank guarantees and meet other conditions for obtaining a public warehouse license, and if they want to obtain the status of recognised Commodity directorate reserves' warehouse, the public warehouses need to deposit guarantees and meet all other requirements. This practically requires double the guarantee cost. The practice in all developed systems is that state grain reserves are kept in the safest place - exclusively in public warehouses. Successful practice in Hungary and Bulgaria to store cereals purchased within the EU market intervention measures - Public Intervention (Public Intervention) in public warehouses.

Proper legal framework and significant support resulted in the financing of Serbian agriculture through warehouse receipts has already exceeded 50 million euros, with interest rates about 20% lower than the market average (Indemnity Fund of the Republic of Serbia, 2021).

Among the reasons for hinders the development of the Public warehouses in Serbia is insufficient capacity of the Public Warehouse Inspection Service as the most important factor. This service is responsible for supervising the quantity and condition of commodities in public warehouses to ensure the security of storage. Unfortunately, the inability to hire enough inspectors has prevented the formation of a dedicated unit responsible for controlling public warehouses.

Potential to increase of the security of stored good in the warehouses is by using of new technologies such as blockchain has had positive effects on the public warehouse system by reducing counterparty risk. Additionally, the electronic warehouse receipt based on blockchain technology has become an important digital asset in the field of bulk commodities, serving as a certificate for supply chain financial businesses (Krivokuća et al., 2021; Wang, 2020; Yuanjian et al., 2019).

In 2010. Food and Agricultural Organization (FAO) donated software for electronic Registry of the warehouse receipts. Electronic warehouse receipts are rare worldwide, considering that the dematerialization of the warehouse receipts is more challenging than the dematerialization of the securities, due to the warehouse receipts are individual in characterises. Electronic warehouse receipts have a great role in reducing the risk in the system of commodity records with the view that in the electronic system of commodity records data on all commodity records can be seen in real time. Serbia has applied a kind of semi-electronic Commodity Records System (Kovačević et al., 2016), with the support of the FAO, it has created an electronic register of commodity receipts, while the warehouse receipts themselves are stood in paper form. Unfortunately, the electronic Warehouse receipts register has never been applied in practice.

For the establishment of public warehouse systems based on the best worldwide practice, efforts are being made by UN agencies to develop general legal guidelines for public warehouses (Dubovec and Elias 2017).

Research Design, Methodology, Research Tasks and Hypothesis

The study employed several methods to ensure objective findings, including a comprehensive literature review, descriptive statistics, and comparative analysis.

Data was sourced from the Indemnity Fund of the Republic of Serbia.

Two research hypotheses were formulated:

Research Hypothesis I: A successful public warehouse system should be anchored on a sound legal framework rather than contractual obligations among stakeholders.

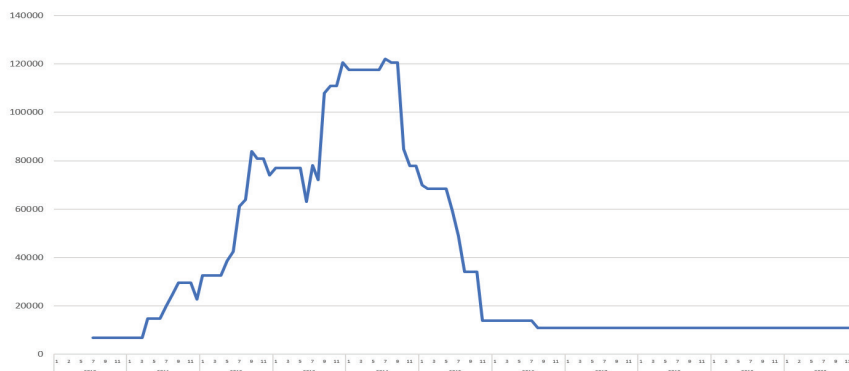
Research Hypothesis II: The key elements of warehouse systems, including licensing and supervision, performance guarantees, and the creation of a conducive business environment, are crucial for the development of the public warehouse system.

Research results and Discussion

The results and discussion of this study are based on a thorough assessment of the current implementation of warehouse receipts in Serbia, aimed at identifying the necessary factors to improve the public warehouse system.

Graph 1 shows the capacity of licensed public warehouses between 2010 and 2020, while Graph 2 presents the number of licensed public warehouses during the same period.

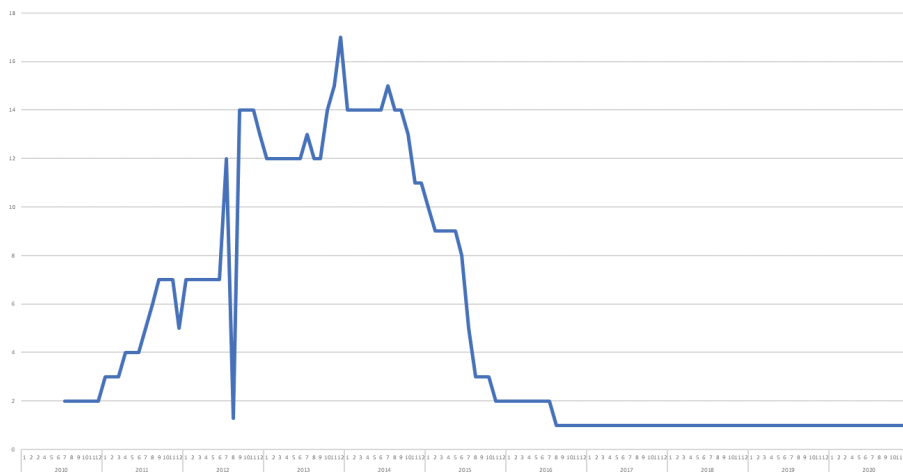
Graph 1. Licensed Capacity of Public Warehouses for Grain and Oilseeds (in tons) from 2010-2020



Source: Indemnity Fund of the Republic of Serbia, 2021

According to Indemnity Fund of the Republic of Serbia, 2021, cold storage capacity of 900 t was licensed as public warehouse in the period July 2011 to July 2012⁴.

Graph 2. Number of Public warehouses for grain and oilseeds in the period 2010-2020



Source: Indemnity Fund of the Republic of Serbia, 2021

⁴ According to Authors best knowledge it is unique attempt to include colling houses in the agricultural commodities public warehouse system due to the challenges in quality determination of the fruits and the fact that often quality cannot be determined at the time of the product deposition.

According to Indemnity Fund of the Republic of Serbia, 2021, one cold storage licensed public warehouses was registered in the period July 2011 to July 2012.

The Serbian Public warehouse path, can be divided into two phases. The from 2010 to 2014 and was characterized by increasing public warehouse capacities and number of licensed warehouses. The second phase began at the end of 2014 and continues to the present day, during which the Serbian public warehouse system deteriorated as a consequence of two large-scale frauds in 2014 and 2015.

Based on the conducted analysis, it can be concluded that the legal framework for public warehouses is exceptionally well-established and can serve as an example for other public warehouse systems.

