ACTA ECONOMICA

УДК 33, ISSN 1512-858X, e-ISSN 2232-738X

АСТА ECONOMICA

Научни часопис за економију
Излази двапут годишње

ИЗДАВАЧ:
Економски факултет
Универзитета у Бањој Луци
БиХ, РС, 78000 Бања Лука
Мајке Југовића 4
E-mail: info@ef.unibl.org

ЗА ИЗДАВАЧА:
Проф. др Станко Станић,
декан Економског факултета
Универзитета у Бањој Луци

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ТИРАЖ: 400

ACTA ECONOMICA

Година XVII, број 31

Бања Лука, децембар 2019. године

Садржај

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GLOBAL MATRIX OF REGIONAL GROWTH IN THE FUNCTION OF THE ANALYSIS OF REGIONAL DEVELOPMENT AND INTERREGIONAL RELATIONS

1 Stanko Stanić, University of Banja Luka, Faculty of Economics, Banja Luka
2 Željko Račić, University of Banja Luka, Faculty of Economics, Banja Luka
*Corresponding author E-mail: zeljko.racic@ef.unibl.org
1 ORCID 0000-0003-3833-4930
2 ORCID 0000-0001-7383-3431

ARTICLE INFO

Original scientific Article
Received: 20.11.2019
Revised: 3.12.2019
Accepted: 16.12.2019
doi 10.7251/ACE1931009S
UDC 330.34:338.124.4(497)

Keywords: *direct growth rate, indirect growth rate, growth matrix, regional growth matrix, global regional growth matrix, dynamic analysis.*

JEL Classification: C44

ABSTRACT

The subject of research in this paper is the expansion of the growth matrix, which is reflected in the definition of a new matrix - a global regional growth matrix. The assumption for the formation of this matrix is that the synthetic measures of the development of individual regions included in the analysis are first calculated. This matrix provides an opportunity to analyze interregional relations and the dynamics of structural change in the respective regions.

1. INTRODUCTION

Trends in economic quantities (social gross product, production volume, investments, various forms of consumption, etc.) within an economic system are interconnected, directly and indirectly, which results in the emergence of a general interdependence of the observed quantities.

Due to the interdependence of economic quantities, the change in the level of any of them is not the result of a purely qualitative and quantitative increase in the size.

If one assumes that changing one size is a function of only its qualitative and quantitative growth, then direct growth rates would be sufficient to analyze the size. Such starting point in the analysis of the development of an economic size is acceptable only on the assumption that there is complete independence be-

tween the observed size on the one hand, and other economic variables on the other. In real life, total independence between sizes within an economic system is impossible.

Similarly, interdependence relations are also observed between economic regions which form the territorial entity of a state and its economic system. There are interdependencies between the regions in the development process, so the level of development of one region changes under the influence of changes within the region itself (direct influences: changes in the volume of investments, changes in the economic structure, etc.) and under the influence of other regions (indirect influence).

2. PREVIOUS RESEARCH

Defining direct and indirect growth rates, as well as growth matrices based on them is originally a work of D. Stojanović (1973). The same author also defined the regional growth matrix. In this regard, there is little previous research. Still, we can single out some authors who have done similar research. We find a similar subject of research in the work of M. Backović (1982).

In later studies, we come across works in which a growth matrix instrument has been applied in various fields,for example: regional management in the maritime transport (Југовић&Лончар,2008), modeling of development potential of logistics operators (Пупавац&Зеленика, 2007), modeling of multimodal transport (Nikolić, 2003).

3. DIRECT AND INDIRECT DEPENDENCE IN THE DEVELOPMENT OF ECONOMIC REGIONS

Based on the previous findings, it follows that in the quantitative analysis of regional development, both direct and indirect rates of development of the observed regions should be considered. In order to show the appropriate model, we will look at m (R_1, R_2,...,R_m),which are from the point of view of economic activities interdependent.

To begin with, we will assume that the level of development of one region is measured by a single indicator, for example, per capita national income.

We will denote income of r and s region in the period t with $P_{r,t}$ and $P_{s,t}$, and income of r and s region in the period $(t-1)$, with $P_{r,t-1}$ and $P_{s,t-1}$, respectively. The change in income of r region in the period $(t-1,t)$,will be

$$\Delta P_{r,t} = P_{r,t} - P_{r,t-1}, \quad \begin{matrix}(t = 1,2,...,T),\\ (r = 1,2,...,m).\end{matrix} \tag{1}$$

Direct income growth rate of *r* region will show how many units of income of that region come per unit of income of the same region in the period (*t*−1):

$$p_{rr,t} = \frac{\Delta P_{r,t}}{P_{r,t-1}}, \tag{2}$$

that is

$$p_{rr,t} = \frac{\Delta P_{r,t}}{P_{r,t-1}} - 1, \quad \begin{matrix}(r = 1,2,...,m)\\ (t = 1,2,...,T),\end{matrix}$$

where direct income growth rate of *r* region in the period *t* was denoted with $p_{rr,t}$ compared to the period (*t*−1).[1]

Indirect income growth rate of *r* region in the period *t* in relation to income of *s* region in the period (*t*−1), denoted with $p_{rs,t}$, shows how many units of increase in income of *r* region come per unit of income of *s* region in the period (*t*−1):

$$p_{rs,t} = \frac{\Delta P_{r,t}}{P_{s,t-1}}, \quad \begin{matrix}(r \neq s = 1,2,...,m),\\ (t = 1,2,...,T).\end{matrix} \tag{3}$$

Direct and indirect rates can be arranged in a square pattern of numbers so that direct growth rates are on the main diagonal of that square pattern and indirect

[1] Direct growth rates in relation (2) are expressed relative to the value of income in the period (*t*−1). They can also be expressed in relation to income in the period *t*, which is less common in practice. The relations between direct growth rates expressed in relation to the period (*t*−1) and the period *t* are given by the following relations:

$$p'_{rr,t} = \frac{p_{rr,t}}{1 + p_{rr,t}}, \quad \begin{matrix}(r = 1,2,...,m)\\ (t = 1,2,...,T),\end{matrix}$$

where

$$p'_{rr,t} = \frac{\Delta P_{r,t}}{P_{r,t}}.$$

A similar observation applies to indirect growth rates, the definition of which follows immediately.

rates are in other places. Such pattern of numbers is called a growth matrix[2] and it has a following appearance:

$$\overline{P}_t = \begin{bmatrix} p_{11,t} & p_{12,t} & \cdots & p_{1m,t} \\ p_{21,t} & p_{22,t} & \cdots & p_{2m,t} \\ \vdots & \vdots & \cdots & \vdots \\ p_{m1,t} & p_{m2,t} & \cdots & p_{mm,t} \end{bmatrix}.$$

In this particular case, the matrix $\overline{P}_t$ is called the regional growth matrix because it contains direct and indirect growth rates of individual regions. It allows monitoring of the growth structure of each region in the period $(t-1,t)$. Direct growth rates show how quantitative and qualitative changes in one region affect the change in per capita income level of the same region in the period $(t-1,t)$. In contrast, the indirect impact of other regions on changes in per capita (regional) income level of the observed region is measured by indirect growth rat

4. FINITION OF THE GROWTH MATRIX BASED ON SYNTHETIC INDICATORS

If we seek to analyze the overall (global) development of the selected regions, for these purposes we cannot use the matrix $\overline{P}_t$, since it is defined on the basis of a single indicator of the level of development. [3]

We defined the economic development of the observed region as the level of development of material production forces, the efficiency or productivity of their use, and the standard of living of the observed region. In short, it follows from the previous definition of the concept of economic development of a region that

[2] A growth matrix for the purposes of analyzing the interdependence of economic quantities was first set by professor Dragiša Stojanović.
See more: Стојановић, Д., Матрица раста, Продуктивност, 1/73, pp. 795-802.

[3] In previous analyses of regional development based on the growth matrix, development has been viewed as a function of only one indicator of the level of development (most often it is the social gross product). The analysis of development using a single indicator, based on the growth matrix, was carried out by professors Dragiša Stojanović and Marko Backović.
See more:
Стојановић, Д., Динамичко програмирање регионалног развоја путем матрице раста, Продуктивност, 7/73, pp. 1126-1129.
Бацковић, М., Анализа и пројекција регионалног развоја методом матрице раста, Економски гласник, 1/82, pp. 128-135.

development is a complex and multidimensional phenomenon and as such cannot be quantified by a single indicator.

In order to analyze the global level of development of m regions and interdependencies in the development process, it is necessary to define a growth matrix which is based on indicators that synthetically express the levels of development of the observed regions.[4] This means that instead of per capita national income data, we should have synthetic indicators of the level of development of each of the observed m regions and in each time unit t (t=1,2,...,T).

Based on synthetic indicators, direct and indirect development rates of the regions would be calculated. Let us assume that $S_{r,t}$ and $S_{s,t}$ are synthetic indicators of the level of development of r and s region, respectively, in the period t, and

$$\Delta S_{r,t} = S_{r,t} - S_{r,t-1}, \quad \begin{matrix}(r = 1,2,...,m) \\ (t = 1,2,...,T),\end{matrix} \tag{4}$$

the change in the level of the synthetic indicator of the development of r region in the period (t−1,t). Then the direct growth rate of r region in the period (t−1,t) denoted with $s_{rr,t}$, will be:

$$s_{rr,t} = \frac{\Delta S_{r,t}}{S_{r,t-1}}, \quad \begin{matrix}(r = 1,2,...,m) \\ (t = 1,2,...,T),\end{matrix} \tag{5}$$

and will show a relative increase in the level of the synthetic indicator of development of r region in the period t in relation to the level of the synthetic indicator of the same region in the period (t−1).

Indirect growth rate, denoted with $s_{rs,t}$:

$$s_{rs,t} = \frac{\Delta S_{r,t}}{S_{s,t-1}}, \quad (r \neq s = 1,2,...,m), \tag{6}$$

will show a relative increase in the level of the synthetic indicator of the development of r region in the interval (t−1,t) relative to the level of the synthetic indicator of the development of s region in the period (t−1).

[4] Only synthetic indicators that have an essential, cardinal meaning can be used to form this matrix. This will be discussed more after defining the matrix.

If we arrange direct rates $s_{rr,t}$ and indirect rates $s_{rs,t}$ ($r \neq s = 1,2,...,m$; $t = 1,2,...,T$) into a square scheme $\overline{S}_t$

$$\overline{S}_t = \begin{bmatrix} s_{11,t} & s_{12,t} & \cdots & s_{1m,t} \\ s_{21,t} & s_{22,t} & \cdots & s_{2m,t} \\ \vdots & \vdots & \cdots & \vdots \\ s_{m1,t} & s_{m2,t} & \cdots & s_{mm,t} \end{bmatrix},$$

we will obtain a growth matrix based on synthetic indicators of the level of development of the regions.

Matrix $\overline{S}_t$ can be called a matrix of global regional growth.

The basic assumption of the application of the global regional growth matrix $\overline{S}_t$ in the dynamic regional analysis is to determine synthetic indicators of development of the observed regions for each time period of observation t ($t = 1,2,...,T$), which will approximate the level of the global development of each of m observed regions.

Therefore, synthetic indicators of the level of development of the observed regions, which serve as a basis for the formation of the matrix $\overline{S}_t$, in addition to being used to compile a rank list of the levels of development of the regions, must provide information on approximately real distances in the level of development between the observed regions. Since there is no mathematical-statistical model that would provide synthetic information with cardinal meaning, while fulfilling other conditions (dependence of indicators, elimination of duplicity, condition of asymmetry), we will be satisfied with unweighted index models, because they give results that are expressed in relative numbers, and therefore have the corresponding meaning. Index models provide solutions that, given the phenomenon of duplication of information, we can only accept as approximate and for now usable only for the formation of a global growth matrix. It is possible to mitigate the problem of duplicity by choosing indicators to be included in the analysis. The formation of the matrix $\overline{S}_t$ would be preceded by a qualitative and quantitative analysis of the interdependence of all indicators considered for the derivation of synthetic information, which should result in the creation of a better statistical basis for its establishment.

5. GROWTH SUBMATRICES BASED ON SYNTHETIC INDICATORS

When analyzing interregional relations, it is sometimes necessary to pay attention to the relations between two particular regions, e.g. R_r and R_s. In this case, direct growth rates s_{rr} and s_{ss}, as well as corresponding indirect rates s_{rs} and s_{sr}, should be extracted from the matrix S_t which will be arranged in a special scheme $\overline{S}_{rs,t}$ called the growth submatrix of r and s region:

$$\overline{S}_{rs,t} = \begin{bmatrix} s_{rr,t} & s_{rs,t} \\ s_{sr,t} & s_{ss,t} \end{bmatrix}.$$

The growth submatrix $\overline{S}_{rs,t}$ is a part of the matrix $\overline{S}_t$, corresponding to r and s region. It provides information on the reciprocal relations between these regions.

Starting from the growth submatrix $\overline{S}_{rs,t}$, we will emphasize the relations that apply to direct and indirect growth rates.

1) The relation between the indirect growth rate $s_{rs,t}$ and the direct growth rate $s_{rr,t}$ is equal to the ratio of the level of the synthetic indicator of r and s region in the period (t−1):

$$\frac{s_{rs,t}}{s_{rr,t}} = \frac{S_{r,t-1}}{S_{s,t-1}}. \tag{7}$$

2) The relation between the indirect growth rate $s_{rs,t}$ and the direct growth rate $s_{ss,t}$ is equal to the ration of increment of the level of the synthetic indicator of r and s region in the period (t−1,t):

$$\frac{s_{rs,t}}{s_{ss,t}} = \frac{\Delta S_{r,t}}{\Delta S_{s,t}}. \tag{8}$$

3) If we put direct rates $s_{rr,t}$ and $s_{ss,t}$ in the ratio,we get the elasticity of the synthetic indicator of the development level of r region relative to s region:

$$\frac{s_{rr,t}}{s_{ss,t}} = \frac{S_{s,t-1}}{S_{r,t-1}} \cdot \frac{\Delta S_{r,t}}{\Delta S_{s,t}}. \tag{9}$$

4) The quotient of indirect growth rates $s_{rs,t}$ and $s_{sr,t}$ is equal to the product of the quotient of synthetic indicators $S_{r,t-1}$ and $S_{s,t-1}$, on the one hand, and the quotient of the increment of synthetic indicators $\Delta S_{r,t}$ and $\Delta S_{s,t}$, on the other:

$$\frac{s_{rs,t}}{s_{sr,t}} = \frac{S_{r,t-1}}{S_{s,t-1}} \cdot \frac{\Delta S_{r,t}}{\Delta S_{s,t}}. \tag{10}$$

Relations (7) - (10) are significant because they provide the opportunity to further analyze interregional movements and the dynamics of structural changes.[5]

6. A FORECASTING TERRITORIAL MODEL OF REGIONAL GROWTH

Starting from the assumption that there is an interdependence of the economic activities of the observed regions, a function can be written as

$$\Delta S_r = F(S_{1,t}, S_{2,t}, ..., S_{m,t}), \quad (r = 1,2,...m), \tag{11}$$

which shows that the increment of the level of development of *r* region is a function of the level of synthetic indicators of development of all regions. Let functional dependence (11) be specified by the following expression:

$$S_r = \frac{1}{m} \sum_{s=1}^{m} s_{rs} S_{st}, \quad (r = 1,2,...,m), \tag{12}$$

where s_{rs} isan indirect rate and *m* is a number of regions.

By supstitution (12) and (4)

$$\begin{aligned}
&S_{1,t} - \frac{1}{m}(s_{11}S_{1,t} + s_{12}S_{2,t} + ... + s_{1m}S_{m,t}) = S_{1,t-1} \\
&S_{2,t} - \frac{1}{m}(s_{21}S_{1,t} + s_{22}S_{2,t} + ... + s_{2m}S = S_{2,t-1m,t}) \\
&\quad \vdots \qquad\qquad \vdots \qquad \cdots \quad \vdots \qquad \cdots \quad \vdots \\
&S_{m,t} - \frac{1}{m}(s_{m1}S_{1,t} + s_{m2}S_{2,t} + ... + s_{mm}S_{m,t}) = S_{m,t-1}
\end{aligned} \tag{13}$$

[5] The proofs of relations (7) – (10) become apparent if, instead of $s_{rs,t}$, $s_{rr,t}$, $s_{ss,t}$ and $s_{sr,t}$,we put expressions by definition in appropriate places:

$$s_{rs,t} = \frac{\Delta S_{r,t}}{S_{s,(t-1)}}, \; s_{ss,t} = \frac{\Delta S_{s,t}}{S_{s,t-1}}, \; s_{rr,t} = \frac{\Delta S_{r,t}}{S_{r,t-1}}, \; s_{sr,t} = \frac{\Delta S_{s,t}}{S_{r,t-1}}.$$

Written as a matrix, the system (13) has a form:

$$(I - \frac{1}{m}\overline{S_t})S_t = S_{t-1}, \tag{14}$$

where:

I - unit matrix of m order,

$\overline{S_t}$ - growth matrix of m order,

S_t - column vector (dimensions $m\times1$) whose coordinates represent synthetic indicators of the level of development of the observed regions in the period t,

S_{t-1} - column vector (dimensions $m\times1$) whose coordinates represent synthetic indicators of the level of development of the observed regions in the period $(t-1)$.

The solution of the system (14) is:

$$\mathrm{S}_t = (I - \frac{1}{m}\overline{S_t})^{-1}\mathrm{S}_{t-1}. \tag{15}$$

Relations (14) and (15) show that the growth matrix $\overline{S_t}$ can be used to establish a relationship between the development levels of selected regions in two successive periods $(t-1,t)$.

If the problem of interdependence of indicators of development of selected regions is viewed through T of time units ($t=1,2,...,T$), then the level of development of all regions in T period can be expressed through the growth matrix from all previous periods. To establish such a connection, we will use relation (14) in which we will replace t with: $t=1$, $t=2$,..., $t=T$:

$$\begin{aligned}
&(I - \frac{1}{m}\overline{S_1})S_1 = S_0\\
&(I - \frac{1}{m}\overline{S_2})S_2 = S_2\\
&\vdots \quad \vdots \qquad \vdots\\
&(I - \frac{1}{m}\overline{S_T})S_T = S_{T-1}.
\end{aligned} \tag{15.1}$$

It follows from system (15.1) that:

$$(I-\frac{1}{m}\overline{S_1})\cdot(I-\frac{1}{m}\overline{S_2})\cdot \quad \cdots \quad \cdot(I-\frac{1}{m}\overline{S_T})=S_0,$$

with the solution by S_T that follows:

$$S_T=\left[(I-\frac{1}{m}\overline{S_1})\cdot(I-\frac{1}{m}\overline{S_2})\cdot \quad \cdots \quad \cdot(I-\frac{1}{m}\overline{S_T})\right]^{-1} S_0. \tag{16}$$

With solution (16) the level of development of all regions in T period was put into function of the level of development of the same regions in all previous periods.[6]

The regional growth matrix can be used to predict the level of development indicators in the future. This problem can be solved in two ways.

First, it is assumed that the same relations between regions will be maintained in the future, which means that the growth matrix does not change. In this case, the growth matrix from the previous period will serve as a basis for estimating the level of development in the future period.

Second, it is assumed that interdependence relations between regions will change. This assumption results in a change in the growth matrix for the future period (e.g. $t=T+1$). As the actual interdependence relations, expressed by direct and indirect growth rates, are unknown, their estimation must be made. The estimation of direct and indirect growth rates is most often done using the trend method (linear, exponential or logarithmic).

If we denote the vector of the level of development indicators of regions in the period ($T+1$) with S_{T+1}, it is predicted that the vector of these quantities will be:

$$S_{(T+1)}=(I-\frac{1}{m}\overline{S_c})^{-1}S_T,$$

where we denoted the estimated growth matrix with $\overline{S_c}$.

The main problem in the application of this model is the estimation of direct and indirect growth rates in the period for which the level of synthetic indicators of

[6] Стојановић, Д., Динамичко програмирање регионалног развоја путем матрице раста, op. cit., p. 1127.

the observed regions is projected, that is, how to obtain a changed growth matrix $\overline{S_c}$.

7. CONCLUSION

In modern conditions of economy, classical methods of analysis are not sufficient to make the choice of the appropriate variant of development, so the need to introduce new models and methods is imposed.

Economic development is a complex and multidimensional phenomenon and as such cannot be quantified by a single indicator. In order to analyze the global level of development of regions and interdependencies in the development process, it is necessary to define a growth matrix that is based on indicators that synthetically express the levels of development of the observed regions. Direct and indirect development rates of regions are calculated based on synthetic indicators.

By applying this matrix, it is possible to predict the level of development of the observed regions, as well as the development rankings.

Since there is no mathematical-statistical model that would provide synthetic information with cardinal meaning, while fulfilling other conditions (dependence of indicators, elimination of duplicity, condition of asymmetry), we will be satisfied with unweighted index models, because they give results that are expressed in relative numbers, and therefore have the corresponding meaning. Index models provide solutions that, given the phenomenon of duplication of information, can only be accepted as approximate and for now usedonly for the formation of the global growth matrix.

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ГЛОБАЛНА МАТРИЦА РЕГИОНАЛНОГ РАСТА У ФУНКЦИЈИ АНАЛИЗЕ РАЗВОЈА РЕГИЈА И МЕЂУРЕГИОНАЛНИХ ОДНОСА

1 Станко Станић, Универзитет у Бањој Луци, Економски факултет, Бања Лука
2 Жељко Рачић, Универзитет у Бањој Луци, Економски факултет, Бања Лука

САЖЕТАК

Предмет истраживања у овом раду јесте проширење матрице раста, које се огледа у дефинисању нове матрице - матрице глобалног регионалног раста. Претпоставка за формирање те матрице јесте да се претходно израчунају синтетичке мјере развијености појединих регија које су укључене у анализу. Та матрица пружа могућност анализе међурегионалних односа и динамике структурних промјена у одговарајућим регијама.

Кључне ријечи:

Директна стопа раста, индиректна стопа раста, матрица раста, матрица регионалног раста, матрица глобалног регионалног раста, динамичка анализа.

THE IMPACT OF FOREIGN DIRECT INVESTMENT ON EMPLOYMENT IN TOURISM IN BOSNIA AND HERZEGOVINA

1 Andrijana Mrkaić Ateljević, lecturer magister, College of Tourism and Hotel Management, Trebinje
2 Ivo Armenko, full professor, Faculty of Business and Tourism, Budva
* Corresponding author E-mail: andrijanamrkaic@gmail.com
1 ORCID ID: 0000-0002-9098-0764
2 ORCID ID: 0000-0002-8043-1032

ARTICLE INFO

Original Scientific Paper
Received: 28.05.2019
Revised: 28.08.2019
Accepted: 19.11.2019
doi 10.7251/ACE1931021M
UDC 330.322:338.48(497.6)

Keywords: *foreign direct investment, tourism, Bosnia and Herzegovina*

JEL Classification: E22, E24, Z3.

ABSTRACT

The global tourism market is accompanied by the constant changes in the market share of individual countries, the preferences of tourists and ways to satisfy their needs. In 2017, Europe, for example, dominated the tourism market with 51% of market share. However, the increase in Asia-Pacific participation compared to 2016 is as high as 24%, which indicates that the share of transnational companies in the region is increasing, not only in revenues, but also in tourism investments. Part of the investment is also directed to Bosnia and Herzegovina, which emphasizes inflows from Arab countries. Regardless of the type, investments in tourism are of particular importance to developing countries, because in addition to economic effects, they contribute to technology transfer, management experience and they also strengthen the cooperation between the state and the investor. The subject of this paper is foreign direct investment (FDI) in tourism in Bosnia and Herzegovina. The aim of this paper is to examine the impact of foreign direct investment on employment in the tourism sector. Using the correlation regression analysis, the impact of foreign direct investments on the number of jobs in the accommodation and food and beverage industries was examined. The paper shows that there is a weak positive impact of FDI on the increase in the number of employees in the accommodation and food and beverage industries.

1. INTRODUCTION

Investments in tourism are an important presumption for faster growth and development of tourism. By a generally accepted definition, they represent a form of investment in which the investor secures the right of ownership, control and management over the company in which the money is invested, with the realization of mutual interests (Халибашић, 2011, p.65). Investments in tourism are crucial because they provide the resources needed to adapt suprastructure and infrastructure, and strengthen human resources and technologies. Important factors for attracting investments are the quality, quantity and position of the transport infrastructure (Popović, Erić, 2018, p.1540). Fulfillment of these factors facilitates and accelerates investments in tourism suprastructure.

Foreign direct investment (FDI) which deepens bonds between the countries and increases internationalization of economic flows are of particular importance (Бошковић, 2008, p.25). Foreign direct investments represent investments of the investors from the country of origin who gained asset in another country for the purpose of managing that asset (Поповић, Савић, Спасојевић, 2014, p.411). These investments can be manifested in many ways: through public-private partnerships, concessions, mergers and acquisitions, joint ventures with or without property component, etc. Benefits from investing are mostly present on the investor side in the form of business expansions, penetration on foreign markets, more economical use of resources, etc. On the other hand, the host countries manage to valorize the natural resources, cultural attractions, etc. (Стојадиновић, 2013, p.15). However, there are disadvantages depending on the type of investment. There is an outflow of tourism income into the investor country (especially when the foreign investor holds 100% of the capital), the host country has no control over the investor policy and there are large hotel or tourism investments that can lead to the elimination of domestic competition and in some cases, even to job cuts.

PREVIOUS RESEARCH

The importance of investments, especially FDI, has been researched by numerous authors. Investments represent a basis of social and economic progress and have a great contribution to the rise in the employment rate (Keynes, 1973, p.223). According to Keynes, an investor buys the right to a range of future net incomes, which he expects from the sales of the mentioned investment during its lifespan. Blomstrom (1992, p.63) finds that FDI has a special contribution to the economic development only in the underdeveloped countries. Similarly, Krugman (1991, p.268) claims that there is no connection between employment growth and FDI in developed countries.

Halley (1997, p.602) analyzes the need of the tourism industry of Vietnam for strategic foreign investment. Broz, Butirac and Tkalec (2015, p.881) analyze Croatia's regional cooperation on certain determinants in Southeast Europe and conclude that regional investment is of great importance in Bosnia and Herzegovina, since in 2010 the share of regional FDI in total FDI in B&H was as high as 32%. The same authors concluded that regarding the region of Southeast Europe Croatia and Serbia are the countries that invest most in all sectors, including the tourism. Papadopoulos (2016, p.619) emphasizes the importance of national branding in attracting foreign investments in tourism. Samimi (2017, p.60) demonstrates long-term bilateral causality between foreign direct investment and tourism development. In a panel discussion, on the example of 49 economies of the world, Alam and Paramati (2016, p25) explore the impact of foreign investment in tourism on reducing income inequality. Falk (2016, p.227) examines the impact of market size, common language, minimum wage levels on the effects and attraction of foreign investment in tourism and hospitality for 105 economies of the world in the period from 2005 to 2011. Using the gravity model, the author concludes that the size of the market and common language have a positive effect on attracting foreign investment, while increasing the minimum wage in the host country reduces the inflow of FDI. Gligorijević and Ubavić (2016, p.227) examined the investment-privatization process in tourism of Serbia and concluded that investment through the privatization process proved ineffective, unlike greenfield investments, which are also very rare. The same authors point out that no matter which country is in question, the condition for greater foreign investments in tourism is interdisciplinary approach to investment policy and political, legislative and macroeconomic stability in the country. Fereiduoni and Al-Mulali (2014, p.107) analyze the connection of foreign investment in the real estate market and international tourism in OECD countries. Marić (2016, p.428) analyzes foreign direct investment in Bosnia and Herzegovina and concludes that B&H has a great potential for attracting foreign investment in tourism, but the priority are investments in infrastructure (author points out the fact that B&H had only 20 km of highway in 2009, probably the least per capita in Europe). Sokhanvar (2019, p.89) examines the direct and indirect effects of FDI on tourism growth in seven EU countries and concludes that even in five countries FDI has a negative impact on economic development and does not stimulate tourism growth.

2. INVESTMENTS IN TOURISM IN BOSNIA AND HERZEGOVINA

Therefore, the economic progress of any country cannot be imagined without investments, the generator of development. Regardless of the type (greenfield & brownfield)[1] greater investments create more productive tourism projects that are regionally competitive. They are a resource base for attracting tourists. The growth in investment, which is accompanied by a high rate of efficiency, actually contributes to the export of the tourism product. The type of investment also determines the direction of impact on the foreign trade balance, where greenfield investments are the most desirable because they involve new hiring of fixed assets, supporting activities, labor or hiring of all three factors of country production, labor and capital. The problem of tourism industry in B&H is that long-term investments are made through acquisitions and privatizations, while a small number are greenfield investments.

According to the Travel & Tourism economic impact report for 2017 (WTTC, 2018) in B&H, the inflow of total investments exclusively in the tourism sector was 326.5 million BAM, which ranked B&H 122nd (Table 1).

Table 1. Ranking of B&H and total investments in the tourism sector in 2017

Ranking	Country	2017 (million US$)
10	Turkey	20.5
17	Italy	11.6
	World average	4.8
40	Greece	3.6
	European average (remaining)	2.6
53	Czech Republic	2.0
64	Croatia	1.2
71	Bulgaria	0.8
93	Cyprus	0.4
95	Montenegro	0.4
113	Albania	0.3
122	Bosnia and Herzegovina	0.2

Source: World travel and tourism council (2018). "*Travel and tourism economic impact 2018*", London, p.7.

1 *Greenfield* investments imply investment in brand new assets and they are crucial for economic development and progress, since they move from the "empty land". Therefore, they require new labor, affect the balance of payments and significantly increase the GDP growth rate, but obtain slower return on funds. Brownfield investments, by contrast, involve investing in existing productive assets, aiming at the greater profitability of jobs taken over, and the easiest way to do this is to lay off workers.

Long-term assesment of the WTTC for the movement of investments in the tourism sector for the period from 2018 to 2028, ranked B&H on the 45th position, with a growth rate of 5.2%, while for the same priod but on the European level, the growth rate is 3.4 % and on the world level it is 4.2%. However, foreseeing is not possible without the synergistic action of all actors involved in building tourism and investment policies (WTTC, 2018, p.10).

According to the records of FIPA, in 2016 foreign investments in the tourism sector amounted to 187 million BAM (95.5 million euros), which makes 1.4 % of the total direct foreign investment in B&H as of December 2016.

Table 2. Overview of FDI importance for the tourism sector, for the period 2011-September 2017 in millions of BAM

FDI		State FDI in millions of BAM		FDI Flows by years in millions of BAM					
By activities		XII 2011	XII 2016	2011	2013	2014	2015	2016	I - IX 2017*
0	FDI in total-all sectors	10,773.5	12,964.4	698.6	407.1	811.1	615.3	536.3	233.5*
1	Accommodation	143.5	163.5	13.1	18.0	26.0	-6.4	10.6	14.2*
2	Food and drink preparation and serving	3.2	11.8	-	0.3	1.4	5.5	-3.2	-
3	Travel agencies	-	-	-	-	-	0.2	0.4	0.9*
4	Creative arts and entertainment activities	-	1.4	-	-	-	-	-	-
5	Sport, fun and recreation	-	10.1	-	0.2	-	0.5	1.5	-
6	Tourism in total (from 1 to 5)	146.7	186.8	13.1	18.5	26.4	-0.2	9.3	15.1*
7	Participation (6) in total FDI (0)	1.4%	1.4%	1.9%	4.5%	3.3%	-	1.7%	*6.5%
8	Real estate business**	622.0	495.7	79.7	24.7	190.7	94.1	-15.1	43.8*
9	Participation (8) in total FDI (0)	5.8%	4.1%	11.4%	6.1%	23.5%	15.3%	-	*18.%

Source: FIPA (2018). *"Analysis of the tourism sector",* Sarajevo, p. 47;
*preliminary and incomplete data for 2017 (no retained earnings).

If you look at the state of FDI by sectors, there is very little participation in tourism in B&H over a longer period, which is shown in Chart 1.

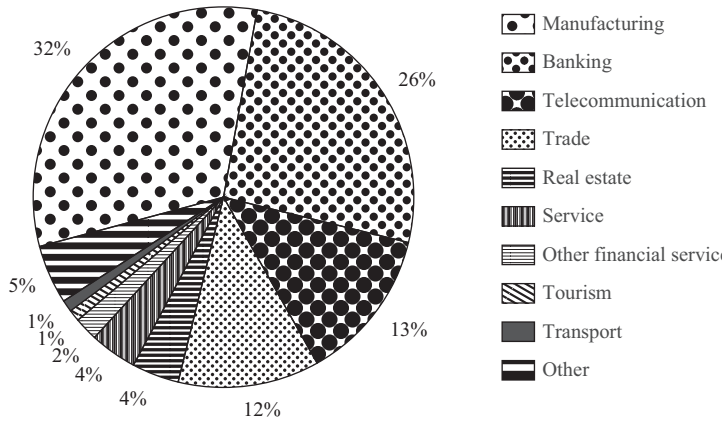


Chart 1. FDI stocks by industry in B&H for the period 1994-2017

Source: http://www.fipa.gov.ba/informacije/statistike/investicije/default.aspx?id=180&langTag=bs-BA, accessed 30 May 2019.

Observing FDI, the Central Bank compilation contains FDI data for a total of 99 categories, of which two categories are closely related to tourism: accommodation and food and beverage service activities. In B&H, most foreign investments in the accommodation category were recorded in 2014, while for the food and beverage preparation and service activities, the highest foreign investments were recorded in 2015. FDI trends for these two categories, as well as their values, are shown in Chart 2.

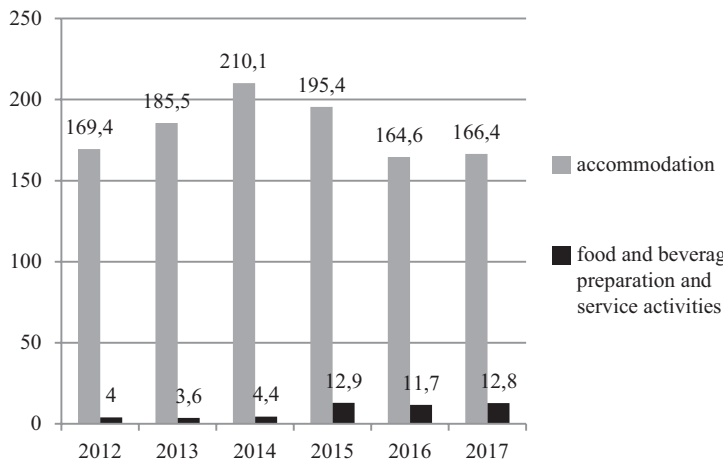


Chart 2. Foreign direct investment by category for the period 2012-2017 (millions of BAM)

Author's calculation according to: http://statistics.cbbh.ba/Panorama/novaview/SimpleLogin_en_html.aspx, accessed 20 May 2019.