The analysis shows that the positive public warehouse environment in Serbia has allowed successful start of the public warehouse system, including:

- 1) The legal framework relies on legislation instead of private contracts;
- 2) The Ministry of Agriculture, Forestry, and Water Management of the Republic of Serbia is responsible for licensing and supervising public warehouses;
- 3) Licensing procedure for public warehouses includes financial and technical requirements;
- 4) The Indemnity Fund of the Republic of Serbia has been established to compensate owners of warehouse receipts in case of public warehouse default through a fast out-of-court procedure;
- 5) According to the Law on public warehouses, a dedicated inspection service for public warehouses is mandated under the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia;
- 6) Public warehouses' storage fees are subsidised by the Ministry of Agriculture;
- 7) Commodity directorate reserves of the Republic of Serbia in 2011 decided to grant automatic status of government warehousemen to the public warehouses;
- 8) European Bank for Development and Reconstruction granted 50.000.000 euros throughout risk share program to three Serbian banks as a support for lending against warehouse receipts in 2011;
- 9) In 2010. Food and Agricultural Organization (FAO) donated software for electronic Registry of the warehouse receipts;
- 10) In 2012. National Bank of Serbia rated as a adequate loans against warehouse receipts.

Based on the analysis conducted in the paper, the reasons for the deterioration of the Serbian public warehouse system are as follows:

- 1) One of the main reason for the deterioration of the Serbian public warehouse system, is that the inspection service responsible for supervising public warehouses within the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, which is mandated by law, has not been established in practice. Indemnity fund was not received initial capitalisation resulting in week guarantee performance;
- 2) Electronic warehouse receipts registry with tremendous effect on the risk reduction donated by the FAO was not operational since today;
- 3) Commodity directorate reserves of the Republic of Serbia in withdrawn

granted automatic status of government warehousemen to the public warehouses;

- 4) Despite the known fact that only storable, easy quality determination products are eligible for public warehouse system. Serbia emended colling houses and frozen fruits in to the public warehouse system. Theoretical knowledge is proven in this case as the frozen fruit in the practice has obstacle in: quality cannot be determined on the commodity deposition (first need to be frozen and then classified to determined quality) etc.

In summary, the non-established public warehouse inspection service is the main reason for the deterioration of the Serbian public warehouses, despite having a proper legal framework in place. As a result, millions of euros worth of warehouse receipts are being issued without adequate on-site control.

The research carried out in this paper provides evidence in favor of the first research hypothesis, which states that a successful public warehouse system must be built upon a legal framework rather than a contractual obligation among stakeholders.

The second research hypothesis Implementation of the core elements of the warehouse systems licensing and supervision, guarantee performances and creation of favourable business environment is essential for development of the public warehouse system is also supported.

Conclusion

The use of warehouse receipts is vital for the agribusiness sector to secure loans using stored commodities as collateral. These receipts also play a significant role in facilitating trade, particularly in commodity exchanges. In developing countries, where borrowers often lack sufficient collateral, warehouse receipts are promising financial and trade instruments. The Serbian public warehouse system, as analyzed in this study, has a well-established legal framework that is conducive to the successful development of a warehouse receipt system. The Ministry of Agriculture has established a system of licensing and supervision, and an indemnity fund has been introduced. However, the lack of an inspection service for public warehouses in practice has led to issues, including two large-scale frauds in 2014 and 2015, which resulted in significant losses. The experience in Serbia highlights the importance of implementing a public warehouse inspection service and providing initial contributions to the indemnity fund to guarantee performance from the outset. Additionally, the Serbian experience confirms the theoretical standpoint that only storable products, such as grain and oilseeds, whose quality can be determined at the time of delivery, are suitable for public warehouses. Frozen fruits are not suitable products for public warehouses. The successful implementation of the Serbian system, as well as experiences from Bulgaria, Hungary, Slovakia, and others, demonstrate that warehouse receipts are excellent financial instruments that provide additional collateral for commodity owners, and are essential for the development of commodity exchanges. Given the significant importance of this topic, further scientific research on public warehouse systems is necessary to avoid the mistakes made in Serbia and establish public warehouse systems with effective inspection service.

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INFORMATION AND COMMUNICATION TECHNOLOGIES AND RURAL DEVELOPMENT OF SERBIA

Abstract

The use of the information and communication technologies (ICTs) transforms ways of manufacturing, doing business, working, accessing public services, informing and communicating. They enable overcoming of both geographical distances and underdevelopment of infrastructures in rural regions and less developed ones. That is why ICTs can play an important role in encouraging economic development of rural areas, improvement of life quality of their population as well as lessening of social exclusion.

The paper is focused upon the possibilities of invigorating rural development in Serbia on the basis of the ICTs use, primarily the Internet. The paper firstly points to the main features of the Serbian village development; then it analyses the Internet access in rural areas. Finally, it points to the ways in which the ICTs can be used for stimulating economic development of the Serbian village in addition to improving life quality of the rural population.

Key words: Rural Development, Information and Communication Technologies, Serbia

JEL classification: O18, O33

ИНФОРМАЦИОНО-КОМУНИКАЦИОНЕ ТЕХНОЛОГИЈЕ И РУРАЛНИ РАЗВОЈ У СРБИЈИ

Апстракт

Употреба информационо-комуникационих технологија (ИКТ) трансформише начин производње, пословања, рада, приступа јавним услугама, информисања и комуникације. Оне омогућавају превазилажење географске удаљености и неразвијености инфраструктуре у руралним областима и мање развијеним подручјима. Због тога ИКТ могу да имају значајну улогу у подстицању економског развоја у руралним областима, побољшању квалитета живота становништва и смањењу друштвене искључености.

Предмет рада су могућности подстицања руралног развоја у Србији на основу коришћења ИКТ, пре свега интернета. У раду се најпре указује на главне карактеристике развоја српског села; затим се анализира приступ интернету у руралним подручјима. На крају, указује се на начине на које се

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ИКТ могу користити за подстицање економског развоја српског села, као и побољшање квалитета живота сеоског становништва.

Кључне речи: *рурални развој, информационо-комуникационе технологије, Србија.*

Introduction

The use of the information and communication technologies (ICTs) transforms ways of manufacturing, doing business, working, accessing public services, informing and communicating. One of the characteristics of these technologies is that they cross over territorial borders. Hence they enable overcoming of both geographical distances and underdevelopment of infrastructures in rural regions and less developed ones. The Internet facilitates the foundation of networks as “crossover structures” that enables its partakers to “implement associations and synergize their activities on common priorities” (Tumbas, Matkovic, Sakal, 2013, p. 19). That is why ICTs can play an important role in encouraging economic development of rural areas, improvement of life quality of their population as well as lessening of social exclusion.

Rural development refers to the development of rural farm economy as well as that of rural non-farm economy, building of infrastructure, improvement of life quality, preservation of rural cultural heritage and living environment protection. For Serbia the stimulation of rural development is important not only because of the 2011 Population Census indicating that 40,56% of the population is living in the rural areas (Mitrović, 2015, p. 57) but also because of economic, demographic and social problems that the Serbian village is facing today.

The paper is focused upon the possibilities of invigorating rural development in Serbia on the basis of the ICTs use, primarily the Internet. The paper firstly points to the basic demographic, economic and social characteristics of the Serbian village; then it analyses the Internet access in the rural areas. Finally, it points to the ways in which the ICTs can be used for stimulating economic development of the Serbian village in addition to improving life quality of the rural population. The paper is based on the analysis of statistical data and strategic documents, as well as sociological and economic research on rural issues. When it comes to statistical data, it should be borne in mind that the Statistical Office of the Republic of Serbia uses the division of the settlements into “urban” and “others” based on the administrative criteria. The data about “other” settlements automatically apply to the rural ones.