3. CORRELATION – REGRESSION ANALYSIS OF THE IMPACT OF FDI ON TOURISM EMPLOYMENT IN BOSNIA AND HERZEGOVINA

Correlation-regression analysis, general part

The correlation regression method is used to determine the relationship and the degree of dependence between two variables. The correlation shows how strong the link between the analyzed variables is. The numerical value of the Pearson correlation coefficient explains the direction and degree of correlation of the two observed variables. In contrast to the correlation analysis expressed by Pearson's coefficient r, regression analysis provides an insight into the form of correlation of the two variables. The form of connection is interpreted on the basis of a regression line, a scatter or dispersion diagram. The least squares mathematical method completes the explanation of the regression line and is expressed in form (Ловрић, Комић, Стевић, 2017, p. 386):

$$Y = a + bx + \varepsilon$$

Y – resultative variable
a – regression constant (section on y axis)
b – regression coefficient (slope of simple linear regression)
x – causal variable
ε – residual variable

The form of correlation is interpreted by the coefficient of determination R^2 resulting from a simple linear regression. It shows the percentage of variables explained by the analysis (Шушић, 2017, p. 15).

Correlation-regression analysis: research part

According to the Central bank of B-&H, foreign investments in tourism have long been statistically classified under the hospitality industry, but since 2011 that category has been split into two: accommodation and food and beverage service activities. Since 2011 there was a continuous increase of foreign direct investment in the accommodation category until 2016, when there was a slight decline in investment, whereas investments in food and beverage preparation and serving activities rose from 4.4 million BAM (2014) to 12.8 million BAM (2017, http://statistics.cbbh.ba).

By using the regression-correlation analysis, the form and strength of dependence of two variables will be presented:

1. Number of employees in accommodation, food and beverage preparation and service activities in the period 2010-2017 in Bosnia and Herzegovina, as dependent variable;

2. FDI in accommodation, preparation and serving of food and beverages from 2010 to 2017 in Bosnia and Herzegovina, as independent variable[2].

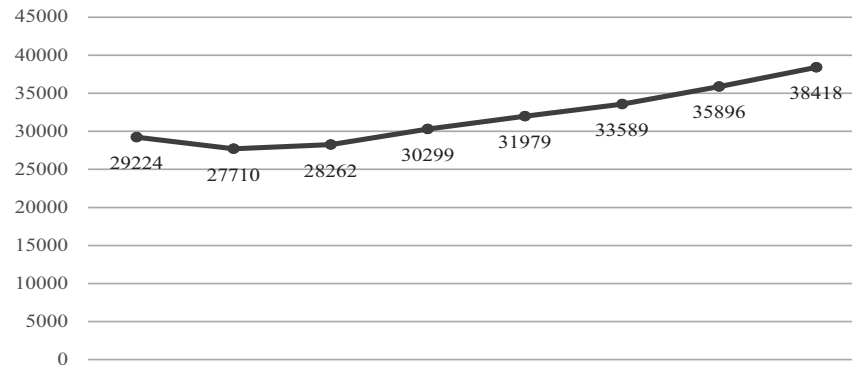
The equivalent of the number of employees in tourism is data on employees in the category accommodation and activities of preparation and serving of food and beverages (according to the official classification of activities in B&H). Data on the annual inflow of FDI were taken from the official website of the Central Bank of Bosnia and Herzegovina. This data, as it can be seen in Chart 2, is available as FDI in the category accommodation and as FDI in the category of food and beverage preparation and serving activities. In order to make it more simple, the data on FDI will be aggregated into one category as FDI in accommodation, as well as food and beverage preparation and serving activities. Data for both variables are presented in Table 4.

Table 3. Number of employees and FDI in the category of accommodation and food and beverage service activities in the period 2010-2017 (B&H)

Year	2010	2011	2012	2013	2014	2015	2016	2017
Number of employees (thousands)	29.224	27.710	28.262	30.299	31.979	33.589	35.896	38.418
FDI (accommodation + food and beverage service activities, millions BAM)	146.7	136.5	173.4	189.1	214.5	208.3	176.3	179.2

Source: http://www.bhas.ba/saopstenja/;http://statistics.cbbh.ba/Panorama/novaview/SimpleLogin_en_html.aspx, accessed 15 May 2019.

As it can be seen in the table, employment in the tourism sector fluctuated slightly during 2011 and 2012. This was followed by the period of growth in the number of employees in tourism (Graph 3).



Graph 3. Number of employees within the category of accommodation and food and beverage service activities in the period 2010-2017 (B&H)
Source: Author's creation in excel program

[2] Employment figures refer to December, each year from 2010 to 2017.

Starting hypothesis of this research is that FDI in tourism has an impact on employment growth in accommodation and food and beverage service activities.

The input data are presented in Table 4 and processed in an excel program using a simple linear regression tool. The processing results are presented in Table 4.

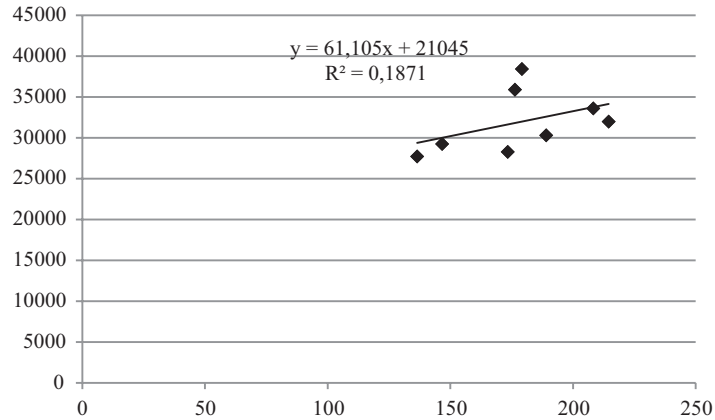
Table 4. Results of the regression analysis

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.43249614				
R Square	0.18705291				
Adjusted R Square	0.05156173				
Standard Error	3714.30731				
Observations	8				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	1.9E+07	2E+07	1.380554161	0.284519617
Residual	6	8.3E+07	1E+07		
Total	7	1E+08			

Source: Author's creation in excel program

The correlation coefficient r = 0.43 indicates a weak positive impact of FDI on employment within the accommodation and food and beverage service activities. A positive sign is that the variables are direct, that is, although there is a weak link between them, FDI growth nevertheless leads to the employment growth.

The determination coefficient R^2 shows that variations are dependent variable with about 18% of variations of the FDI independent variable. The significance of the model is within optimal limits, which confirms the value of *Significance F* ($F<\alpha$ 0.05). The simple linear regression equation is represented on the scatter diagram – Graph 4.



Graph 4. FDI scatter diagram and employment within accommodation, food and beverage preparation and serving, B-H, for the period 2010-2017
Source: Author's creation in excel program

Scatter diagram shows that the direction approximates well between the variables, which results in a linear line indicating a linear relationship between the variables (Станивук, 2017, p. 387). The equation of the regression model in this case would be:

$$Y = 21045 + 61{,}105(x)$$

If the independent variable (FDI) had a value of zero, then the dependent variable (number of employees in tourism) would have an average value of 21045. With an increase in foreign direct investment in accommodation and food and beverage preparation and serving of one million, employment would be expected to increase by about 61 workers.

4. CONCLUSION

According to the long-term forecasts of the World tourism and travel council, tourism investment could increase by more than 5.2 % annually in Bosnia and Herzegovina by 2028, which would also affect the GDP growth of the whole country.

The paper focuses on the statistical analysis of foreign direct investments and their impact on employment in the accommodation sector, as well as the preparation and serving of food and beverages. Regression-correlation analysis confirmed the research hypothesis that FDI affects employment in tourism. The analysis showed a weak positive impact of FDI on employment within the accommodation and food and beverage service activities.

The obtained coefficient of determination R^2 shows that variations in the number of employees in the tourism sector with 18% are conditioned by variations of foreign direct investment in the sector.

The regression equation and the obtained dispersion diagram suggest that with the increase of foreign direct investment in the accommodation and food and beverage industry by one million, there could be an increase in employment by about 61 work places.

Bosnia and Herzegovina's tourism economy is facing various problems. Some investments have not been completed because investors have abandoned investing in projects due to institutional problems, slow procedural conditions, corruption, conflicts of laws, etc. Although the legal framework provides certain benefits for foreign investors, they are not sufficient to motivate foreign investors.

The impact of foreign direct investment on employment in other sectors is greater, considering the fact that *"Global Location Trends Facts & Figures report"* from 2018 put B&H on the third place in the number of jobs created under foreign direct investment projects (per one million population). The weak influence on the growth of employment in tourism is justified by the fact that B&H is still not sufficiently recognized in tourism and therefore, there is no greater interest for foreign investors to invest in B&H tourism. Nevertheless, the positive trend of foreign investment in tourism indicates the importance of this sector.

Finally, Bosnia and Herzegovina needs to make additional efforts to attract as many investors as possible, increase foreign investment in tourism and harmonize its legislation with the European Union. Greater realization of foreign investments requires fulfillment of a large number of general criteria and conditions necessary for the functioning of modern tourism economies.

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УТИЦАЈ СТРАНИХ ДИРЕКТНИХ ИНВЕСТИЦИЈА НА ЗАПОСЛЕНОСТ У ТУРИЗМУ БОСНЕ И ХЕРЦЕГОВИНЕ

1 Андријана Мркаић Атељевић, Висока школа за туризам и хотелијерство, Требиње, Босна и Херцеговина
2 Иво Арменко, Факултет за бизнис и туризам, Будва, Црна Гора

САЖЕТАК

Глобално туристичко тржиште константно доживљава промјене у смислу степена тржишне партиципације појединих земаља, склоности туриста и начина испуњавања њихових потреба. Европа је у 2017. години имала доминацију на глобалном туристичком тржишту са чак 51% тржишног удела. Озбиљно повећање учешћа Азије у 2017. години у односу на 2016. годину износило је чак 24%, што ствара каузалне ефекте и на све веће учешће транснационалних компанија из тог региона у туризму. Овај рад систематизује инвестиције у туризам Босне и Херцеговине, са фокусом на ефекте страних улагања на запосленост у туристичком сектору. Емпиријска анализа, базирана на регресионо-корелационом моделу, показала је да постоји слаб позитивни утицај СДИ на запосленост у делатностима смјештаја, те припреме и услуживања хране и пића. Истраживања у овом раду су предуслов за озбиљније анализирање типологије и значаја страних инвестиција за туристички развој Босне и Херцеговине.

Кључне ријечи:
стране директне инвестиције, туризам, Босна и Херцеговина.

STOCHASTIC ASPECTS OF CONTINUOUS IMPROVEMENT OF THE BUSINESS RESULTS PERFORMANCE OF THE PUBLIC ADMINISTRATION

1 Mirjana Landika, associate professor, Pan-European University "Apeiron" Banja Luka
2 Sanel Jakupović, associate professor, Pan-European University "Apeiron" Banja Luka
3 Radmila Bojanić, PhD, "M:tel", Banja Luka
4 Velibor Peulić, International Road Transport Union, Geneve
5 Vedran Šupuković, assistant professor, director RK PPD Zagreb
6 Wolfgang Berger, associate professor, the Ministry of Finance, Austria
*Corresponding author E-mail: mirjana.landika@gmail.com
1 ORCID ID: 0000-0002-1495-2462
2 ORCID ID: 0000-0001-5940-6126
3 ORCID ID: 0000-0002-1115-1264
4 ORCID ID: 0000-0002-2320-9419
5 ORCID ID: 0000-0002-0720-6445
6 ORCID ID: 0000-0002-0370-3815

ARTICLE INFO

Original scientific Article
Received: 17.11.2019
Revised: 04.12.2019
Accepted: 18.12.2019
doi 10.7251/ACE1931035L
UDC
35.07:316.334.3]:519.21

Keywords: *business excellence, effective operation, unwanted result, stochastic manifestation, probability distribution, performance improvement.*

JEL Classification: C20

ABSTRACT

Effective operation of a system is expressed as an aspiration to achieve excellence in business results, recognized as total elimination of prevented difference between desired values and actual values of the realized system performance, requiring identification of both environmental and internal factors, as well as an explicit expression of the form and the extent of their impact on business processes. It is heavily laden by stochastic manifestation of their values and complexity of the influence. Optimal business management is determined by the structure and the concept of the system operation, and it is expressed and measured by the extent to which a business result meets user requirements. Realization of business objectives is contained in the performance of an output vector, being a resultant of actions of the business system, in terms of separate task stages in public administration management, and also in the operation of the system as a whole. Elimination of unwanted results involves interdependence, conditioning, frequency and probability distribution of their occurrence, and also coordination of, and cooperation between, numerous resources required to achieve the desired level of operational efficiency. Testing the reagibility of realized level of customer (dis)satisfaction with the performance of administrative services, as a dependent variable, in terms of level and intensity, manifested forms of used protocols and adequacy of service provider engagement, as an input

of the variable, and their expression by means of an appropriate statistical function represents the aim of research, i.e. improvement of business efficiency by means of exact results. The aforementioned procedures facilitate anticipation and correction of business results, and despite the stochastic process performance variations which are analyzed and monitored, their behavior is predicted, controlled and rationally directed towards a desired business result. The design of experiment is based on time disproportion in discovering the causes of realized level of subjective perception of satisfaction when satisfying the demand in terms of administrative services, and in the context of frequency of demandand the form of service requested. By overcoming and eliminating dissatisfaction with the performance of services, business efficiency of administrative process results is being significantly and permanently improved and the degree of employees' satisfaction is intensified; the same is with the service users, whose final result minimizes differentiality of realized and targeted performances, and simultaneously the global optimum of the social-economic system.

The conclusion in terms of the existence of intensive connections between the observed phenomena reveals the causes of the achieved level of output performance and facilitates its indirect correction by dosing the structure and intensity of the input vector.

1. INTRODUCTION

Public Company is a legal entity that performs activities from the domain of general public interest and includes energy industry, utility services, management of public goods, education, medical treatment and health care, public administration with administrative services and others. It is a well-known fact that the activities of such companies are often the source of dissatisfaction and frustration among the service users, and also the objective inability of a service provider to influence the degree of user satisfaction.

Respecting the requests, as well as the measurement of customer satisfaction with the administrative services of public company, represent a marginal interest of directors and managers, and stems from the monopolistic market position, inertia and complexity of the processes within the administrative system, inter

correlation of numerous qualitative and quantitative factors in terms of business results, existence of non-propulsive procedures, misuse of social-human and social-political generally accepted system of evaluation and tolerance, especially in terms of administrative officers from the public company.

Additional aggravating circumstance is contained within a mental-emotional resistance of human resources, as the carriers of substantive initiative in business systems, and improving public company business efficiency.

The capacity of the management to recognize, through a comprehensive analysis, all relevant factors and interpolate them, by applying adequate metrics, in the process of continual improvement of the system performance, and thus in the system performance of the output vector, significantly contributes to a rise inthe level of satisfaction of the users and those employed in the system.

2. REVIEW OF LITERATURE

Contemporary tendencies in public administration are related to the growth of administrative organizations, as well as to the computerization, professionalization and diversification of organizations. Significant benefits in operating efficiency and service performance relate to the computerization of the process, while other elements are symbolically represented on the territory of Bosnia and Herzegovina and Republika Srpska. Quality of service in the public sector is usually measured and expressed by the number, severity and frequency of failures formulated as poor quality services in the domain of individual users and their personal preferences and subjective expectations.

The establishment of errors and omissions in the work of the public sector should go towards identifying them. "Investigating medical errors in Bosnia and Herzegovina is not an easy task, especially due to the fact that there is no database that would uniquely and comprehensively enable the monitoring of criminal offenses against the health of people whose perpetrator is a doctor or other healthcare professional." (Mešić, 2018)

The usual process of examining public service user satisfaction on the territory of Bosnia and Herzegovina and Republika Srpska is performed by a pulse methodology, whose "ultimate goal is… to increase the accountability and quality of services at the local level and provide a detailed insight into the flow of their provision based on the feedback mechanism between the first and the last stages of the political process." (Ahmetović et al., 2014)

The problem of the education system is related to the structure of the educational profile whereby "most young people do not have a lower secondary education level and leave the education and training system early. The transition from the education system to the labor market is not easy... and there is increasing concern about the rise of unemployed young people with the highest level of education. (Obadić, 2017)

Realization of public sector services is aggravated due to the pervasive problem of corruption. Often corruption involves small bribes which are not perceived as a problem by entrepreneurs, but rather as an accepted part of doing business. In this way, petty corruption acts as an insurance payment compensation for institutional failure, as bribes can ensure that entrepreneurial activity is not directly constrained by institutional inefficiencies. Petty corruption is often liked to nepotism rather than money, and entrepreneurs can turn to informal networks to circumvent or speed up complex bureaucratic procedures and to obtain preferential deals (Williams & Yang, 2017).