Economic and Social Conditions in the Rural Areas

In order to understand social and economic situation in the Serbian rural areas it is necessary to briefly point to the historical development in the last two centuries (path dependence). Serbia has, as an independent state and as a part of Yugoslavia, undergone belated modernization. In the first half of the 20th century it was an underdeveloped

and predominantly agrarian country with poorly developed industry. After the World War Two, in the period of socialism development, for ideological reasons the rural development was neglected for a long period of time. "Rural areas were always viewed as a problem, rarely as a resource" (Bogdanov, 2007, p. 67). A troubled postsocialist transformation of Serbia coupled with economic crises and the lack of an adequate policy of rural development have all led to further devastation of the village. The most important consequences of such development are: depopulation and senilization of the village, small farm holdings and deterioration of farmers' cooperatives.

The migration process that was intensive during the country's socialist industrialization continued in the transition period as well. Along with a low population growth it led to depopulation of some (especially rural) parts of the country while the rural settlements either died away or were left with only households of the aged. The data obtained by the 2011 Population Census show that the average age of the rural population is 43,6 years while each fifth inhabitant is older than 65 years of age (Penev, 2015, p. 162). Each fifth rural household (20,5%) is elderly, namely, all the household members are older than 65 years of age; similar is the share of single households (21,5%) (Djurđjević et al., 2015, p. 272, 279). In Serbia there are 1034 settlements with less than a hundred dwellers. „In such devitalized villages and areas small is the number of perspective individuals and families; neither roads nor schools are built but what is already built is neglected and what is open is getting closed“ (Mitrović, 2015, p. 48). Economic consequences of such a state are multiple – every year uncultivated remains the land estimated to range from 200 to 350,000 ha of arable land and meadows while the area of the unused farm land with pastures is considerably larger (Government of the Republic of Serbia, 2014, p. 14). This is the land whose owners are elderly and thus cannot work on it; or they have moved away or this is derelict land in social ownership. The number of derelict rural farm holdings is increasing. Despite low prices of the land and farm holdings, few are those interested in buying them and returning to the village even in the lowland areas.

Another consequence of such historical developments is a sheer size of the rural holding. A small rural farm holding was sustained throughout 19th century in Serbia thanks to the legal protection followed by, in the 20th century, agrarian reforms that led to fragmentation of great estates and allotment of their parts to poor families. In the socialist days of Yugoslavia no single collectivization in the village took part to some notable extent but legally the size of the private estate was limited to 10 - 15ha. That is why the dominant is a small rural holding that itself constrains modernization of production and competitiveness of farm holdings: 77,7% of the holdings are of up to 5ha in size; average size of the holdings possessed by physical persons is 4,5ha while the holdings usually comprise six portions (Government of the Republic of Serbia, 2014, p. 16). Today's village lacks many prerequisites for developing agriculture, namely, legally and technically defined land, educated workforce, larger cattle fund, cheaper capital, lasting interest or motivation of young people to get into farming and remain to live in the village (Mitrović, 2015, p. 209). Moreover, underdeveloped rural non-farm economy and public sector in the rural areas contribute to the economic underdevelopment of these regions.

Farm cooperatives have a long tradition in the Serbian village. In the socialist period they were forms of association and cooperation of independent agricultural producers. Despite the weaknesses of such a form of organization, they played an important role in

marketing of farm products, input acquisition, building of infrastructure and social life of the rural population. In the transition period a considerable sum of these cooperatives ceased to exist while a few new ones were created. The cooperatives are facing a series of problems which unable them to meet the objectives they were created for (Cvejić, 2016). No land was returned to them by restitution. The ownership of the cooperatives over the land has not been legally regulated which lessens their chances of obtaining bank loans for production or of competing for various projects. The lack of experts and professional management coupled with a low level of social capital has both limited the cooperatives' efforts to adjust themselves to the new ways of doing business. „The dying out of cooperatives economically and socially weakens local rural communities while poor economic resources and a low social capital create further unfavorable prerequisites for future individual and joint activity“ (Cvejić, 2016, p. 187). The institutional framework and financial support to cooperatives are not stimulating for their development.

The development as presented above affects life quality and social exclusion of rural population. Poverty, underdeveloped infrastructure, a difficult access to health care and education, lack of cultural and entertaining programs – all this has an impact upon the decision to leave the village (or to direct children to leave the village) or to make the village unattractive for urban people to return to it (such as workers who remained unemployed while having a farm in the countryside or pensioners or unemployed who would, with adequate training and state support, start farm or rural non-farm economy and services in the village and the like).

Considering the policy of rural development what must be taken into account are peculiarities of a given region as well as the difference among three kinds of rural regions in Serbia, namely, hilly-mountainous, big cities environments and lowland or flatland ones. Of them all, the most unfavourable position is taken by hilly-mountainous villages, distant and with poor communication links with big cities, with small family holdings and semi-natural economy. Mitrović (2015) distinguishes five types of villages with respect to their sustainability, namely, deserted (less than ten dwellers), disappearing (less than 100 dwellers or less than 200 dwellers if there are no children or women of childbearing age), sustainable (in the socio-economic and demographic sense, these are medium-developed villages with more than 500 dwellers), prosperous (above-average developed villages in terms of development of agrarian and rural structure and infrastructure) and prominent villages (that can serve as a good example to others in some important aspects of rural life) (pp. 221–222). In this paper a special attention is devoted to the possibilities of stimulating development of the villages whose sustainability is jeopardized.

Use of the Internet in Rural Areas

The prerequisite for making use of the possibilities created by the information development in rural areas is accessibility and the use of the Internet by rural population. The data obtained in 2020 show that a digital divide between the village and the city in Serbia is prominent (Table 1). Somewhat less than two-thirds of the village households possess a computer and 90.3% possess mobile phones, while a connection to the broadband Internet is possessed by 70.1% households. Only 3.2% have internet access elsewhere (Statistical Office of the Republic of Serbia, 2020, p. 31).

Table 1: Percentage of households having a computer, a mobile phone, an internet connection and a broadband internet connection by type of settlement

Type of settlement	Computer	Mobile phone	Internet connection	Broadband internet
Urban	81.6	96.3	87.1	87.0
Rural	61.8	90.3	70.4	70.1

Source: Statistical Office of the Republic of Serbia 2020, p. 30, 15

The reasons that the rural population states when asked about the lack of the Internet connections point to the actions that have to be undertaken, namely: don't need the Internet (75.6% of rural not-have population), equipment costs too high (20.4%), access costs too high (10.9%), lack of skills (9.4%), broadband internet is not available (7.6%). The research conducted in 176 rural settlements in four municipalities in Southeast Serbia which belong to the devastated regions (with development level below 50% of the Republic average) shows that 29% of villages have an access to the broadband Internet and 44% of them have a mobile phone signal (Jelić, Kolarević 2021, p. 1344).

When it comes to computer literacy, according to the 2011 Census, one third of rural population is computer-literate or possesses, to an extent, computer skills (Table 2). Two-thirds of the population is computer-illiterate, that is, people who do not know how to perform any of the questioned activities.