3. ASPECTS AND EXPRESSION OF PERFORMANCES OD SERVICE QUALITY OF THE ADMINISTRATIVE PROCESS RESULTS

The quality of a business result represents "the degree to which a set of inherent characteristics of products, processes and systems satisfies the requests of users and all interest parties" (ISO 9001:2008). Charter on public services, which are related to administrative services as well, is based on the idea that there should be an instrument which defines core rights and principles in providing services to the users. Such principles include:

- service continuity;
- quality;
- secure supply;
- equal access;
- affordable prices;
- social, cultural and environmental acceptability (DEI, 1997-1999).

The quality represents a user perception about the level of product performances which puts an emphasis on users, and not providers, which in turn is additionally exacerbated by a monopolistic position of the provider, as well as by the ignorant attitude and system inertia in the procedure of cause appreciation, and correction and elimination of the source of customers' dissatisfaction.

Service performances are often not well defined, do not possess quantitative character and clear metric, hence the level of quality is based simply on a subjective individual's perception, whether individuals are users or serviceproviders. Additionally, it is reasonable to assume that causes of insufficient satisfaction derive from inadequate knowledge and/or interest in possible improvements, both in terms of employees and users of administrative services.

Quality management encompasses a set of activities which facilitate the prevention and lack of need for correction, where the service quality represents a multidimensional variable and includes "determination, reliability, accessibility, serviceability and communication skills". (Bergman &Klefsjo, 1994)

Exactness in measuring and reporting on the quality in the field of administrative service activities and the results of public company operations in relation to the provision of administrative services is possible by forming communication channels between the provider and the user of a particular service, which would enable focusing on determining aspects of the improvement of business efficiency. The basic request applies to the collection of useful information which can be expressed in an objective manner, which are understandable and usable in the context of problem solving.

4. ADAPTATION OF QUALITATIVE METRICS AND ASPECTS OF REPORTING ON THE DEGREE OF USER SATISFACTION IN TERMS OF THE EFFECTS OF ADMINISTRATIVE PROCESSES

Stochastic processes of the realized level of user satisfaction in terms of the work of administrative officers are tested by means of inferential statistical methods. Inferential approach to statistical analysis implies making conclusions and judgements based on incomplete information. The key issue of probabilistic judgements is related to the method of choice and sample size used for the analysis of population from which the sample originates, which is determined by the "planned reliability and preciseness of the obtained results, and the variability of the change tested" (Šošić, 1998).

Useful and usable information for expressing the causality of subjective perception of the realized level of service quality, as a dependent variable dimension, can be very simply and cost-effectively obtained by interviewing users of administrative services. Questionnaire is formed in a manner that it contains questions whose answers adequately elucidate the problem being solved, which is achieved by a concise approach to the process of defining questions, offering

clear and comprehensive answers in the context of covered area of elementary events. Testing of the degree of satisfaction of service users with the performance of administrative systems can be expressed and analyzed on the example of the work of administrative services on the territory of Gradiška municipality. Testing is performed by means of the questionnaire which has the following form:

Please take a few minutes and truthfully answer the following questions

1. Age:

2. Place of residence:
a. city center
b. wide city area
c. suburbs
d. rural area (village)

3. Education level:
a. elementary school
b. high school
c. college
d. university
e. MA or PhD

4. Employment status:
a. employed
b. unemployed
c. retired

5. Have you requested administrative services of the public administration bodies:
a. very often (several times a year)
b. often (annually)
c. occasionally (not every year)
d. rarely or never (do not remember when)

6. If yes, which services:
a. document notarization
b. identification documents (IDs)
c. certain individual rights (e.g. aid, subvention, medical treatment or health services outside standard procedure)
d. none of the above
e. If the answer includes more statements, please indicate which:_____

7. Are you satisfied with the services:
a. yes, completely
b. mostly yes
c. partially
d. unsatisfied

8. The cause of your dissatisfaction:
a. objectively complicated procedure
b. long lasting procedure
c. inhospitable administrative officers
d. unskillfulness of administrative officers
e. I am fully satisfied with the services administrative officers provide

If the answer includes more statements, please indicate which:_____

Thank you for your time and truthfulness!

Figure 1. The form of the questionnaire for testing the degree of satisfaction of administrative service users on the territory of Gradiška municipality.

The questionnaire was carried out on two independent samples which include two groups of examinees. For the first sample administrative officers were chosen, and for the second residents of the Gradiška municipality who are not administrative officers were chosen. The reason for the aforementioned approach is objectification and comparison of the satisfaction degree depending on the involvement of examinees in the mentioned processes.

In the first group 30 examinees were questioned and 55 in the second group; the questionnaire results can be demonstrated by the following linear overview (Landika et al., 2018):

Table 1. Aggregated questionnaire results – distribution of the frequency of examinees' answers per questions (multiple answers to the question no. 6 for group I are b and c; for group II two are b and c, while the other two are a and d; multiple answers to the question no. 8 for group I are a and b; for group II five are a and c, while two are c and d)

Question	Answer / Group	Up to 25	25-35	35-45	45-55	55-65	65 and more	Total
1	I	1	2	13	3	11	0	30
	II	12	8	16	7	3	9	55
2	Answer / Group	A	b	C	d	-	-	Total
	I	7	12	5	6	-	-	30
	II	5	23	17	10	-	-	55
3	Answer / Group	A	b	C	d	e	-	Total
	I	3	5	9	12	1	-	30
	II	11	15	16	12	1	-	55
4	Answer / Group	A	b	C	-	-	-	Total
	I	30	-	-	-	-	-	30
	II	27	19	9	-	-	-	55
5	Answer / Group	A	b	C	D	-	-	Total
	I	5	12	7	6	-	-	30
	II	11	24	16	4	-	-	55
6	Answer / Group	A	b	C	D	E	-	Total
	I	3	17	2	6	2	-	30
	II	6	41	1	3	4	-	55
7	Answer / Group	A	b	C	D	-	-	Total
	I	12	16	2	0	-	-	30
	II	5	11	16	23	-	-	55
8	Answer / Group	A	b	C	D	E	f	Total
	I	12	9	-	-	7	2	30
	II	9	3	16	17	3	7	55

The subjectivity of the perception of the quality level of the performance of service provided derives from the research results where the degree of examinees' involvement in the process of provision of administrative service has an intense and direct influence on the perception of the degree ofuser satisfaction with the

services. The structure of answers to the question number 7 from the questionnaire can be demonstrated by the following illustration:

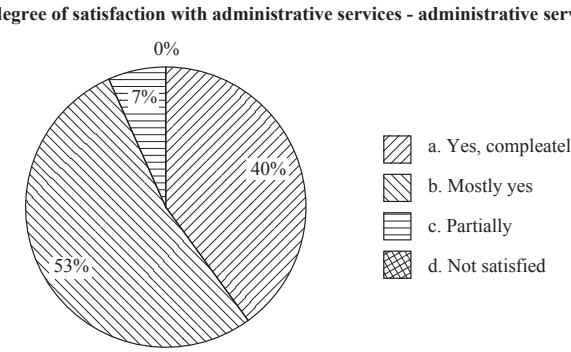

Figure 2. The structure of examinees in relation to the quality perception of administrative services among the examinees who are involved in the process of administrative service provision

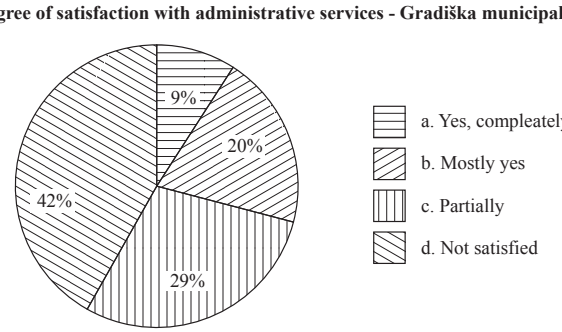

Figure 3. The structure of examinees in relation to the quality perception of administrative services among the examinees who are not involved in the process of administrative service provision

Comparing the form of the structural circle in Figure 2 and Figure 3, a significant difference of the structure of quality perception of administrative services is evident, depending on the degree of examinees' involvement in the process of administrative service provision. It is clearly evident that the biggest share percentage in the "Group I" have the examinees who are "mostly satisfied" with the quality of administrative services, namely 53%, while 93% out of the total number of examinees are "completely satisfied" or "mostly satisfied" with the quality of administrative services, in terms of examinees involved in the admin-

istrative processes. For the examinees not involved in the process of the administrative service provision ("Group II"), the same percentage amounts to 9 and 20%, hence only 29% of the examinees are "completely satisfied" or "mostly satisfied" with the quality of administrative services. Since the aforementioned indicators significantly differ, it can be concluded that the degree of involvement in administrative processes represents a key factor of the perception of quality level of administrative services, thus indicating that administrative service officers do not have an objective opinion about the degree of business efficiency of their own business outputs.

5. CORRECTION OF ADMINISTRATIVE PRACTICES AND PROCEDURES FROM ASPECT OF STOCHASTIC SENSIBILITY OF THE PERCEPTIONF OF USER SATISFACTION

Spearman's rank correlation coefficient is used for the measurement of degree and direction of connectivity of two phenomena expressed by ranked variable pairs. If statistical variables are numeric, it is necessary to convert them to ranked variables.

The basis of Spearman's rank correlation coefficient are pairs of ranked variable modalities $[r(x_i); r(y_i)]$; i = 1, 2, ... , n. The modalities of each ranked variable are from the set of the first n natural numbers. The coefficient of linear correlation is calculated by the usage of ranked variable modality pairs, and it is called the Spearman's rank correlation coefficient where the following formulation is used:

$$rS=1-6i=1ndi2n3-n, \text{ where } d_i = r(x_i) - r(y_i); -1 \leq r_s \leq 1.$$

If in each pair all ranks are equal, their difference is equal to zero, and the coefficient value is 1. Then there is an ideal (complete, perfect) positive rank correlation. When the modality sequence of one ranked variable is inverse from the sequence of other variable part of the pair, rank correlation coefficient is -1, thus the rank correlation is perfect and of the negative direction. The largest rank discrepancy is when the rank correlation coefficient is equal to zero. Other rank correlation coefficient values are interpreted analogically as well as the coefficient values of the simple linear correlation (Pearson coefficient). When calculating Spearman's rank correlation coefficient it is assumed that there are no connected ranks or that their number is insignificant in relation to the number of pairs of values for which the coefficient is being calculated.

The hypothesis on statistical significance of the Spearman's rank correlation coefficient belongs to a nonparametric test, where the testing of hypothesis about

the assumed rank correlation coefficient values is related to the procedure of determining crucial value, by means of which the limits of acceptance (or non-acceptance) of statistical hypothesis are determined, which can be illustrated by the following overview:

Table 2. The procedure of determining crucial values and (non)acceptance limits of statistical hypothesis based on a chosen level of significance $(1 - \gamma)$.

Test type	The hypothesis form	Acceptance area H_0	Rejection area H_0
Two-way	$H_0: \rho_S = 0;\ H_A: \rho_S \neq 0$	$r_{S;\gamma/2} > \lvert r_S \rvert$	$r_{S;\gamma/2} < \lvert r_S \rvert$
One-way (on positive rank correlation)	$H_0: \rho_S = 0; H_A: \rho_S > 0$	$r_S < r_{S,\gamma}$	$r_S > r_{S,\gamma}$
One-way (on negative rank correlation)	$H_0: \rho_S = 0; H_A: \rho < 0$	$r_S > -r_{S,\gamma}$	$r_S < -r_{S,\gamma}$

Test value represents the sampling realization of the rank correlation coefficient r_s, and table value is read for the values of sampling distribution of the rank correlation coefficient for a given risk of error γ and sample size n.

The procedure in terms of making conclusions on the test outcome is performed by the comparison of read crucial (table) value and test value, as mentioned in the previous table or by the comparison of empirical and theoretical level of trust.

If the sample contains more than 30 elements, hypothesis testing can be approximated by the Student t – test, where the table value is read along with the risk of error γ and n – 2 degree of freedom, while the test value (Landika, 2015):

$$t = r_S \cdot \sqrt{\frac{n-2}{1-r_S^2}}$$

6. EVALUATION OF STOCHASTIC CORRECTION OF THE BUSINESS EFFICIENCY LEVEL

On the one hand, managerial information contained in the indicator value of the quantitative consolidation of subjective perception variations in terms of the source of dissatisfaction with the services provided, and on the other hand the variation of frequency of requesting services by the users and the variation of the service type facilitate an objective approach to the dosing of business system inputs in order to achieve a desired performance level of business results.

Testing of statistical significance of the rank correlation coefficient is carried out on two independent samples whose purpose is to prove a non objective valoriza-

tion of the realized level of service quality by the workers involved in the process of administrative service provision, and by doing so raising awareness about the significance of their role in the perception of performance of quality service.

6.1. The degree of quantitative consolidation of variations of perception of (dis)satisfaction level of administrative service users in terms of the frequency ofthe need for the use of administrative services

Spearman's rank correlation coefficient by means of which the degree of quantitative consolidation of variations of perception of (dis)satisfaction level of administrative service users in terms of the frequency of need for the use of administrative services is expressed:

- For administrative officers it has a value: rS=1-6i=1ndi2n3-n = 0,99764
- For non-administrative officers (municipality residents) it has a value: rS=1-6i=1ndi2n3-n = – 0,987978

In both cases, the rank correlation coefficient indicates a high level of quantitative consolidation of variations of perception of dissatisfaction source of administrative service users in terms of the frequency of the need for the use of administrative services, while the rank correlation coefficient is of the opposite direction in terms of administrative and non-administrative officers.

The rank correlation coefficient is determined based on incomplete information, thus it is justified to test its statistical significance. Testing of statistical significance is conducted in the following manner:

a. The hypothesis of the statistical test has the following form: H_o:$\rho_s = 0$; $H_A : \rho_s \neq 0$;
b. Table value is determined with the reliability percentage of 99%, the risk of error $\gamma = 0,01$ respectively, by using the Student t probability distribution, where table value for the first sample has a value: $t_{0,005;28} = 2,7633$; while for the second sample table value is: $t_{0,005;53} = 2,6778$;
c. The test value is determined by using the following form: $t = r_S \cdot \sqrt{\frac{n-2}{1-r_S^2}}$; where the test size for the first sample has a value: $t^{I} = 77,28093$; while for the second sample the test value is: $t^{II} = 46,52549$;
d. In both samples, the table value is smaller than the test value, hence for both cases the null hypothesis is rejected with the reliability of 99%. With the reliability of 99% it can be concluded that the degree of quantitative consolidation of variations of perception of (dis)satisfaction source in

terms of the frequency of the need for the use of administrative services has a statistical significance.

6.2. The degree of quantitative consolidation of variations of perception of dissatisfaction source of administrative service users in terms of the type of administrative services

Spearman's rank correlation coefficient by means of which the degree of quantitative consolidation of variations of perception of dissatisfaction intensity of administrative service users in terms of the type of administrative services:

- For administrative officers it has a value: rS=1-6i=1ndi2n3-n = 0,984983
- For non-administrative officers (municipality residents) it has a value: rS=1-6i=1ndi2n3-n = –0,997727

In both cases, the rank correlation coefficient indicates a high level of quantitative consolidation of variations of perception of dissatisfaction source of administrative service users in terms of the type of service requested, where the direction of quantitative consolidation is the same for administrative officers and non-administrative officers.

The rank correlation coefficient is determined based on incomplete information, thus it is justified to test its statistical significance. The testing of statistical significance is conducted in the following manner:

a. The hypothesis of the statistical test has the following form: $H_0:\rho_s = 0$; $H_A : \rho_s \neq 0$;
b. Table value is determined with the reliability percentage of 99%, the risk of error $\gamma = 0,01$ respectively, by using the Student t probability distribution, where table value for the first sample has a value: $t_{0,005;28} = 2,7633$; while for the second sample table value is: $t_{0,005;53} = 2,6778$;
c. The test value is determined by using the following form: $t = r_S \cdot \sqrt{\frac{n-2}{1-r_S^2}}$; where the test size for the first sample has a value: $t_I = 30,18856$; while for the second sample the test value is: $t_{II} = 107,7973$;
d. In both samples, the table value is smaller than the test value, hence for both cases the null hypothesis is rejected with the reliability of 99%. With the reliability of 99% it can be concluded that the degree of quantitative consolidation of variations of perception of (dis)satisfaction source in relation to the use of administrative services and in terms of the type of administrative services has a statistical significance.

7. CONCLUSION

By analyzing the obtained results of the performed research, within which instruments of descriptive and interferential statistical analysis were used, the results can be summarized in the following managerial guidelines.

Descriptive statistical analysis tools which were used encompass *table* overview of the distribution of answers obtained in relation to the conducted interview procedure and *graphic* overview of the distribution of perception of the level of user satisfaction with the administrative service performance in comparison to the degree of involvement in the production process of the same. The test results point out to a high level of causality among stated phenomena, where even 93% of examinees, involved in the production process of administrative services, realized level rank as of high level of satisfaction, while only 29% of examinees, not involved in the production process of administrative services, have the same perception about the level of realized administrative service performances.

The above stated leads to the conclusion that it is necessary to reinvestigate the causes of dissatisfaction and educate staff to adjust working procedures, within the prescribed procedures, to the users' needs and requests. Additionally, another question is raised, namely to which extent the perception of examinees in terms of the quality level is an adequate indicator of the real level, since there is a possibility that the realized service quality is of a different level of performance in relation to different service users.