Table 2: Population aged 15 and over by computer literacy and type of settlement (%)*

Type of settlement	Computer literate persons	Persons with partial computer skills	Computer illiterate persons	Total
Urban	44.09	15.11	40.80	100
Other	19.84	14.29	65.87	100
of which:				
Male	20.93	15.58	63.49	100
Female	18.74	13.02	68.24	100

* Data relative to whether a person knows text processing, creating tables, sending and receiving electronic mail, as well as whether a person knows how to use the Internet.

Source: Statistical Office of the Republic of Serbia, 2013, p.140

Education is the most important predictor of an efficient use of the Internet. Educational structure of the rural population in Serbia is unfavorable though it has been considerably improving in the last decades. According to the 2011 Census, half of the rural population is of primary and less than primary education (51,1%) while only 6,1% is with high and higher education (Statistical Office of the Republic of Serbia, 2013, pp. 34–35).

The data about Internet connections, computer literacy and educational structure of the rural population must be taken into account when it comes to considering the possibilities of stimulating rural development and social inclusion of the rural population through the ICTs. In order to benefit from these possibilities it is necessary to encourage the rural population to use the Internet as well as enable it to develop adequate skills. In addition, to motivate the Internet usage in the rural areas it is necessary to make the rural

population familiar with the concrete benefits they would have from using the Internet for farming and non-farming businesses as well as for fulfillment of all sorts of its needs; also, the rural population should be trained for mastering the basic Internet skills as well as those needed for business through the Internet in addition to opening up telespots in local communities (schools, cultural centers) for connection and training. It is of special importance to make people familiar with the opportunities of the Internet connection through mobile phones that are more accessible to the rural population and that enable realization of different activities through various applications.

The Digital Skills Development Strategy of the Republic of Serbia (2020) highlights the population of rural areas as one of the groups exposed to the digital divide and envisages measures to reduce this gap (pp. 43–44). Having in mind the specifics of rural areas, raising awareness about the use of ICTs can be achieved through conducting campaigns, TV and radio shows and the Internet. Non-formal education should be adapted to the rural conditions (use of public spaces, libraries and schools; NGOs' activities, "traveling" trainings, massive open online trainings (MOOCs), promotion of peer to peer education). Given that a large number of people are switching to mobile phones without previous computer experience, the Strategy stresses that mobile literacy is needed to overcome the gap between basic phone use and smartphones use (Government of the Republic of Serbia, 2020, p. 39).

ICTs and Rural Development

The role of the ICTs in stimulating the development of rural areas can be fully comprehended if we observe, on the one hand, the needs of the given areas and, on the other hand, the possibilities to contribute, by means of the ICTs, to their long term and sustainable fulfillment.

Data from the 2012 Census of agriculture show a low level of education in the field of agriculture. Most farm managers have acquired knowledge of agriculture exclusively through practical experience (60%). When it comes to formal education, 2.5% have completed high school in agriculture, and 1.4% have graduated from the faculty of agriculture. Only 3.2% of farm managers attended some form of education and training in the census year (Bogdanov, Babović 2014: 44–45).

The exploration of small rural households has shown that two-thirds of the examinees stress the need for jobs outside farming as a factor that would contribute to a better life of their households (Bogdanov, 2007, p. 152). This is followed by credit availability (57,4%) while the third factor refers to the ensured market for their products (40,3%). A smaller number of examinees state, as the most important factors; access to information (16,8%), business associations (12,9%) and training and education (12,5%).

The sustainable development of the rural areas should be oriented to two directions, namely, economic development (development of agriculture and rural non-farm economy) and improving life quality of the rural population and community. When it comes to the economic development, the Internet can contribute to informing, marketing and sale of products, development of non-farm businesses and associations of farmers and service providers.

Informing represents a very important problem for rural holdings in view of their geographical position and educational structure of population. The above mentioned

research project (Bogdanov, 2007, p. 142) has shown that, for instance, the state counseling service agency for agriculture as a source of information is mentioned by only 2,1% of the rural households; more than 40% of households are not aware that the counseling services exist, and further 24% has a need for such services but does not know how to acquire them. This example shows that farm producers do not know what sources of information exist which are of relevance for their business; and even if they know of their existence, they are ignorant of how to contact them. The Internet provides the possibilities for them to find out, in a simple way, what sources of information exist, and to get the needed information just on time and from many different sources (from expert agencies to other farmers). The Internet ensures a personalized and two-way communication while the range of information refers to practically all the fields of interest to farm holdings: social networks, mailing lists and other applications ensure regular information about any topic the user cares to choose. For the Internet function to be performed efficiently, it is necessary for the organizations and organs dealing with affairs of interest to the rural holdings (state organs, banks, insurance agencies, non-government organizations, expert and scientific organizations) to adjust their activities to the needs and capabilities of farmers. In all this care should be taken of the changes taking place in economy and a rural way of life – all sorts of information about bank loans, insurance, subventions, taxes, agriculture-designed projects, cadastre, market developments, product standards and ways of acquiring certificates are equally needed to the farmers just as much as they need information about production innovations. The Internet widens up a circle of experience exchange among the farm producers themselves: social networks, forums, blogs and commentaries on the part of the users provide for information exchanges regardless of their places of residence which becomes very important when it comes to narrowly-specialized topics. The platforms for such information exchanges can be given by the Cooperative Association of Serbia, associations of agricultural producers, state agencies, local self-governments, non-government organizations and media organizations. A successful example of the Web site with information collected from different fields and the forum for communication is provided by the Agricultural counseling and expert services of Serbia.

Secondly, the Internet offers various possibilities for marketing farm products. Most of the farm holdings have, for one thing, small and unspecialized economy which is insufficient for supplying great trade chains with while, moreover, they are often too far from urban settlements and without sufficient workforce to sell their products directly at local markets. The Internet provides informed decision-making on the basis of an insight into market developments, product advertizing, a direct contact with the buyer and sale *via* the Internet, avoidance of mediators and shortening of supply chains as well as finding market niches for specific products. The process of carrying out financial transactions and applying for projects and state subventions is made easier by using e-management services through the Internet thus reducing the costs of their businesses.

Thirdly, the Internet can contribute to the promotion of rural non-farm activities. Rural development does not imply only the development of farm economy but also of rural non-farm economy thus diversifying economy and ensuring population employment. Regarding the economic situation in Serbia as well as the lack of infrastructure and educated workforce in the countryside, no considerable investment into rural areas is to be expected. That is why attention should be paid to production and services based on

knowledge and resources of rural holdings. The ICTs can contribute to such development, firstly by recognizing the possibilities of rural non-farm economy. Namely, many skills that the village dwellers possess are not learnt at school but they are mastered through the process of growing up and working on rural holdings (Bogdanov, 2007, p. 115). That is why they are often experienced as something taken for granted and with no market value. That is exactly what the Internet is offering, namely, the opportunity to the village people to recognize what sorts of things can be a source of profit while, at the same time, being the sort of things they themselves possess enough skills, prerequisites, means and tradition to produce (old crafts, folk art, artifact of natural materials, food preparation in the traditional ways, rural tourism, recreational and educational tourism). In addition, the Internet provides for marketing and product sales, additional education, knowledge about how to make a brand of certain region by relying on cultural and rural legacy and natural riches (such as, for instance, pullovers from Zlatibor or carpets from Pirot). The carriers of the development policy can promote, through the Internet, a variety of ideas and point to the instances of successful practice besides offering helpful counselling (especially when it comes to financial and organizational aspects). Moreover, local communities can promote the advantages of their rural areas through the Internet for the sake of attracting investors. ICTs are very widely used in the tourism and travel business. Application in rural tourism is important because it enables overcoming the distance between supply and demand, improves intermediary business, increases the visibility of destinations and enables the competitiveness of rural supply (Vuković, Popović & Arsić 2016). The development of rural tourism does not only bring employment and income. Improving services, entertainment and cultural facilities aimed at attracting tourists at the same time contribute to better meeting the needs of residents, especially young people. „In such circumstances, young people can find not only economic, but also social and cultural reasons to continue living in rural areas“ (Maksimović, Urošević & Mihajlović, 2015, p. 91).

Fourthly, the ICTs plays an important role in strengthening social capital and setting up associations of producers (farmers, tourists, manufacturers). Small rural holdings cannot ensure quantity and continuity as providers; this, in turn, creates the need for their association and common market strategy. Two forms of organization are available: associations and cooperatives. There are successful examples of association that use the advantages of the Internet, first of all, in the field of rural tourism: Web sites of association collect, at one place, offers from different parts of Serbia, offer the possibilities to set up contacts with potential guests while, at the same time, educating their own members (for instances, how to present one's own offer in the most efficient way). Associations of producers of particular farm products (for instance, producers of raspberries) provide, through Web sites and social networks, exchange of information related to the innovation in production, situation at the market and problems faced by the producers. Unlike associations, cooperatives, to a lesser degree, use the Internet opportunities for doing business, networking and common activities. The Internet offers another possibility of linking that would strengthen social capital of village communities – “homeland networks” (Mitrović, 2015, p. 224). The homeland networks that would virtually link village dwellers, their co-villagers that have migrated abroad or to the city and their offspring, would activate hidden human potential for development by bringing together “those who know what and how with those who want and can – here and now” (Mitrović, 2015, p. 223).

The research of a Facebook group of small-scale food producers shows that this way of doing business is multifunctional, providing a number of opportunities to producers (Šljukić, Šljukić, Vidicki 2021). Participants are various: small-scale food producers (individual producers, family agricultural holdings, small partner cooperatives, organizations with food production as an additional activity, both from rural and urban areas), customers, agents between customers and producers, lawyers, translators, agricultural or food engineers and administrators. Diverse membership of the group provides producers with customers' suggestions concerning what it is they should produce and how as well as "legal services required for complex paperwork; expertise and advise relative to different production processes; business and marketing advisory services; translation services for product labels; transportation services in regular or refrigerated vehicles; agent services in the market expansion process (even in the foreign market penetration) etc." (Šljukić, Šljukić, Vidicki 2021, p.1332).

Besides invigorating economic activities in the village, of equal importance is the role of the ICTs in improving life quality of rural population and lessening of social exclusion. The most important problems that the rural population is facing are: underdeveloped infrastructure, availability of public services, a low quality of medical and educational institutions and the lack of organized cultural, recreational and entertaining programs. The ICTs application in diverse fields enables all sorts of activities to be done online and services and resources to be closer to the users (e-health care, e-management, e-banking, e-learning). The traditional ways of social life are dying away; mainly sports, cultural and art societies exist in the villages; other possibilities for social life that are more adjusted to the sensibility of younger generations are scarce. The networking *via* the Internet of cousins, friends, people of similar interests, social networks, membership in virtual groups, online learning and the like would provide for reducing the sense of isolation and the lack of perspective of rural population.

Besides economic sustainability and improvement of life quality, an important role implied in the ICTs application is an increasing consciousness about the significance of the protection of environment, biodiversity and cultural legacy.

The Information Society and Information Security Development Strategy of the Republic of Serbia (2021) envisages primarily activities aimed at development of all types of analytical information systems to support agriculture and tourism (agricultural statistics, public reporting and forecasting service systems, market information, registers, digitalization of subsidies award, etc.). A precondition for the application of ICTs in rural areas is the development of communication infrastructure, in which the state must play an important role, because it may not be profitable for operators in certain areas. The Strategy pointed out the development of modern telecommunication solutions, which enable the connection of remote rural areas as well as remote production plants (factories, agricultural farms, etc.) and thus enable the development of industry and agriculture (Government of the Republic of Serbia 2021, p. 67).

Conclusion

In order to make the most of the possibilities offered by the ICTs for the sake of stimulating rural development in Serbia it is necessary, for one thing, to encourage

the Internet usage by the rural population and, moreover, to develop contents and applications adjusted to the needs of the same population. A systematic and organized approach must involve state agencies, business associations, the Cooperative Association of Serbia, non-government organizations, specialized agencies for rural development and other actors that are to provide for online informing and business activities by using a variety of possibilities offered by the ICTs (Web sites, mailing lists, social networks, blogs, forums, Smartphone apps). In so doing, it is necessary that the contents should be customized to fit the needs of rural holdings while the applications should be accessible to rural population.

In the process of realization of the above-listed actions, it is necessary to rationally estimate possible effects of the applied actions having in view the peculiarities of economic and social conditions in different rural areas. The disappearing villages that are difficult to economically revitalize (less than a hundred dwellers, mostly older people) can be networked by creating „virtual rural municipalities“ (Mitrović, 2015, p. 220) with the objective, primarily, to support the remaining rural population, improve life quality and safeguard natural riches and cultural legacy. When it comes to social-demographic and economically sustainable villages, attention should be directed to the stimulation of farm and non-farm economy, access to public services and social and cultural life thus making the village attractive as a place of living for (young) population.

Two more benefits should be mentioned. Firstly, digitalization of the rural amenities would not only stimulate the development of certain economic activities such as recreational tourism and creative economy (Rikalović, Molnar & Nikić, 2016) but would also lead to a change of the ideas about village life in both rural and urban population; this would, in its turn, launch a demographic renewal of the village. Secondly, village marginalization would decrease if the “voice” of rural population is heard more than it is now – meaning, its authentic statements of interest, needs, problems and experiences through the Internet would increase solidarity with rural population and impose the “obligation” on the whole society (first of all, policy creators) to do its best for the village to take the place it deserves in the Serbian society.

An integral social development of the rural areas implies a systematic long-term approach, coordinated actions on the part of various actors on the national and local levels as well as application of good practices (primarily those developed in the European Union countries) adjusted to the local conditions, the use of available (natural, human and cultural) resources and combination of traditional ways of economy with those of modern technologies and modern business. The ICTs application cannot replace a strategic approach and budget support but it can contribute to income diversification, faster and cheaper ways of doing business and greater competitiveness of rural households.

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THE EFFECT OF MONETARY POLICY ON GROSS DOMESTIC PRODUCT IN THE REPUBLIC OF SERBIA

Abstract

The aim of this paper is to carry out an analysis of the impact of the monetary and credit policy on the real economic flows in the Republic of Serbia. In order to answer to the given goal, a correlation and regression analysis was performed for the period from 2004 to 2020. The results of this analysis have shown that there is a strong influence of the monetary and credit policy on the gross domestic product of the Republic of Serbia. Based on the results of the conducted regression analysis, it was found that in the Republic of Serbia, with the growth of the monetary aggregate M2 by 1%, gross domestic product grew by 0.691%. It was also found that the growth of approved long-term loans by 1% had a positive impact on the growth of gross domestic product by 0.425%. These values point to the great importance of the monetary and credit policy on economic growth in the Republic of Serbia and the need to attach great importance to monetary policy in the future period.