Inferential statistical analysis tools that were used include *Spearman's rank correlation coefficient* and *statistical inference on the level of its significance*. An objective approach to the analysis of quality of process results requires adjustment of metrics, adequate stochastic modeling, and adjustment of quality aspect of administrative service performances by the usage of ranked variables.

The stated approach facilitates the collection of useful managerial information on the intensity of quantitative consolidation of variations of (dis)satisfaction level of service users and the frequency of their demand. Managerial information derive from the structure of answers to the questions number 7 and 5 of the questionnaire, where after an adequate transformation of statistical variables into ranked variables, the obtained rank correlation coefficient for the first group of examinees is 0,997664; while its value for the second group of examinees is -0,987978; which leads to the conclusion that among the observed phenomena there is an intensive correlation, but of the opposite direction, among different groups of examinees. Obtained values of the rank correlation coefficient are tested at the significance level of 99%, hence the modeled information can be used with a high level of trust.

Useful managerial information also derive from the values of the Spearman's rank correlation coefficient which is used for testing the intensity of quantitative consolidation of variations of the (dis)satisfaction source of service performances in terms of the type of administrative service. Managerial information derive from the structure of answers to the questions number 6 and 8 of the questionnaire, where after an adequate transformation of statistical variables into ranked variables, the obtained rank correlation coefficient for the first group of examinees is 0,984983; while its value for the second group of examinees is – 0,997727; which leads to the conclusion that among the observed phenomena there is an intensive correlation, but of an opposite direction, among different groups of examinees. Obtained values of the rank correlation coefficient are tested at the significance level of 99%, hence the modeled information can be used with a high level of trust.

Indications derived from the opposite direction of correlation of the phenomena observed among examinees are determined by the involvement of examinees in the production process of administrative services, which can lead to the conclusion that the administrative officers have incorrect perception of the level of business efficiency or that they behave unprofessionally while providing services. It is possible and necessary to investigate additionally the stated assumptions. However, they are irrelevant from the aspect of research conducted.

Apart from the analysis conducted, together with the adequate adaptation, it is possible to analyze numerous business processes, especially in the function of raising the level of business efficiency in terms of provision of service and processes whose results are of qualitative characters. The effects of implementation of the results of analysis and research go far beyond the modest costs of their collection, and they are related to the collection and processing of statistical material, which is efficient especially when adequate computer programs, such as SPSS, are used.

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СТОХАСТИЧКИ АСПЕКТИ СТАЛНОГ УНАПРИЈЕЂЕЊА ПЕРФОРМАНСИ ПОСЛОВНИХ РЕЗУЛТАТА ЈАВНЕ УПРАВЕ

Проф. др Мирјана Ландика, ванредни професор, Паневропски универзитет Апеирон, Бања Лука
Проф. др Санел Јакуповић,ванредни професор, Паневропски универзитет Апеирон, Бања Лука
Др Радмила Бојанић, "M:tel", Бања Лука
Проф. др Велибор Пеулић, Међународна унија за друмски транспорт, Женева
Доц. др Ведран Шупуковић, РК ППД Загреб
Проф. др Волфганг Бергер, ванредни професор, Савезно министарство финансија Аустрије

САЖЕТАК

Ефикасно функционисање система изражава се као тежња за постизањем изврсности у пословним резултатима, односнокао потпуно уклањање разлике између жељених вриједности и стварних вриједности остварених перформанси система, које захтијева идентификацију спољашњих и унутрашњих фактора, али и експлицитни израз облика и обима њиховог утицаја на пословне процесе; веома је оптерећен стохастичким испољавањем њихових вриједности и сложености утицаја.

Оптимално пословно управљање одређују структура и концепт рада система, а оно се изражава и мјери обимом којим пословни резултат задовољава потребе корисника. Реализација пословних циљева је садржана у извођењу излазног вектора, који је резултат активности пословног система, у смислу одвојених фаза задатака у управљању јавном управом, као и у раду система у цјелини. Елиминација нежељених резултата укључује разматрање међузависности, условљавање, учесталост и дистрибуцију вјероватноће њихове појаве, као и координацију и сарадњу између бројних ресурса потребних за постизање жељеног нивоа оперативне ефикасности.

Циљ истраживања је тестирање осјетљивости постигнутог нивоа (не)задовољствакорисника извршавањем административних услуга, као зависневаријабле, у смислу нивоа и интензитета, манифестованих облика кориштених протокола и адекватности ангажовања даваоца услуга, као улазневаријабле, као и њихово изражавање одговарајућом статистичком функцијом, односно побољшање ефикасности пословања помоћу тачних резултата. Горе наведени поступци омогућавају предвиђање и корекцију пословних резултата, и упркос стохастичким варијацијама перформанси процеса које се анализирају и прате, њихово понашање се предвиђа, контролише и рационално усмјерава ка жељеном пословном резултату.

Дизајн експеримента је заснован на временској диспропорцији у откривању узрока оствареног нивоа субјективне перцепције задовољства приликом задовољавања потражње у смислу административних услуга, а у контексту учесталости потражње и облика тражене услуге. Превазилажењем и елиминацијом незадовољства извршавањем услуга значајно се и трајно побољшава ефикасност пословања административних процеса и повећава степен задовољства запослених; исто се односи и на кориснике услуга, чији је крајњи резултат минимализација разлике између реализованих и циљаних перформанси, а истовремено и глобалног оптимумасоцијалног и економског система.

Закључак у погледу постојања интензивних веза између посматраних појава открива узроке постигнутог нивоа резултирајућих перформанси и олакшава њихову индиректну корекцију дозирањем структуре и интензитета улазног вектора.

Кључне ријечи:

пословна изврсност, ефикасни рад, нежељени резултат, стохастичка манифестација, дистрибуција вероватноће, побољшање перформанси.

IMPACT OF MATERNAL MORTALITY ON SUSTAINABLE DEVELOPMENT IN THE SELECTED WEST AFRICAN COUNTRIES

1 Joseph Afolabi Ibikunle, Department of Economics, Ajayi Crowther University, Oyo, Oyo State, Nigeria
*Corresponding author E-mail: toy4kuns@yahoo.com
ORCID ID: 0000-0001-9865-4202

ARTICLE INFO
Original scientific Article
Received: 14.08.2019
Revised: 15.11.2019
Accepted: 29.11.2019
doi 10.7251/ACE1931051A
UDC 314.14:618.7(6-15)

Keywords: *maternal mortality, sustainable development, cross-sectional dependence, West Africa, female*

JEL Classification: I12, O47, Q01

ABSTRACT

Over half a million females die every year as a result of pregnancy and birth complications. The vast majority of these fatalities can be avoided. SDG 3.1's objective is to reduce the global maternal mortality ratio by 2030 to below 70 per 100,000 live births. Despite a number of policies put in place maternal mortality in Africa remains unacceptably high. This study investigates the impact of maternal mortality on sustainable development in 9 selected West African countries for the period from 1990 to 2015. Data used were adjusted net savings, maternal mortality, consumer price index, per-capita income and financial development. The second-generation econometric methods were employed: cross sectional dependence, slope homogeneity, Westerlund cointegration, Eberhadt and Teal AMG regression, and the Emirmahmutoglu and Kose bootstrap Granger causality test. Findings confirm the following: First, cross-sectional dependence and slope heterogeneity exist among the West African countries. Second, there is a long run relationship between maternal mortality and sustainable development. Third, maternal mortality impacted negatively and significantly on sustainable development. Fourth, the direction of causality varies across countries between maternal mortality and sustainable development. Lastly, causality runs from maternal mortality to sustainable development when analyzing the causal relationship among all countries. The findings suggest that the West African government needs to commit more funding to the health care sector and ensure access to free healthcare service to pregnant women or at low cost with quality and effective health care services if the countries must attain sustainable development by 2030.

1. INTRODUCTION

The Sustainable Development Goals (SDGs) target is now less than twelve years to finish, but target 3.1 to reduce the worldwide maternal mortality ratio by 2030 to less than 70 per 100,000 livebirths is still unrealistic in most African countries. Approximately 830 females die every day from preventable causes linked to pregnancy and childbirth, according to the World Health Organization (2018). It is disheartening that while maternal mortality, which is pregnancy-related death, is preventable, it has continued to rise in many nations around the globe, particularly in the countries of Western Africa. It is also unfortunate that 99% of all maternal deaths in the globe happen in developing countries where the bulk of state claims to have invested more in the health industry in an effort to guarantee health care efficiency and effectiveness (Bhalotra et al., 2018; WHO, 2018 ; Olonode et al., 2019).

Literature has recently disclosed that one female dies in pregnancy per minute around the globe and that half of these fatalities still happen in sub-Saharan Africa. Despite advancement in many nations in growing maternal health care accessibility, most females throughout Africa stay without complete access to this care (Africa Progress Panel Policy Brief, 2010; Say et al., 2014; WHO, 2019). A recent research by McArthur, Rasmussen and Yamey (2018) demonstrates that researchers are now more concerned about how many lives are at risk in an effort to achieve sustainable development with high maternal mortality. They are also concerned about how far the nation has to go by the end of 2030 to achieve the goal of less than 70 maternal deaths per 100,000 live births.

Recognizing these problems, the worldwide community has once again created history by agreeing on a common front to tackle some of today's most daunting development problems of humanity. As a consequence, at the end of 2015, the objective of maternal mortality was included in the objective of sustainable development. Goal 3 of the SDGs calls for ensuring healthy lives and promoting well-being for all ages, and the global goal is to reduce the global maternal mortality ratio (MMR) to less than 70 maternal deaths per 100,000 live births by 2030, while the national goal for countries is to reduce their MMR by at least two-thirds from their 2010 baseline by 2030. Finally by 2030, there should be no nation with MMR higher than 140 maternal deaths per 100,000 live births, twice the worldwide target (Garenne, 2015; Maternal Health Task Force, 2019; Piane, 2019).

However, the trend is still on the rise despite many measures put in place to decrease maternal deaths in Western African nations. The issue that comes to mind is, what effect does maternal mortality have on West Africa's sustainable

development? Is there a long-term connection between maternal mortality and sustainable development? If so, what is the causality direction between maternal mortality and sustainable development? As a result of the bordering questions, the effect of maternal mortality on sustainable development in West Africa is therefore essential to investigate. Hence, the objective of this paper is to examine the impact of maternal mortality on sustainable development in some selected West African countries.

The remainder of this paper is structured as follows, in addition to the introduction: section 2 provides the literature review, section 3 defines the information used by the adopted methodology, section 4 introduces the empirical outcomes, and section 5 concludes the research and recommends.

2. MATERIALS AND METHODS

2.1. Data requirements and source

The research sample used involves: Benin, Gambia, Ghana, Guinea Bissau, Mali, Niger, Nigeria, Senegal and Togo. The covered period runs from 1990 to 2015. Selecting the nations used and selecting the time frame is based on the accessibility of information for each of the nations in West Africa. Therefore, a panel information series for 5 variables was produced to examine the impact of maternal mortality on sustainable development in the chosen West African nations. Sustainable development, consumer price index, GDP per capita, financial development and maternal mortality are included. Sustainable development data, inflation rate, income per capital and maternal mortality data were retrieved from the World Development Indicators (http://data.worldbank.org). Data for financial development were sourced from the site http://data.world/imf/financial-development-fd. The adjusted net savings is used as a proxy for sustainable development (World Bank, 1997; Farida, Arifin & Abdol, 2015).

2.2. Model specification and methods of estimation

The adjusted net savings were accepted by the World Bank as an indication for sustainable development (Faridah et al., 2015) and are calculated from the fixed capital depreciation, education expenditure, natural resource depletion and pollution damage. The adjusted net savings are therefore calculated

$$ANS = \frac{GNS - Dh + CSE - \sum R_{n.i} - CD}{GNI}. \quad (1)$$

Where ANS = Adjusted Net Saving Rate, GNS = Gross National Saving, Dh = Depreciation of produced capital, CSE = Current (non-fixed-capital) expenditure on education, Rn,i = Rent from depletion of natural capital, CD = Damages from carbon dioxide emissions and GNI = Gross National Income at Market Prices.

Since the intention of this paper is to examine the impact of maternal mortality on sustainable development in some selected West African countries, we specify a typical sustainable development equation that takes the functional form:

$$SD = f(MM, CPI, PCINC, FINDEV) \tag{2}$$

Where SD = sustainable development proxied by the adjusted net savings, MM = maternal mortality, CPI = consumer price index, PCINC = Per-capita income and FINDEV = financial development. Equation (2) in a linear econometric log form is re-specified as:

$$LSD_{it} = \beta_0 + \beta_1 MM_{it} + \beta_2 CPI_{it} + \beta_3 PCINC_{it} + \beta_4 FINDEV_{it} + \varepsilon_{it} \tag{3}$$

Where LSD = log of sustainable development, β_0=constant term, β_k(k = 1, 2, 3, 4) = coefficients on independent variables, ε_{it}= error term. In equation 2 only sustainable development (dependent variable) is in logarithmic form. The above log linear model will be estimated using the Eberhardt and Teal (2010) Augmented Mean Group estimation techniques for panel data. Although the objective of the study was to determine the effect of maternal mortality on sustainable development, we also introduce other variables that are generally accepted as determinants of sustainable development to serve as control variables. These variables include: consumer price index, per capita income and financial development.

2.3. Estimation techniques

In order to prevent an unreliable parameter, an estimate from the factors used, as a first step in this research, we check the existence of cross-sectional dependence and slope heterogeneity in our data sequence to determine the most suitable unit root and cointegration tests to be used. This is because lack of control of the effect of these two issues, which exist in the data series, may result in spurious regression. Four distinct cross-sectional dependence trials are available. These include the LM test of Breusch-Pegan (1980), Pesaran Scaled LM (2008), Bias - the corrected LM test of scale and the Pesaran CD test.

Breusch-Pagan (1980) LM test: this LM statistics for reliance is provided under a null hypothesis of no cross-sectional dependence as follows:

$$LM = \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} T_{ij} \hat{p}_{ij}^2 \rightarrow \chi^2 \frac{N(N-1)}{2} \tag{4}$$

Where $\hat{p}_{ij}^2$ is the correlation coefficient of the residuals extracted from the equation in (4). However, Pesaran (2004) provides a more effective test for data sequence involving high number of nations than the Breusch-Pagan (1980) LM test. This test is considered to be the LM test scaled by Pesaran. It is also a test of null hypothesis under no cross-sectional dependence. The Pesaran (2004) LM statistics and equation are shown below.

$$LM_s = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T_{ij} \hat{p}_{ij}^2 - 1) \rightarrow N(0.1) \tag{5}$$

The Bias - corrected Scaled LM test by Baltagi, Feng & Kao (2012) is the third cross-sectional dependence test. This test results in asymptotic bias corrections to the scaled LM test statistics, and the LM test statistics is given under the same null hypothesis of no cross-sectional dependence as:

$$LM_{BC} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T_{ij} \hat{p}_{ij}^2 - 1) - \frac{N}{2(T-1)} \rightarrow N(0.1) \tag{6}$$

The problem of the size distortion was a major flaw of the Pesaran scaled LM test. Pesaran (2004) created an alternative test statistics called the Pesaran CD test to tackle this deficiency. This test is based on the average of coefficients of correlation $\hat{p}_{ij}$. The test also assumes no cross-sectional dependence, i.e. null hypothesis. The statistics of the Pesaran CD test is shown in equation 7 below.

$$CD_p = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} T_{ij} \hat{p}_{ij} \rightarrow N(0.1) \tag{7}$$

Given the four different variations of the cross-sectional dependence test statistics, the null hypothesis of no cross-sectional dependence is denoted as:

$$H_0 : \hat{p}_{ij} = cor(\mu_{it}, \mu_{jt}) = 0 \quad for \ i \neq j \tag{8}$$

Slope homogeneity test

Another major issue for this study is the heterogeneity of the slope (cross-country). An indication that important economic shock discovered in one nation is not necessarily imitated in other nations is the presence of slope heterogeneity in a series.

Pesaran and Yamagata (2008) slope heterogeneity tests were therefore used to prevent this, using the standardized version of the Swamy (1970) homogeneity test called delta tests. However, a modified version of the Swamy test (1970) is first calculated as shown in the equation below.

$$\hat{S}_w = \sum_{i=1}^{N} \left(\hat{\alpha}_i - \hat{\alpha}_{WFEP}\right)' X_I' \frac{M_T X_i}{\delta_i^2} \left(\hat{\alpha}_i - \hat{\alpha}_{WFEP}\right) \tag{9}$$

From 6, $\hat{\alpha}_i$ is the pooled OLS estimator, $\hat{\alpha}_{WFEP}$ is the weighted fixed effect pooled estimator and δ_i^2 is the estimator. The standard dispersion statistics of equation 6 is computed to take the form specified in equation 7 and 8 below

$$\hat{\Delta} = \sqrt{N} = \left(\frac{N^{-1}\hat{S}_w - k}{2k} \right). \tag{10}$$

Otherwise, the bias adjusted version of the standard dispersion statistics in 8 can be computed as

$$\hat{\Delta}_{adj} = \sqrt{N} \left(\frac{N^{-1}\hat{S}_w - E\left(\tilde{Z}_{it}\right)}{\sqrt{var}\left(\tilde{Z}_{it}\right)} \right) \tag{11}$$

Westerlund cointegration test

The four-panel cointegration experiments to test no cointegration established by Westerlund (2007) are used to determine whether there is a long-term connection between the variables. These tests are designed to determine if the term of error correction in a model of conditional error correction is equal to zero. Rejecting the null of no error correction will cause the null of no cointegration to be rejected. Through bootstrapping, all four tests can handle particular slope parameters and cross-sectional dependence. Two of the four tests (group mean statistics) test against an alternative for the null of no cointegration in which at least one section of the panel is cointegrated. The other two tests (panel statistics) testing against

the option that the panel is cointegrated will also be calculated for the result of no cointegration. The statistics of the group-mean is calculated as:

$$G_{-tau} = \frac{1}{N}\sum_{i=1}^{N}\frac{\hat{\alpha}_i}{SE(\hat{\alpha}_i)} \tag{12}$$

and

$$G_{-alpha} = \frac{1}{N}\sum_{i=1}^{N}\frac{T\hat{\alpha}_i}{\hat{\alpha}_i(1)} \tag{13}$$

In which $\hat{\alpha}_i$ = error correction estimate, and $SE(\hat{\alpha}_i)$ = standard error of $\hat{\alpha}_i$.

The panel statistics is constructed as:

$$P_{-tau} = \frac{\hat{\alpha}}{SE(\hat{\alpha})} \tag{14}$$

and

$$P_{-\alpha lpha} = T\hat{\alpha} \tag{15}$$

Bootstrap panel Granger casualty test

The direction of causality between sustainable development and maternal mortality among the nations used is one thing that is more essential to be identified in this research. To achieve this, Emirmahmutoglu and Kose (2011) suggested the bootstrap panel causality method based on meta-analysis in heterogeneous mixed panels. This test is an extension of the techniques of Toda and Yamamoto (1995) to test coefficient restrictions for an integrated or co-integrated process in a level VAR model. However, the pattern of ensuring that the variables in the underlying VAR system are stationary does not follow this test. Therefore, the use of this test may be appropriate to apply for panels composed of stationary, non-stationary, cointegrated and non-cointegrated series (see Seyoum et al., 2014, for instance). Therefore, pre-test bias associated with stationary testing and cointegration is prevented. This is because, in a lag-augmented VAR (LA-VAR), the technique uses a modified Wald (MWALD) test that has a standard asymptotic chi-square distribution when estimating a VAR (p+dmax). The value of p is the lag order and dmaxis is the maximum integration order assumed to occur in the

computing process. Therefore, following Emirmahmutoglu and Kose (2011), the panel causality test equation system includes two sets of equations:

$$SD_{it} = \alpha_{1i}^{SD} + \sum_{j=1}^{L_{SD}+dmax_i} \beta_{1ij} SD_{it-j} + \sum_{j=1}^{L_{MM}+dmax_i} \gamma_{1ij} MM_{it-j} + \varepsilon_{1it}. \quad (16)$$

$$MM_{it} = \alpha_{2i}^{MM} + \sum_{j=1}^{L_{SD}+dmax_i} \beta_{2ij} SD_{it-j} + \sum_{j=1}^{L_{MM}+dmax_i} \gamma_{2ij} MM_{it-j} + \varepsilon_{2it}. \quad (17)$$

In equation (16) and (17) SD_{it}, i=1,...,N denotes sustainable development and $MM_{i,t}$=1,...,N denotes maternal mortality. N represents the number of the countries included in the panel (j=1,...,N), t is the time period (t=1,2,3,4,5,6,7,8,9), 1 is the lag length and $dmax_j$ represents the maximal order of integration. However, if cross-sectional dependence exists in the data series used, the limit distribution of the Fisher test statistics is assumed to become invalid. To prevent such an issue, the bootstrap strategy used Emirmahmutoglu and Kose test for causality of Granger in the presence of cross-sectional dependence. The work by Emirmahmutoglu and Kose (2011) provides details of the bootstrap procedure. We estimate equations (13) and (14) with bootstrap critical values and perform panel Granger causality tests. Emirmahmutoglu and Kose's Granger causality employs the statistical method of meta-analysis of Fisher (1932). It performs N amount of distinct time series trials and combines meaningful individual p-values in a single panel test statistics. The test statistics has a chi-square distribution with 2N degrees of freedom. The Fisher test statistics (λ) is specified as

$$\lambda = -2\sum_{i=1}^{N} ln_{(pi)} \qquad i = 1, 2, \ldots, N. \quad (18)$$

In equation (15) *pi* represents *ρ-value* for the Wald statistics of the *ith* cross sections.

However, the limit distribution of the Fisher's test becomes unacceptable when cross-sectional dependence exists in the data series. The paper uses the Emirmahmutologu and Kose Bootstrap Granger causality test in the presence of cross-sectional dependence in order to find a way out of this issue. Equation (18) and (19) are estimated using the bootstrap critical value of Emirmahmutologu and Kose panel Granger causality tests.

3. RESULTS AND DISCUSSION

3.1. Trend of maternal deaths

Figure 1 demonstrates the trend in maternal death in chosen nations in West Africa. From 1990 to 2004, maternal mortality rose in Benin. The mortality between 2004 and 2009 was stable and declined in 2010. However, maternal death has been diminishing and stable since this era. Maternal death has increased over the years in the Gambia. In Ghana, maternal death declined from the beginning of 1990 to 2008 and began to rise from 2009 to 2015. Guinea Bissau's maternal mortality fell from 1990 to 2004 but has risen since 2005. It decreased again from 2005 to 2010, where the amount of maternal deaths for Mali has risen again, the amount of fatalities has not been also stable, but it demonstrates that the amount of fatalities is declining in Mali and Togo, as well as in Nigeria. After attempts to lower the rate since 2010 Senegal has reported a stable maternal death.

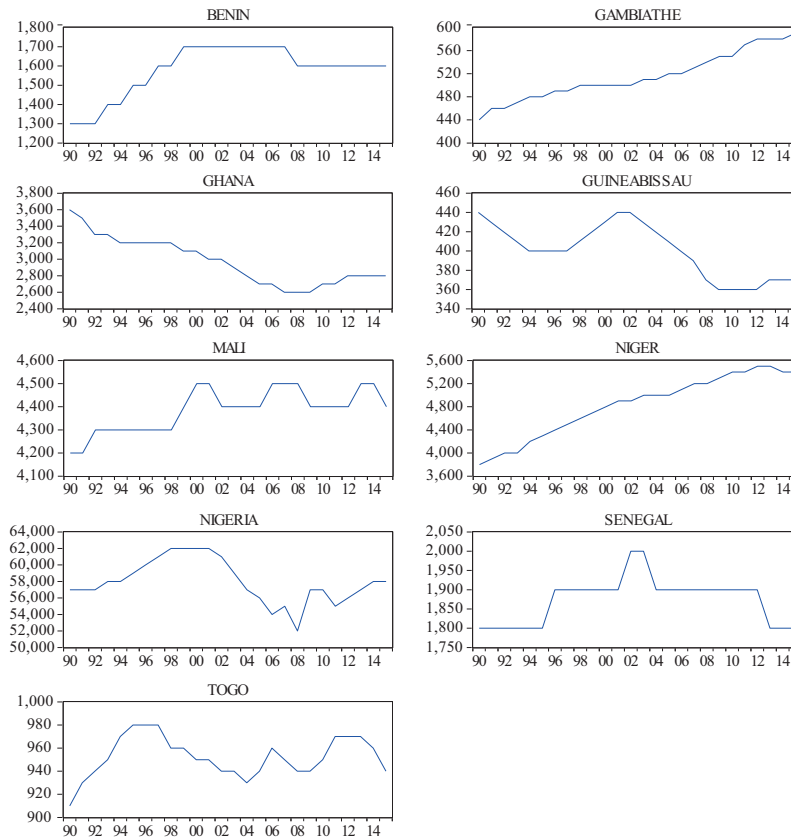

Figure 1. Trend of maternal death in the selected West African countries
Source: World Bank data base, 2019

3.2. Summary of statistics

Table 1 provides an overview of the descriptive statistics of variables. Nigeria has the highest mean value for sustainable development for the period 1990-2015, followed by Senegal, whereas the lowest is in the Gambia. The largest peak value for sustainable development was also reported in Nigeria while the minimum was recorded in the Gambia. The largest peak value for sustainable development was also reported in Nigeria while the minimum was recorded in the Gambia. Ghana recorded the highest mean value in terms of inflation followed by Nigeria. Senegal reported the least mean value. Nigeria has the highest mean value for per capita income followed by Senegal. The lowest mean value was recorded by Ghana. Nigeria also has the average maximum values (2563.09), whereas Niger has the minimum value (322.16).

Table 1. Summary of statistics

Country	Mean	Std. dev	Minimum	Maximum
Panel A: Sustainable development				
Benin	-0.32	1.64	-2.93	4.31
Gambia	-12.18	6.18	-22.94	4.11
Ghana	-0.40	8.23	-17.84	9.78
Guinea Bissau	-6.26	6.54	-19.27	8.89
Mali	2.23	4.34	-8.99	10.77
Niger	-2.42	7.61	-15.67	9.25
Nigeria	20.83	11.97	0.08	43.92
Senegal	4.06	4.23	-3.83	12.26
Togo	1.45	8.95	-12.81	31.20
Panel	0.78	11.06	-22.94	43.92
Panel B: Consumer price index				
Benin	4.41	7.68	-1.00	38.53
Gambia	5.90	3.96	0.84	17.03
Ghana	20.45	12.42	7.13	59.46
Guinea Bissau	16.02	22.38	-3.50	69.58
Mali	3.04	5.75	-6.24	23.18
Niger	2.91	7.94	-7.80	36.04
Nigeria	18.89	18.09	5.38	72.84
Senegal	2.75	6.50	-2.25	32.30
Togo	4.39	8.00	-1.00	39.16
Panel	8.75	13.58	-7.80	72.84
Panel C: Per capita income				
Benin	707.87	69.30	609.35	833.64
Gambia	521.37	17.99	488.55	562.48
Ghana	1114.97	268.95	832.59	1642.42
Guinea Bissau	568.18	60.23	508.70	731.10

Country	Mean	Std. dev	Minimum	Maximum
Mali	610.58	83.98	481.25	726.25
Niger	346.24	20.44	322.16	388.34
Nigeria	1795.63	431.65	1347.89	2563.09
Senegal	1150.37	105.59	995.42	1346.36
Togo	532.50	45.07	419.28	622.35
Panel	815.42	466.02	322.17	2663.09
Panel D: Financial development				
Benin	.09	.01	.07	.10
Gambia	.08	.01	.06	.09
Ghana	.11	.01	.09	.14
Guinea Bissau	.04	.01	.02	.06
Mali	.09	.02	.06	.11
Niger	.07	.02	.05	.12
Nigeria	.12	.03	.07	.19
Senegal	.10	.01	.09	.11
Togo	.09	.01	.07	.12
Panel	.09	.03	.02	.19
Panel E: Maternal mortality				
Benin	510.77	58.05	405	577
Gambia	862.15	107.70	706	1030
Ghana	434.5	101.50	319	634
Guinea Bissau	717.31	114.80	549	907
Mali	779.46	137.23	587	1010
Niger	742.11	95.33	553	873
Nigeria	1057.81	196.02	814	1350
Senegal	446	70.20	315	840
Togo	469.73	73.93	368	573
Panel	668.87	233.50	315	1350

Source: Author's computation (2019) using Stata 12

3.3. Preliminary analysis

There are two significant issues when carrying out panel-data estimates. First is the existence of cross-sectional dependence. The probability that individual units are interdependent is an important consideration in panel-data studies (Sarafidis and Wansbeek, 2012). Wrong assumption that there is no cross-correlation between data error terms (relaxation of the cross-sectional dependence hypothesis) implies that the variance-covariance matrix is likely to improve with the number of cross-sections and that the sample distributions will become spurious and invalid (Cerrato & Sarantis, 2002).

Second is the question of the presence of slope heterogeneity in parameters. Erroneous assumption that slope coefficients are homogeneous across cross-sections when in reality they are heterogeneous, will result in inconsistent data parameter estimates. The paper therefore test for both to prevent the presence of spurious results.

The empirical findings of cross-sectional dependence and slope homogeneity respectively are presented in Table 2 and Table 3. Table 2 results provide adequate proof for nine nations to dismiss the null hypothesis of no cross-sectional dependence. The rejection of the null hypothesis was significant at 1% in all data except for the LMadj test for ANS, which was significant at 5%. Similarly, the substantial test data described in Table 3 for all delta trials and adapted delta tests led to the refusal of the null slope homogeneity hypothesis at 1%. Thus, the outcome confirms the existence in various nations of slope heterogeneity among the series.

Table 2. Cross-sectional test dependence result

	Test stat. and prob.				
	ANS	CPI	PCINC	FINDEV	MM
LM (Breusch & Pegan, 1980)	180.69***	813.27***	370.78***	180.84***	840.29***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CDlm (Pesaran, 2004)	15.99***	90.57***	38.39***	16.01***	93.72***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CD (Pesaran, 2004)	15.81***	90.36***	38.22***	15.83***	93.54***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LMadj (PUY, 2008)	1.78**	28.48***	12***	7.76***	28.96***
	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)

Source: Author's computation (2019) using Eviews 9: ***and **, indicate rejection of the null of no cross-sectional dependence at the 1%, and 5% levels, respectively

Table 3. Slope homogeneity test results

Delta Tests	Test stat. and prob.				
	ANS	INF	PCINC	FINDEV	MM
Delta tilde	4.832***	1.083	2.101**	1.017	6.727***
	(0.00)	(0.14)	(0.02)	(0.16)	(0.00)
Delta tilde adj.	5.137***	1.152	2.234**	1.082	7.152***
	(0.00)	(0.13)	(0.01)	(0.14)	(0.00)

Source: Author's computation (2019) using GAUSS 14. *** and **denotes sig. at 1% and 5%, respectively.

3.4. Panel unit root test results

To determine the type of cointegration techniques to be used for the study and to avoid a spurious regression resulting from the series, Pesaran (2007) Cross Sectional Augmented Dickey – Fuller (CADF) and CIPS panel unit root tests were used and the test results are presented in Table 4 and Table 5. In Table 4, where intercept and trend were presented at the first difference, the result shows that all variables at levels were not stationary but only after the first differencing in Table 5.

Table 4. Panel unit root test results with intercept and trend at levels

Countries	Test statistics					Critical values		
	ANS	CPI	PCINC	FINDEV	MM	1%	5%	10%
Benin	-1.47	-0.41	-3.25	-0.91	-4.06	-6.40	-4.87	-4.00
Gambia	-0.16	-0.30	-3.05	-1.96	-3.43	-6.40	-4.87	-4.00
Ghana	-0.21	1.12	-2.73	-2.01	-0.95	-6.40	-4.87	-4.00
Guinea Bissau	-1.68	-0.98	-3.19	-3.30	-1.71	-6.40	-4.87	-4.00
Mali	-2.20	-0.21	-2.39	-1.87	-3.37	-6.40	-4.87	-4.00
Niger	2.94	1.46	-1.80	-3.37	-1.92	-6.40	-4.87	-4.00
Nigeria	-2.66	0.60	-0.44	-3.23	-2.08	-6.40	-4.87	-4.00
Senegal	-0.39	-0.36	-2.56	-1.31	-2.25	-6.40	-4.87	-4.00
Togo	0.36	-0.10	-1.30	-2.73	-2.71	-6.40	-4.87	-4.00
CIPS stat. for all countries (panel)	-0.61	0.09	-2.30	-2.30	-2.43	-3.30	-2.94	-2.76

Source: Author's computation (2019) using GAUSS14

Table 5. Panel unit root test results with intercept and trend after the first difference

Countries	Test statistics					Critical values		
	ANS	CPI	PCINC	FINDEV	MM	1%	5%	10%
Benin	-2.67	-3.64	-1.47	-1.80	-4.01	-6.40	-4.87	-4.00
Gambia	-2.74	-2.51	-2.96	-2.83	-6.63	-6.40	-4.87	-4.00
Ghana	-3.31	-1.50	-2.81	-4.39	-2.84	-6.40	-4.87	-4.00
Guinea Bissau	-2.77	-4.50	-2.35	-5.03	-1.81	-6.40	-4.87	-4.00
Mali	-4.28	-4.48	-2.70	-2.56	-2.82	-6.40	-4.87	-4.00
Niger	-3.32	-2.86	-1.75	-3.21	-3.95	-6.40	-4.87	-4.00
Nigeria	-4.29	-3.02	-1.43	-2.59	-3.14	-6.40	-4.87	-4.00
Senegal	-2.92	-3.57	-1.38	-1.48	-4.71	-6.40	-4.87	-4.00
Togo	-2.36	-4.28	-2.40	-1.94	-4.96	-6.40	-4.87	-4.00
CIPS stat. for all countries (panel)	-3.18	-3.73	-2.58	-2.87	-3.87	-3.30	-2.94	-2.76

Source: Author's computation (2019) using GAUSS14

Westerlund cointegration test result

As shown in Table 6, when the long-term relationship between the sustainable development (SD) and all the explanatory variables (MM, CPI, PCINC, FINDEV) is tested, two out of the four cointegration tests reject the null of no cointegration, i.e., $P_{-tau,}$ and P_{-alpha} test statistics rejects the null hypothesis at the 5% significant level. Hence, the result indicates that there is a long run relationship between SD and MM, CPI, PCI and FD. The evidence of a long run relationship between MM and SD indicate that maternal mortality has implication on the attainment of sustainable development to come by 2030.