Key words: Gross Domestic Product, Monetary Policy, M2, Loans.

JEL classification: E51, E52, C12.

ЕФЕКАТ МОНЕТАРНЕ ПОЛИТИКЕ НА БРУТО ДОМАЋИ ПРОИЗВОД У РЕПУБЛИЦИ СРБИЈИ

Апстракт

Циљ овог рада је да се изврши анализа утицаја монетарне и кредитне политике на реалне економске токове у Републици Србији. Да би се одговорило на постављени циљ, извршена је корелациона и регресиона анализа за период од 2004. до 2020. године. Резултати ове анализе су показали да постоји снажан утицај монетарне и кредитне политике на бруто домаћи производ земље. Република Србија. На основу резултата спроведене регресионе анализе, утврђено је да је у Републици Србији, уз раст монетарног агрегата М2 од 1%, бруто домаћи производ порастао за 0,691%. Такође је утврђено

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да је раст одобрених дугорочних кредита од 1% позитивно утицао на раст бруто домаћег производа од 0,425%. Ове вредности указују на велики значај монетарне и кредитне политике за привредни раст у Републици Србији и потребу да се монетарној политици придаје велики значај у наредном периоду.

Кључне речи: Бруто домаћи производ, Монетарна политика, М2, Кредити.

Introduction

The goal of each country's economic policy is to have as high a GDP growth rate as possible, but also to develop sustainably. In order to achieve these goals monetary policy, as an integral part of economic policy should contribute to the realization of these goals. The monetary policy holder is the central bank. In the case of the Republic of Serbia, it is the National Bank of Serbia. Monetary policy, led by the NBS, and central banks of other countries, consists of emission (this function does not have a central bank of dollarized economies), credit and foreign exchange policies. Through the emission policy, the central bank may broadcast additional amounts of money in circulation. Through a credit function, the central bank lends money to commercial banks with defined interest rates, which has an impact on the level of the interest rate and on the offer of loans by commercial banks to business entities, citizens and the public sector. The foreign exchange policy of the central bank is linked to the management of the exchange rate and foreign exchange reserves.

Performing its functions, the central bank, has an impact through the transmission mechanisms of monetary policy on the business flows. In the open market operations, the central bank through the appropriate channels affects the aggregate demand, which further has a positive effect on the growth of economic activity and the development of the country.

When it comes to the NBS, a particularly important channel of monetary transmission is the channel of bank lending (Lučić, 2006). The main reason why this channel has special significance is the importance of banks within the financial system in the Republic of Serbia and insufficient development of the capital market, which would enable the issuance of securities to provide additional cash for business and development of business entities. The essence of this channel is that banks' reserves are changing through open market operations, which further has an impact on demand for loans and hence on investments and the value of gross domestic product.

Due to this great importance of the banking lending channel, within this paper, an analysis of the impact of the monetary aggregate M2 and the approved long-term loans to the private sector on the value of GDP will be carried out in order to determine how much monetary and credit policy strongly influence the movement of gross domestic product, as real economic variable.

A review of literature

When it comes to the monetary influence on the real economic flows in the Republic of Serbia, theoretical analyzes are present in the literature. It is therefore important in this paper to make an empirical analysis and give answers to the hypotheses that will be defined in the paper.

When it comes to foreign literature, empirical analyzes are present, and mainly the authors came to the conclusion that there is a strong positive link in some countries between monetary and real economic variables.

In the nineties, in the Republic of Serbia, monetary policy was extremely inefficient. The imposed sanctions against Yugoslavia, as well as the war in the former Yugoslavia, led to the printing of huge amounts of money without cover, which led to hyperinflation (Djurovic, 2004; Pitić, Dimitrijević, 1995). Also, during the 1990s, a complete collapse of the banking system occurred due to the banks Jugoskandik and Dafiment. By offering high interest rates, these banks have accumulated large amounts of deposits. By the bankruptcy of these banks, clients who deposited deposits remained without their money, which led to the collapse of confidence in the banking system. Over time, trust in the banking system has been restored, and today the channel of bank lending in the framework of the transmission mechanism is considered as the most important (Kujundžić, S., Otašević, D., 2012).

The significance of the banking lending and monetary policy channel to real economic trends will be tested by correlation and regression analysis, but before defining the model and conducting an analysis based on the available data, we will present the results of other authors' research on the topic we deal with in this paper.

Robbi Fazli (2011) analyzed the link between monetary policy and the real sector, by analyzing the relationship between supply of money, gross domestic product and consumer price index in developing countries. By analyzing the time series for the period from 1972 to 2005, he concluded that there is a strong and statistically significant link between the observed variables.

Khin et al. (2014) have carried out the analysis for Malaysia. The study was conducted on the basis of the collected secondary data for the period 1991-2011. The aim of their study was to answer the question of whether there is a positive link in Malaysia between the supply of money and the real interest rate on loans on the one hand and the gross domestic product on the other. By applying Johansson co-integration analysis and Vector error correction models, these authors have proved that the relationship between the observed variables is present and strong.

Ayub and Shah (2015) state that monetary policy plays a key role in the economic movements of each state. These authors analyzed the impact of monetary policy on economic growth on the example of Pakistan for the period 2005-2014. In their analysis, they applied correlation and regression analysis, where they analyzed the impact of monetary aggregate M2, interest rates and inflation rates on GDP. Based on the results of the conducted research, they came to the conclusion that the monetary policy in Pakistan and how it affects the gross social product of this country.

Mathenge (2011) found in its research that there is a link between monetary policy and gross domestic product. He came to the conclusion that gross domestic product strongly depends on the monetary policy of the state. Using the regression analysis on

the example of Kenya for the period 2002-2011, the author has proven that growth in money supply has a strong impact on GDP, but also that there are many unknown factors that have an impact on GDP.

Koivu (2002) dealt with the impact of the banking sector on real economic trends. Namely, using the panel data analysis, this author analyzed the link between approved loans to the private sector and the growth of gross domestic product. The analysis was conducted in 25 transition countries for the 1993-2000 period. It was found that the link between approved loans to the private sector and economic growth is extremely weak. It has also been established that the link between previously approved loans and current economic growth is negative. However, taking into account numerous studies that showed a positive link between these variables, this author concluded that the results obtained may be the reason for the insufficient development of the analyzed countries and the inadequate placement of approved loans. Cristea and Dracea (2010) came to similar results. Contrary to these surveys in the literature, there are numerous studies that prove the positive effect between approved loans to the private sector and the growth of gross domestic product. For example, Cojocaru et al. (2021), in its analysis, established a positive relationship between the volume of loans approved and GDP growth, in the period when the central bank maintains inflation in reasonable values, using the generalized method of moments model.