Table 6. Westerlund cointegration test result

Statistics	Value	Asym *p*–value	bootstrap *p*–value
g-tau	2.902	0.988	0.937
g-alpha	4.023	1.000	0.160
p–tau	2.372	0.991***	0.011
p–alpha	2.372	0.978**	0.019

*** and ** indicate rejection of the null of no cointegration at the 1% and 5% levels, respectively.
Source: Author's computation (2019) using GAUSS 14

Regression results

To determine the impact on sustainable development of maternal mortality, the AMG methods used by Eberhardt and Teal (2010) was employed and the results are presented in Table 7 below.

Table 7. AMG estimation results (dependent variable: sustainable development)

Variable	Coefficient	ρ value
Maternal mortality	-0.005	0.041
Consumer price index	-0.001	0.038
Per capita income	0.007	0.051
Financial development	1.023	0.510

Source: Author's computation (2019) using Stata14

The above results show the log linear result obtained from the estimated equation in 3. The Eberhardt and Teal (2010) AMG regression analysis was used. The result is in a log linear form with the dependent variable of sustainable development (LSD) in the logarithmic form while the independent variables were not logged. Maternal mortality demonstrates an inverse relationship to sustainable

development as a consequence. The outcome is consistent with the theoretical postulation. Increase of 1% in maternal mortality will decrease sustainability by 0.5%. The outcome from ρ – value shows a significance of 5%. This shows that addressing the issue of maternal mortality is an important factor for achieving sustainable development in the selected countries of West Africa. The result also found a negative impact of the consumer price index (CPI) on sustainable development. The result corresponds to the a priori expectation. An increase of 1% in CPI causes LSD to drop by 0.01%. The result with ρ – value < 0.05 was significant at 5%. The significance of this result demonstrates that CPI in the chosen West African nations is an important determinant of sustainable development. Per capita income (PCINC) shows a positive relationship with sustainable development (LSD). The result conforms to the theoretical postulation too. As a consequence, 1% rise in per capita income will lead to an improvement in LSD by about 0.07%. Value ρ< 0.05 indicates that per capita income in the selected West African countries is an important determinant of sustainable development. Financial development outcome shows a positive but insignificant result with sustainable development outcome. The outcome demonstrates that an increase in economic growth of 1 percent will lead to an increase in sustainable development by about 102 percent. Values ρ > 0.05 shows that financial development is not a significant factor that determines sustainable development in the selected West African countries.

Emirmahmutoglu and Kose Bootstrap Granger causality test result

It is evident from Table 2 and Table 3 that the null of no cross-sectional dependence has been dismissed across the nine nations and that the slope coefficient is heterogeneous. A causality test must therefore be used to take into account both cross-sectional dependence and slope homogeneity. Therefore, the Bootstrap Granger causality test by Emirmahmutoglu and Kose (2011) is used to determine the direction of causality between maternal mortality and sustainable development and the outcome is displayed in Table 8 below.

Table 8. Granger causality between sustainable development and maternal mortality

Maternal mortality does not cause sustainable development		Sustainable development does not cause maternal mortality	
Countries	Wald statistics	Countries	Wald statistics
Benin	9.583*	Benin	2.189
	(-0.008)		(0.335)
Gambia	0.774	Gambia	2.011
	(-0.679)		(0.366)

Maternal mortality does not cause sustainable development		Sustainable development does not cause maternal mortality	
Countries	Wald statistics	Countries	Wald statistics
Ghana	9.031**	Ghana	3.112
	(0.011)		(0.211)
Guinea Bissau	19.128*	Guinea Bissau	3.616
	(0.000)		(0.164)
Mali	0.350	Mali	1.132
	(0.554)		(0.287)
Niger	4.965**	Niger	2.425
	(0.026)		(0.119)
Nigeria	2.082	Nigeria	6.404**
	(0.149)		(0.011)
Senegal	1.150	Senegal	4.909**
	(0.284)		(0.027)
Togo	6.557**	Togo	8.944**
	(0.038)		(0.011)
Panel Fisher	59.892	Panel Fisher	42.81
Asymptotic value	(0.000)	Asymptotic value	(0.001)
Bootstrap p value	(0.010)	Bootstrap p value	(0.789)

Note: * and ** indicate significance at 0.1 and 0.5 significance level
Source: Author's computation (2019) using GAUSS14

The outcome of the granger causality test is shown in Table 8. The result shows that the following outcomes will be discovered when the variables of sustainable development and maternal mortality are displayed at their country level. Significant one-way causality in Benin, Ghana, Guinea-Bissau and Niger, from maternal mortality to sustainable development has been discovered. There is also a one-way causality in Nigeria and Senegal that runs from sustainable development to maternal mortality. In Togo, there is a two-way or bi-directional causality between sustainable development and maternal mortality. This shows the country's feedback existence. However, there was no evidence of causality in the Gambia and Mali among the two. However, the bootstrap outcome shows a one-way causality from maternal mortality to sustainable development when testing for the overall chosen West African countries. There is therefore proof of causality in the chosen West African nations between sustainable development and maternal mortality.

4. CONCLUSIONS AND RECOMMENDATIONS

This research examines the effects of maternal mortality on sustainable development in nine West African nations between 1990 and 2015. The conclusions of the study are as follows:

First, across West African nations, there is a cross-sectional dependence and slope heterogeneity. Second, there is a long-term connection between maternal mortality in the countries and sustainable development. Third, maternal mortality has had a negative impact on sustainable development and is also a major factor determining sustainable development in the nine countries. Fourth, the direction of causality between maternal mortality and sustainable development differs among countries. In Benin, Ghana, Guinea Bissau and Niger, one-way causality occurs running from maternal mortality to sustainable development. On the other hand, causality ranges from sustainable development to maternal mortality in Nigeria and Senegal, whereas there is two-way causality between maternal mortality and sustainable development in Togo and no evidence of causality between them in the Gambia and Mali. In particular, when evaluating the causal relationship between overall maternal mortality and sustainable development, causality in the chosen nations ranges from maternal mortality to sustainable development.

Accordingly, the study recommends that achieving the SDGs target of a global MMR of less than 70 maternal deaths per 100,000 live births by 2030 will require from the government of West African countries to increase funding for research, programs and policies on maternal health at the global level and highly focused action in countries. In addition, childbirth complications should be expected and resolved quickly by referral with the suitable level of good-quality obstetric care. Higher-level care access also needs a powerful referral system that involves communication with referral centers and transportation to them. Provision of fundamental instruments to enhance health of employees in the community is also necessary, as well as the development of creative incentive structures to support health of employees in the community. The price of health care for pregnant females should be minimal or free.

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УТИЦАЈ СМРТНОСТИ МАЈКИ НА ОДРЖИВИ РАЗВОЈ У ОДАБРАНИМ ЗАПАДНОАФРИЧКИМ ЗЕМЉАМА

1 Џозеф Афолаби Ибикунле, Економски факултет, Ајаји Краутер Универзитет, Ојо, Нигерија

САЖЕТАК

Преко пола милиона жена годишње умре од посљедица трудноће или компликација на порођају. Велика већина ових смртних случајева се може избјећи. Циљ ЦДГ 3.1 јесте смањити глобални омјер смртности до 2030. године на испод 70 на 100 000 рођених. Међутим, упркос бројним политикама, смртност мајки у Африци је даље неприхватљиво висока. Ова студија истражује утицај смртности мајки на одрживи развој у девет одабраних западноафричких земаља у периоду од 1990. до 2015. године. Подаци који су кориштени су прилагођене нето уштеде, смртност мајки, индекс потрошачких цијена, доходак по становнику и финансијски развој. Кориштене су економетријске методе друге генерације: зависност попречног пресјека, хомогеност нагиба, Westerlund коинтеграција, Eberhadt&Teal AMG регресија, Emirmahmutoglu&Kose Bootstrap Granger тест узрочности. Резултати потврђују сљедеће: прво, зависност од попречног пресјека и хетерогеност нагиба постоје међу западноафричким земљама. Друго, постоји дугорочна веза између смртности мајки и одрживог развоја. Треће, смртност мајки је негативно утицала на одрживи развој. Четврто, правац узрочности између смртности мајки и одрживог развоја варира између земаља. Посљедње, узрочност се креће од смртности мајки до одрживог развоја када се анализира узрочна веза у свим земљама. Резултати сугеришу да владе западне Африке морају да обезбиједе више финансија за здравствени сектор и да се трудницама обезбиједи приступ бесплатним здравственим услугама или по ниским цијенама уз квалитетне и ефикасне здравствене услуге уколико земље желе да постигну одрживи развој до 2030. године.

Кључне ријечи:
смртност мајки, одрживи развој, зависност од попречног пресјека, западна Африка, жене.

Прегледни научни чланци
Review Scientific Papers

POSSIBLE DIRECTIONS OF CHANGE OF KEY SEGMENTS OF THE ECONOMIC REGULATORY FRAMEWORK IN SERBIA

1 Gojko M. Rikalović, full professor, Faculty of Economics, University of Belgrade
2 Dejan S. Molnar, associate professor, Faculty of Economics, University of Belgrade
*Corresponding author E-mail: molnar.dejan@gmail.com
1 ORCID ID: 0000-0002-6638-3724
2 ORCID ID: 0000-0002-6081-8141

ARTICLE INFO

Review Article
Received: 10.10.2019
Revised: 04.12.2019
Accepted: 18.12.2019
doi 10.7251/ACE1931073R
UDC
338.124.4(497.11):330.34(4-672ЕУ)

Keywords: *constitution, regulatory framework, economy, public finances, Serbia, EU.*

JEL Classification: F02, H60, H63.

ABSTRACT

The paper first analyzes the institutional framework of the economy and public finances in Serbia, with particular reference to the treatment of the SME sector and entrepreneurs, foreign investors and the digital (IT) infrastructure. A special part of the paper deals with the dynamics of accession to the European Union of some countries that are now members of this integration, as well as with the process of Serbia's membership, since it is considered that this process is the key determinant of the institutional conditions for our country. The third part deals with the treatment of public finances in the Constitutions of the selected EU Member States.

1. INTRODUCTION

The Republic of Serbia is in the process of implementing comprehensive reforms in almost all relevant areas. Institutional reforms are one of the most important segments along the way. This is because they determine the quality of management. The following dimensions are at stake: participation and accountability, political stability, government effectiveness, the quality of the regulatory framework, the rule of law and the control of corruption.

The current state and basic directions of institutional activity must focus on these six issues, since this is how the development results of our society and economy are significantly determined. In this regard, at least a few important aspects that are primarily related to constitutional presumptions, our membership in the European Union and the coverage of economy and public finances in the documents of selected EU member states should be considered.

2. INSTITUTIONAL FRAMEWORKS OF THE ECONOMY AND PUBLIC FINANCE IN SERBIA

The institutional and legal prerequisites of each state are defined by its highest legal act, that is, the Constitution, which establishes the principles and regulates the basic political, economic and social relations in the country, the obligations, rights and freedoms of citizens, and especially the basic organization of the state and the decisions-making process in its highest organs. Serbia adopted its first Constitution on 15th February 1835. With this first (so-called Sretenje Constitution) constitution, the tracing of the road of the state of Serbia began. After numerous side-tracks, it finally reached its last, seventh constitution, adopted via referendum on 28th and 29th October 2006. As a principality it had 3 constitutions (1835, 1838, 1869), as much as it did as a kingdom (1888, 1901, 1903), and one as a republic (2006). From 1918 to 2006, the constitutional development of Serbia was inseparable from the history of the constitutionality of the Yugoslav state, which changed its name several times (Kingdom of Serbs, Croats and Slovenes, Kingdom of Yugoslavia, Democratic Federative Yugoslavia, Federal People's Republic of Yugoslavia, Socialist Federal Republic of Yugoslavia, Federal Republic of Yugoslavia, State Union of Serbia and Montenegro). However, the very first constitution of Serbia (1835) proclaimed that the property of every Serb was "in any way inviolable ...", while its most advanced constitution (1888) stated that the property was "inviolable no matter what its nature is."

In March 2007, the European Commission for Democratization through Law (better known as the Venice Commission) adopted the Opinion on the Serbian Constitution and assessed that our new constitution met European standards in many respects, but that there were still provisions that were not in accordance with them. As a positive element, this commission particularly emphasizes the possibility of functioning of the government parliamentary system and human and minority rights and freedoms, while regarding the judiciary and the courts, it is necessary to amend the relevant constitutional provisions since there is a possibility of party interference (and even control) in these important areas of social regulation. The Venice Commission is also skeptical of the rules on territorial organization, as it regards them as complicated and vague but not irreparable.

The third part of the Constitution of the Republic of Serbia deals with the economic organization and public finances of our country. Our economic regulation rests on a market economy, an open and free market, the freedom of entrepreneurship, the independence of economic operators and the equality of private ownership and other property forms. The economic structure of Serbia starts from the uniqueness of the economic space with the single market of goods, la-

bor, capital and services and implies harmonization of the influence of the market economy on the social and economic position of employees through social dialogue between trade unions and employers. Some restrictions on entrepreneurial freedoms can only occur in the case of threats to human health, environment, natural resources and security. The rights acquired by investing capital cannot be diminished, nor can free competition be restricted by creating a monopoly position or a dominant position, while foreigners are subject to national treatment, i.e. they are on a par with the domestic market. Foreigners can own real estate, have the right to concessions on natural resources and goods of general interest.

The existing social property is transformed into private ownership, while the co-operative and public ownership are guaranteed. Public property is defined as state ownership, property of an autonomous province and property of a local government unit. State property includes natural resources, goods of general interest and resources used by state bodies. Legal and natural persons are allowed to acquire individual rights to certain goods in general use, while natural resources are used under appropriate legal conditions. The use and disposal of private agricultural, forestry and urban construction land is free, unless there is a danger of harming the environment or endangering the rights and legal interests of others. Natural rarities and scientific, cultural and historical heritage are of general interest and the Republic, autonomous provinces and local self-government units have a special responsibility for their conservation. The constitutional foundations of Serbia's economic structure also provide the protection of consumers' health, safety and privacy. In particular, dishonest market transactions are prohibited.

Financing of state competencies is realized through taxes and other public revenues. The economic power of the taxpayer is a criterion for paying taxes and other duties. All revenues and expenditures financed by state competencies are presented in the republic, provincial and local budgets. *State Audit Institution* (DRI) controls the budget execution at all levels. In addition, it gives an opinion on the draft budget statement for consideration by the National Assembly of Serbia. The Republic, autonomous provincial and local self-government units may be indebted, if necessary for the effective conduct of their competences. The harmonization of development, even sustainable regional development, is a competence for the Republic. The National Bank of Serbia, as the central bank of our country, is independent in the performance of its functions. The highest state body of audit of public funds in our country is the State Audit Institution, which is independent in its activities.

The no-conflict-of-interest clause stipulates that no one may perform public or state functions that conflict with his or her other competences, affairs and private interests.

One of the fundamental transitional laws in Serbia was the Privatization Law of 2001. Its main feature is basing privatization on the sales method. Namely, 70% of the social (or state) capital of the company is sold and the rest is distributed free of charge to employees and/or all citizens. The shares of socially-owned (or state-owned) enterprises are sold through an auction (public bidding) or through tenders (competitive bidding). The tendency is to reach strategic investors in this way, who will own a controlling stake and have the interest and ability to control the management and ensure good corporate governance. By the beginning of June 2013, 2,364 companies were privatized, from which it could be expected that the privatization was mostly completed. However, more than a quarter of privatization contracts were broken, and a process of reviewing the privatization of 24 large companies (which the EU also insists on) was conducted. At the same time, great efforts have been made to complete the restructuring process in 179 companies. From the aforementioned, it follows that the current privatization process has not been in line with the needs of the efficient conduct of overall transition processes. It should be borne in mind that successful privatization is, as a rule, the mainstay of transition.

In mid-2014, the list of non-privatized companies included 161 restructuring companies and 423 firms. Expenditures for publicly owned enterprises, local and national, excluding the Agency listed companies, were approximately $750 million annually. The existing list of privatized companies is characterized by their significantly worse characteristics than in 2001, when the implementation of the previous law began. The analysis of privatized entities included in the list of the Privatization Agency showed that the models and methods of privatization applied in the previous period (according to the previous Law and by-laws) were outdated and inapplicable. Therefore, it was necessary to pass a new privatization law, which was adopted in mid-2014.[1]

The new Privatization Law makes a clear distinction between companies that can find a future owner and continue their business and those that cannot be sold through privatization and that will be able to return their resources to cash flows through bankruptcy. In this way, privatization occurs as a change of ownership of the capital and property of legal entities operating with social and public capital. Models of privatization are: capital sales, asset sales, transfer of capital without compensation and strategic partnership. The method of selling capital and prop-

[1] See more: Albaneze, Ž., (2014).

erty is public bidding. Methods of privatization through the transfer of capital without compensation include transfers to employees and transfers to strategic investors. The method of privatization through strategic partnership refers to public bidding. In the process of privatization, a combination of multiple privatization methods and models can be applied in order to implement them more effectively. In fact, the new privatization law set a deadline for completion of the privatization of social capital which was the end of 2015. The idea of this privatization law is to apply the established methods, models and measures only to companies with sustainable business. In this regard, another business sustainability assessment is being conducted, which, with information and a letter of intent from potential investors, will be the basis for deciding on a model, method and measure for companies with sustainable operations. For companies that have been assessed as unsustainable, it is foreseen that a bankruptcy petition can be filed to resolve their status as soon as possible.