Rousseau and Wachtel (2009), in their analysis, concluded that there is a positive link between lending and economic growth. They also state that this connection was significantly stronger before, but with the strengthening of the capital market, it was possible for the resources to be supplied with the issue of securities, which affected the decrease in the significance of the loan. Considering the insufficient development of the capital market in the Republic of Serbia, it is expected that the results of the analysis in this paper will show a positive link between the approved long-term loans to the private sector and the growth of gross domestic product.

Cappiello et al. (2010) in his paper answered to the question whether monetary policy through a channel of banking lending affects the loan offer and whether this loan offer by commercial banks continues to have an impact on economic growth. In the analysis, the authors included countries from the European area: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain for the period 1999-2008. By applying panel data regression analysis, the authors have come to the conclusion that in these countries there is a positive impact of monetary policy on the growth of loan offerings, and that the growth in loan supply continues to lead to the growth of gross domestic product.

Korkmaz (2015) came to similar results. He dealt with the analysis of the impact of bank credit on economic growth and inflation. By applying the panel data regression model on the example of ten European countries, for the period 2006-2012, this author came to the conclusion that the higher amount of loans granted by banks had an immanent effect on inflation growth, but the growth of loans to the private sector had a positive impact on growth gross domestic product.

Driscoll (2004) and Ashcraft (2006) found no link between credit and output in the US case in their analyzes. Takast and Upper (2013) concluded in their studies that there is no positive correlation between loans and gross domestic product in the US, especially after the period of an economic crisis.

Research methodology

The research in this paper is based on the impact of monetary policy on gross domestic product, as the most important variable through which economic growth is expressed. In order to carry out the regression analysis, which will show us the connection between the monetary aggregate M2 (cash in circulation, transaction deposits, other dinar demand deposits and time deposits in dinars, short-term and long-term) and gross domestic product, as well as long-term loans companies and population and gross domestic product, data were collected from the NBS website for the period 2004-2020. The data were collected in millions of dinars and their logarithm was performed before conducting the research.

Secondary data used for research are taken from the National Bank of Serbia website on December 10, 2021. The Statistical Package for the Social Sciences (SPSS) was used to process these data. In order to obtain the relevant results, the maximum number of years for which data are available is used.

The subject research is of a deductive-implicit type, because in the research we start from the results of previous studies and theoretically defined frameworks, and then on the basis of the obtained research results we can conclude whether the same phenomena apply in the case of the Republic of Serbia.

In order to realize the set goal of the research the hypotheses are defined:

Hypothesis H1:

H0: There is a positive and strong relationship between the supply of money and the value of gross domestic product;

H1: There is a poor link between the supply of money and the value of gross domestic product:

Hypothesis H2:

H0: The higher amount of long term loans to the private sector leads to a faster growth of gross domestic product.

H1: The higher amount of long-term loans to the private sector does not lead to a faster growth of gross domestic product.

Proof of zero hypotheses, ie denial of alternative hypotheses, will lead to significant conclusions, which will show whether there is a positive effect of the monetary and credit policy on the real economic trends in the Republic of Serbia, as well as the strength and direction of this connection. The empirical results of this research will provide answers to numerous theoretical controversies about the importance of monetary and credit policy on real economic trends in the RS. This is also the significance of this research.

Model

In order to prove or deny hypotheses, correlation and regression analysis are used. By using the correlation analysis we will get an answer on the degree of agreement between the observed variables, while the application of the regression analysis will give an answer to the question of how many changes in independent variables have an effect on the dependent variable.

Since Pearson's correlation coefficient is suitable for interval or continuous variables (Pallant, 2009), as such will be applied in analyzing the relationship between given variables.

The Pirson Correlation Coefficient Form can be represented by the following formula (Sharma, 2007):

$$r = C_{xy} / SD_x SD_y \quad (1)$$

where:

C_{xy} - covariance and

SD_x, SD_y - standard deviations of variables x and y .

By introducing the defined variables into a given formula, Pirson's correlation coefficient between the monetary aggregate M2 and gross domestic product, i.e. between the amount of approved long-term loans and gross domestic product can be obtained on the basis of the following formula:

$$r1 = C_{\ln M2 \ln GDP} / SD_{\ln M2} SD_{\ln GDP} \quad (2)$$

$$r2 = C_{\ln DK \ln GDP} / SD_{\ln DK} SD_{\ln GDP} \quad (3)$$

Unlike Pirson's correlation coefficient, the determination coefficient, which will also be part of the analysis, will show how much changes in gross domestic product can be explained by changes in M2, or the sum of long-term loans granted to the private sector.

In defining the regression model, we start from the simple linear regression model, which can be represented by the following formula (Yan, Gang Su, 2009):

$$y_i = \beta_0 + \beta_1 x_i + \epsilon_i \quad i = 1, 2, \dots, N \quad (4)$$

where:

y_i - i th dependent variable;

x_i - i th value of the explanatory variable;

β_0 and β_1 - regression parameters, which is a section or a free member in the model, while β_1 is a slope;

ϵ_i - stochastic member or accidental error;

N - the core of the basic set and

I - i th value in the basic set.

By reaching the result, it will be possible to determine how many percentages will change the dependent variable if the independent variable increases by 1% (Chatterjee, Hadi, 2006). In order to consider the obtained analysis results statistically significant, it is necessary that the parameter p , that is, probability be less than 0.05 i.e. 5%.

In accordance with the model of regression analysis presented, we can define a model for the concrete problem, which this paper deals with. Before the data was entered into the model, their logarithm was performed, so the form of the monetary aggregate M2 impact on gross domestic product can be shown as follows:

$$\ln GDP_i = \beta_0 + \beta_1 \ln M2_i + \epsilon_i \quad i = 1, 2, \dots, N \quad (5)$$

where:

$\ln GDP_i$ - logarithmic GDP, for $i = 1 \dots N$;

$\ln M2_i$ - logarithmic M2, for $i = 1 \dots N$.

When it comes to the impact of the amount of approved long-term loans to the private sector on gross domestic product, the following formula is applied:

$$\ln \text{GDP}_i = \beta_0 + \beta_1 \ln \text{DK}_{i+} \epsilon_i \quad i = 1, 2, \dots, N \quad (6)$$

where:

$\ln \text{DK}_i$ - the logarithmic sum of long-term loans, for $i = 1 \dots N$.

In the continuation of the paper, by using the defined model, a response will be given to the defined hypotheses, which will enable us to give a conclusion on the importance of the monetary and credit policy for the real economic sector in the Republic of Serbia.

Research results and Discussion

Before determining the Pearson correlation coefficient and linear regression, the results of descriptive statistics for the listed variables, which are the subject of analysis, are presented and analyzed.

Table no. 1 Results of descriptive statistics of defined variables in millions

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
GDP	17	1526205	5502216	3681983.56	1219373.154
M2	17	146209.00	1553797.00	618895.5294	371123.50602
L_loans	17	102756.00	2359708.00	1155138.0000	673516.85478
Valid N (listwise)	17				

Source: Authors

As can be seen from Table no. 1 in the analysis of this problem, a period of 17 years is used. In this period, the highest value of gross domestic product was 5502216 million dinars, while the lowest value of gross domestic product amounted to 1526205 million dinars. The average value of GDP, which is obtained when the values of GDP for all observed years are divided by the number of years, in the observed period amounted to 3681983.56 million dinars. The standard deviation from the determined mean value for GDP is 1219373.154 million dinars.

The highest value of monetary aggregate M2 is 1553797.00 and the lowest is 146209.00 million dinars. The arithmetic mean of this monetary aggregate is 618895.53 million dinars, while the standard deviation from the determined mean value is 371123.51 million RSD.

Table no. 2 Results of the correlation analysis of GDP and monetary aggregate M2

Correlations			
		LN GDP	LN M2
LN_GD	Pearson Correlation	1	.970**
	Sig. (2-tailed)		.000
	N	17	17
LN_M2	Pearson Correlation	.970**	1
	Sig. (2-tailed)	.000	
	N	17	17

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

Source: Authors

The amount of 102756.00 million dinars represents the lowest amount of long-term loans granted to the private sector for the period 2004-2020, while the sum of 2359708.00 million dinars represents the highest amount of approved long-term loans. The average value of approved long-term loans in the observed period equals 1155138.00 million dinars. Standard deviation from the average value of approved long-term loans, amounts to 673516.85 million dinars.

After the presentation of descriptive statistics, the data are logarithmic and the results of the correlation analysis of gross domestic product and monetary aggregate M2 are shown in table no. 2.

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After the presentation of descriptive statistics, the data are logarithmic and the results of the correlation analysis of gross domestic product and monetary aggregate M2 are shown in table no. 2.

The results of the Pearson linear correlation between GDP and M2 show that there is a positive link between these two variables. The obtained score of 0.970, with the realized significance level $p = 0.000 < 0.01$, shows that this connection is extremely strong, which means that the changes in the money supply (M2) have a strong impact on the growth of gross domestic product in the Republic of Serbia. On the basis of the Pearson's correlation results, a coefficient of determination was obtained, which in this case amounts to 97 %, which means that the changes in GDP are strongly influenced by the changes in M2.

Table no. 3 Results of regression analysis of GDP and M2

Coefficients ^a						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	7.271	.505		14.403	.000
	LN M2	.691	.038	.970	15.440	.000

a. Dependent Variable: LN_GDP

Source: Authors

Table 3 shows the results of the regression analysis on the basis of which the regression equation can be written, using the equation number 4, which shows the effect of monetary aggregate M2 on GDP in the Republic of Serbia:

$$BDP = 7.271 + 0.691 * M2 \quad (6)$$

based on which it can be seen that with the growth of money supply (M2) by 1%, the gross domestic product increase by 0.691%, with the level of statistical significance $p = 0.000 < 0.05$. Based on the obtained results the zero hypothesis, within the hypothesis H1 has been proven, ie in the Republic of Serbia there is a strong connection between the

supply of money (monetary aggregate M2) and the growth of gross domestic product. In this way, we came up with similar results as the authors of Fazli (2011), Khin et al. (2014) and Ayub and Shah (2015) who have shown in their analyzes the existence of a strong link between money supply and economic growth in the countries that were the subject of their analysis.

As in the analysis of the relationship between GDP and M2, in calculating the ratio between the volume of long-term loans and gross domestic product, the Pirson coefficient of correlation was first calculated, and the results are shown in table no. 4.

Table no. 4 Pirson's correlation coefficient between the sum of approved long-term loans and GDP

		LN GD	LN Lloans
LN_GD	Pearson Correlation	1	.989**
	Sig. (2-tailed)		.000
	N	17	17
LN_Lloans	Pearson Correlation	.989**	1
	Sig. (2-tailed)	.000	
	N	17	17

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

Source: Autors

And in the case of these two variables there is a strong correlation, with the realized level of statistical significance $p = 0.000 < 0.05$. Similarly, changes in the level of approved long-term loans to the private sector have a strong impact on economic growth, ie on the movement of gross domestic product. The coefficient of determining this model is 98.9%, which means that changes in GDP can be explained with 98.9% in oscillations in the scope of approved long-term loans.

Table no. 5 Results of regression analysis between GDP and long-term loans

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	9.238	.229		40.273	.000
	LN_Lloans	.425	.017	.989	25.420	.000

a. Dependent Variable: LN_GD

Source: Autors

Based on the results of the regression analysis, it can be concluded that the growth in the volume of long-term loans granted to the private sector of 1% leads to a growth of gross domestic product of 0.425%. This result of the regression analysis can be represented by the following formula, and by the model of the equation number 5:

$$BDP = 9.238 + 0.425 * LL \quad (6)$$

The obtained results are statistically significant. We conclude this on the basis that the realized level of statistical reliability is less than 0.05. Based on the results obtained in this way, another paper hypothesis is proved that the volume of approved long-term loans has a positive impact on economic growth, i.e. growth of the gross domestic product of the Republic of Serbia. In this way, as well as the authors of Cojocaru et al. (2011), Cappiello et al. (2010), Rousseau and Wachtel (2009) and Karkmaz (2015), we have come to the conclusion that there is a positive impact of credit on the real economic sector.

These results, which are determined by the analysis, point to the need to place monetary policy a special place within economic policy. In the Republic of Serbia, monetary policy, especially in recent years, has gained in importance, and it is especially important that inflation is maintained in reasonable values, the exchange rate is stable, and interest rates are lower than before. However, it should be emphasized that, compared with EU member states, interest rates in our banks are still high. This certainly negatively affects the demand for loans, and therefore the investment in expanding the existing one or starting a new business, i.e. on the demand of loans by the sector of the population, which can increase demand and encourage additional production of goods and services in the country.

Conclusion

The monetary and credit policy of the central bank plays an extremely important role when economic growth is in question. In the nineties, in the Republic of Serbia, an inefficient monetary and credit policy was conducted, and then there was a collapse of the banking and economic system. However, after this period, the level of efficiency of monetary policy has increased, and the trust in the banking sector has gradually returned. Considering the insufficient development of the capital market and the significance of the banks in the Serbian financial system, the channel of bank lending, as part of the transmission mechanism, is of great importance.

The analysis of the impact of monetary policy and approved credits on gross domestic product, as the most significant macroeconomic variable, was dealt with by a large number of authors. Most of them by analyzing developing countries, and some developed countries, came to the conclusion that there is a strong link between these variables in a large number of countries. The extremely high significance of bank loans is determined in the case of countries in which the capital market is underdeveloped, and the banking sector as a form of obtaining funds is dominant.

In order to analyze the impact of the monetary and credit policy on the real sector in the Republic of Serbia, a correlation and regression analysis was applied.

Based on the conducted analysis for the period 2004-2020. The positive relationship between monetary aggregate M2 and gross domestic product, ie between approved loans to private sector and gross domestic product, was established. On the basis of the conducted regression analysis, it was found that with the growth of monetary aggregate M2 by 1%, there is GDP growth of 0.691%, with the realized significance level $p = 0.000$, thus the hypothesis H1, which reads "There is positive and a strong link between the supply of money and the value of gross domestic product," is proven. It was

also found that with the growth of approved loans to the private sector by 1%, the level of gross domestic product is increasing by 0.425%, which means that another hypothesis set in the paper, that the higher amount of long term loans placed in the private sector leads to a faster growth of gross domestic product is also proven.

The obtained results point to the need to give greater importance to monetary and credit policy in the future period, given that banks have a dominant role in obtaining the necessary long-term funds in relation to the capital market in the Republic of Serbia.

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Литература

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