Small and Medium-Sized Enterprises and Entrepreneurs (SMEs) in Serbia operate in a business environment that is in the development phase and is constantly recording progress in the field of regulation and business conditions in the country. One step along the way were the new issues passed by the Companies Act of 2012 (also held in the new Companies Act[2]), which ensured the improvement of the business environment in the Republic of Serbia: the reorganization of management bodies and the establishment of a unicameral or bicameral management system, which was prescribed to reduce the financial contribution for the establishment of a limited liability company (to 100 RSD). In order to continue further development and improvement, the following laws were also enacted: the Law on Amendments to the Bankruptcy Law, the Law on Amendments to the Labor Law, the Law on Privatization, the Law on Amendments to the Planning and Construction Act.

Within the framework of establishing a legal framework that encourages the development of MESP, the activities of "Comprehensive Regulatory Reform" are foreseen and implemented, but not fully. Progress has been also made on the implementation of the Regulatory Impact Analysis. A number of existing laws have been amended and new laws have been adopted to improve the business environment, such as: the Law on Deadlines for Settlement of Financial Liabilities in Commercial Transactions, the Law on Audit, the Law on Accounting, the Law on Factoring, and the Law on Amendments to the Law on Tax Procedure and Tax Administration[3].

[2] The Law on Enterprises {Zakon o privrednim društvima ("Sl. Glasnik RS", бр. 36/2011, 99/2011, 83/2014; "Sl. Glasnik RS", бр. 5/2015, 44/2018, 95/2018)}.

[3] Vlada Republike Srbije (2015), p. 8.

Free pricing of goods and services with the direct price control of strategic products and foreign trade liberalization is a confirmation of our country's market orientation. Foreign trade is quite liberalized, and exports and imports of goods and services are largely free. The regime of export-import contingents and licenses was abolished, as well as a differentiated system of customs protection, whose main task was to eliminate or mitigate price disparities. Our foreign trade system enables us to operate in free customs zones, similar to the European free zones. The area of foreign trade and foreign exchange is regulated by the Law on Foreign Currency Trade, the Law on Foreign Credits, the Law on Foreign Trade, the Customs Law, the Law on Customs Tariff, the Law on Free Zones, the Law on Tax system and the Law on Standardization.

By reducing the average tax burden and distributing tax liabilities more evenly, taxpayer coverage is widening, contributing to a real increase in public revenue and reducing the so-called tax burden, putting the gray economy into more bearable frames. A sustainable non-inflation funded budget deficit is recorded. The second phase of the reform of the public revenue system has begun, as well as changes to the budgetary procedure, taxation and tax administration procedures, which should ensure more efficient collection and rational use of public revenues. The Law on Value Added Tax and the introduction of a tax register were expected to be and generally are an effective counterbalance to illegal business.

The functioning of the financial market is institutionally regulated by determining the terms and the manner of issuing securities and their trading on stock exchanges. Secondary capital markets are traded mainly by banks, while a smaller number of companies market their shares. The money market is there to conduct short-term cash transactions.

Appropriate **antitrust laws** have also come into force, which comprehensively regulate the rules of antitrust behavior, thus enabling the application of a constitutional principle that prohibits all acts and actions which create or promote a monopoly position, i.e. restrict the market in any way.

The business operations of foreign persons in the Republic of Serbia are regulated, first of all, by the Law on Foreign Investments, the Law on Companies and the Law on Concessions. These legal regulations are very much in line with European standards and enable foreigners to carry out various business operations. Foreigners can set up their own businesses or special-purpose businesses, buy local businesses, invest with local entities in joint ventures, buy domestic companies' shares, convert receivables and investments into a permanent domestic investment businesses, use concessions and BOT[4] (build, manage, use

[4] English abrreviation (BOT – *build, operate and transfer)*

and transfer facilities, plants or facilities) arrangements, may establish branches and representative offices, banks, property and personal insurance organizations, audit firms, as well as establish companies in free zones[5].

Serbia is working on creating a supportive institutional environment for foreign investment. In fact, foreign investors are treated equally in business, provided that there is free transfer of invested capital and profits, tax incentives, professional workforce, and access to banks, stock exchanges, securities business, free zones, etc.[6] International agreements on the prohibition of double taxation, which our country has signed with a number of developed and other countries, are particularly important for attracting foreign capital from private sources.

In the case of Serbia, there is an effort to align the regulatory-political framework with the European Union[7] as much as possible. In terms of legal solutions, Serbia has made some efforts in the previous period: the Draft Law on Amendments to the Law on Information Security has been done, amendments to the Law on Data Confidentiality and the Law on Personal Data Protection, as well as amendments to the Criminal Code and Criminal Procedures are planned. The Law on Critical Infrastructure was adopted, and it is indirectly important for the implementation of other laws in the field. **Information Security Law** is the umbrella law governing this area and defining risk protection measures, liability of legal entities and competent authorities. This law stipulates that operators of information and communication systems of particular importance must adopt an act that would provide clear safeguards, control over the information and communication system and the appointment of people to perform these tasks. In order to comply with EU regulations, it is also prescribed to establish a National Center for Security Risk Prevention (National CERT), as well as other similar centers

[5] For more detailed legal regulations see the following address: https://www.slglasnik.com/правна-библиотека/едиција-закони-и-прописи (accessed: November 2019)

[6] Foreign investors may have gained a somewhat privileged status: Foreign investors have so far received EUR 443 million in subsidies, an average of EUR 6,795 per job created. Considering that a quarter of investments are subsidies, the question remains what the Republic of Serbia receives from this. In the period from 2006 to 2016, EUR 501.8 million were spent from the budget on incentives, 90% of which were received by foreigners. In addition, 314 incentive contracts were signed - 149 with domestic and 165 with foreign investors. Most contracts were terminated with domestic companies (83), and 16 contracts were terminated with foreign companies. Most often incentives are directed towards the products of low complexity, low added value and with high involvement of manual labor of low skilled workers. Therefore, there is no significant effect of the spillover of value and the involvement of local suppliers in the production chain. Out of 188 subsidized projects of manufacturing industry, only 4 were related to the field of high technology. See more in: Filipović M., Nikolić M. (2017), p. 161-162.

[7] See more at: Evropska komisija (2019): http://www.mei.gov.rs/upload/documents/eu_dokumenta/godisnji_izvestaji_ek_o_napretku/20190529-serbia-report_SR_-_REVIDIRANO.pdf

of the republic authorities and enterprises. This Law also requires the creation of the Body for Coordination of Information Security Affairs, with the option of creating expert subgroups that would also include representatives of other public bodies, businesses, academia and the community.

The whole process of harmonization should be aimed at eliminating all the inconsistencies and shortcomings in the legal regulation of cybersecurity, as well as truly understanding the benefits of fully aligning with the existing principles, standards and practices, primarily within the European Union. This first implies harmonization with the EU **Directive on Attacks on Information Systems**, which was also taken into account in the latest already mentioned Government strategic documents. The legal solutions prescribed by the **Network and Information Security Directive (*NIS*)** and the **General Data Protection Regulation (*GDPR*) also need to be considered.** The second document is of particular importance as it applies to all personal data on persons residing in the EU, regardless of the place of business. **Data Protection Act of Personalities** fully complies with this regulation, but there are some vague provisions and mechanisms that do not exist in the legal system of Serbia, and thus its applicability is now in doubt.

3. EU MEMBERSHIP AS A DETERMINANT OF INSTITUTIONAL CONDITIONS IN SERBIA

Given that Serbia's strategic goal is the EU membership, the institutional conditions for the development of Serbia are largely determined by the standards and legal framework of the Union. In doing so, it should be borne in mind that the experience of the EU Member States to date has shown that this process has been (or is) slow, as can be seen in the following table.

Table 1. EU accession process of individual countries

Country	Start of SAA negotiations	Membership application submitted	ES awarded candidate status	ES approves date to start negotiations	Start of membership negotiations	EU accession
Turkey	1959 (EEC)	14. 4. 1987	12. 12. 1999	17. 12. 2004	03. 10. 2005	/
Iceland	1990	16. 7. 2009	19. 6. 2010	26. 7. 2010.	27. 7. 2010.	Gave up in 2013
Slovakia	1990	27. 6. 1995	12. 12. 1997	10. 12. 1999	15. 2. 2000	1. 5.2004
Czech R.	1990	17. 1.1996	12. 12. 1997	12. 12. 1997	31. 3. 1998	1.5.2004
Bulgaria	1990	14.12.1995	12.12.1997	10.12.1999	15.2.2000	1.1.2007
Finland	1990	18. 3. 1992	21.12.1992	21.12.1992	01.2.1993	1.1.1995
Macedonia	2000	22 .3. 2004	17.12.1995	-	-	-

Country	Start of SAA negotiations	Membership application submitted	ES awarded candidate status	ES approves date to start negotiations	Start of membership negotiations	EU accession
Croatia	2000	21. 2. 2003	18. 6. 2004	2004–2005	03. 10. 2005	1.7.2013
Albania	2003	28. 4. 2009	-	-	-	-
Montenegro	2005	15.12.2008	17.12.2012	26. 6. 2012.	29. 6. 2012	-
Bosnia and Herzegovina	2005	-	-	-	-	-
Serbia	2005	22.12.2009	1.3.2012	January2014	January 2014	-

Source: Devetaković et all. (2019), p. 234-235.

Serbia has acquired the status of the associate member of the EU by ratification of the Stabilization and Association Agreement by all member states. The text of the Council of Europe Conclusion (Article 19) reads: "It has been decided to open accession negotiations with Serbia. The first international conference will be held no later than January 2014. Prior to that, the Council of Ministers will adopt a negotiating framework, as confirmed by the Council of Europe at its regular enlargement session. The Brussels Agreement, reached between representatives of the Government of the Republic of Serbia and representatives of Kosovo's provisional authorities, with the mediation of authorized representatives of the European Union. EU negotiations with Serbia began on 23rd January 2014, and our country's legal regulation is in line with the European chapter-by-chapter regulations.

Table 2. Chronological overview of the opening of negotiating chapters between Serbia and the EU

DATE	CHAPTERS
14.12.2015	Second Intergovernmental Conference between Serbia and the EU: Chapter 32 on financial supervision and Chapter 35 on the normalization of Belgrade-Priština relations.
18.07.2016	Third Intergovernmental Conference between Serbia and the EU: Chapter 23 - Justice and Fundamental Rights and Chapter 24 - Justice, Freedom and Security.
13.12.2016	The decision on opening negotiation chapters 5 and 25 was taken at the Fourth Intergovernmental Conference in Brussels. Serbia's negotiating positions for Chapter 5 - Public Procurement and Chapter 25 - Science and Research were presented at the conference.
27.02.2017	At the Fifth Intergovernmental Conference in Brussels it was decided to open negotiation chapters 20 and 26. The conference presented Serbia's negotiating positions for Chapter 20 - Entrepreneurship and Industrial Policy and Chapter 26 - Education and Culture.
20.06.2017	At the Sixth Intergovernmental Conference in Luxembourg it was decided to open negotiation chapters 7 and 29. The conference presented Serbia's negotiating positions for Chapter 7 - Intellectual Property Law and Chapter 29 - Customs Union.

DATE	CHAPTERS
11.12.2017	At the Seventh Intergovernmental Conference in Brussels it was decided to open negotiation chapters 6 and 30. The conference presented Serbia's negotiating positions for Chapter 6 - Company Law and Chapter 30 - Foreign Economic Relations.
25.06.2018	At the Eighth Intergovernmental Conference in Luxembourg it was decided to open negotiation chapters 13 and 33. The conference presented Serbia's negotiating positions for Chapter 13 - Fisheries and Chapter 33 - Financial and Budgetary Issues.
10.12.2018	At the Ninth Intergovernmental Conference in Brussels it was decided to open negotiation chapters 17 and 18. The conference presented Serbia's negotiating positions for Chapter 17 - Economic and Monetary Policy and Chapter 18 - Statistics.
27.06.2019	At the Tenth Intergovernmental Conference in Brussels, a decision was taken to open negotiation chapter 9. The conference presented Serbia's negotiating position for Chapter 9 - Financial Services .

Source: http://www.mei.gov.rs/srl/srbija-i-eu/istorijat-odnosa-srbije-i-eu/

It is interesting that already at the Second Intergovernmental Conference between Serbia and the EU, held on 14th December 2015, negotiation chapter 35 was opened concerning the status of our province of Kosovo and Metohija. One should not lose sight of the fact that Kosovo * is today a potential candidate for the EU membership, since negotiations were opened in 2013. The Kosovo Stabilization and Association Agreement (SAA) * with the EU, as the first formal step towards eventual membership, was initiated in July 2014, signed in October 2015, and its implementation began in April 2016. However, the unresolved issue of Kosovo and Metohija is a key obstacle to achieving the goals of political integration and socio-economic development of our country[8].

Table 2 also shows that the process of opening individual chapters in the negotiations with Serbia is rather slow. In addition, the current situation in the European Union - the process of reforming and restructuring it (debates on two-speed Europe, multi-speed Europe, etc.), the issue of further EU enlargement and treatment of the Western Balkans, as well as Brexit, is not without significance.

4. TREATMENT OF PUBLIC FINANCES IN THE CONSTITUTIONS OF INDIVIDUAL MEMBER STATES OF THE EUROPEAN UNION

Although the survey covers nine EU Member States, among which there is a great similarity (by size, development, geographical location, political system,

[8] World Bank (2017).

etc.) the treatment of public finances in the constitution, as the highest legal act, differs significantly[9].

In four of the nine observed countries (France, Croatia, Bulgaria and the Czech Republic), public finances are not even mentioned as such in the constitutions of these countries. Only some of the common elements in other fields are mentioned, or more commonly, their precise definition is left to acts of lesser legal force.

Unlike these four countries, public finances are explicitly mentioned in their constitutions in other countries, but the scope and the content are different.

In Germany (Basic Law for the Federal Republic of Germany), public finances have received considerable attention (the most comprehensive of all countries observed). Within the area called finance, attention was paid to the following issues: expenditure allocation, financial system and accountability, financial assistance with investment, distribution of powers with respect to tax laws, distribution of tax and other fiscal revenues, regulation of monopolies, federal grants for local mass transportation, provinces' participation in the distribution of motor vehicle taxes, financial settlement between provinces and additional assistance to provinces, federation and provincial financial administration - financial courts, management of the budget at the level of the federation and the provinces, emergency budget, federal budget, temporary budget management, extra-budgetary expenditures, expenditure increase, report submission, and control and debt limits. The German constitution also regulates the status of the Federal Court of Auditors (Control), one of its primary tasks being to control the soundness and efficiency of the use of public finances.

In the Romanian constitution, public finance considerations are given together with the economy to look at (the area is called economics and public finance). Within this area, besides considering purely economic issues (characteristics and desirable characteristics of the economy, issues related to property and its management), provisions are also laid down to determine the financial system more closely (formation, administration, use and control of financial resources of the state, territorial-administrative units and public institutions), the national currency is prescribed, the issues related to the national budget are covered (national public budget consisting of the state budget, the state budget of social security and budgets of local self-governments, cities and regions), the laws that more closely regulate issues related to budgeting are specified (the Law on the State Budget and the Law on the State Social Security) and the types of public revenues (taxes, duties, local taxes and other public revenues) are determined

[9] See more in the paper: Rikalović, G., Molnar, D., Nikolić, M. (2015).

more closely. It also prescribes the work of the Court of Auditors, which should oversee the formation, organization and the use of financial resources of the state and the public sector, as well as the work of the Economic and Social Council as an advisory body to parliament and government in specific areas.

In the Hungarian constitution, the area of public finances has been further elaborated. Within the area of public finances, the issues related to the adoption and implementation of the central budget are covered, the conditions related to the Law on the Central Budget are specified, stating that the national debt must not exceed half of GDP, measures for reducing public debt depending on its share of GDP are covered, as well as the conditions under which it can derogate from this rule (e.g. mitigation of the effects of extraordinary circumstances, or, in the event of a lasting and significant national economic recession, to the extent necessary to restore the balance of the national economy). It also prescribes in more detail the jurisdiction and mechanisms of action of the Constitutional Court in relation to the adoption and implementation of the central budget, the collection of central taxes, fees and contributions, customs and other regional taxes, etc. It then prescribes the type and manner of disposal of property of the state and local self-governments (national goods), ways of its disposing and other related issues, as well as the management of public funds (public funds and other national funds of public interest). This part of the constitution also gives details of the work of the National Bank of Hungary with related issues. It also prescribes the work of the State Audit Institution as a body of the National Assembly in charge of financial and economic control. The State Audit Institution audits the implementation of the central budget, the management of public finances, the use of public finances and the management of national funds, as well as the audit in accordance with the criteria of legality, expediency and efficiency.

In the Republic of Slovakia, issues related to public finances are given in the section with closer definition of the economy. In this sense, the basic determinants of the economy are given, but it also defines more closely the position of the National Bank of Slovakia as well as the state budget. By elaborating these areas (budget revenues, rules of budget economy, as well as the relationship between the state budget and the budget of territorial units) it refers to the relevant laws.

In the Polish constitution, public finances occupy a significant place. Financial resources (collection and storage) for public purposes, acquisition, disposal and encumbrance of property, shares or units, issues of securities given by the State Treasury, the National Bank of Poland or other legal entities are defined Then there are issues related to guarantees and financial guarantees given by the state and a limit for lending, whereas guarantees and financial guarantees are pre-

scribed so that national public debt does not exceed three-fifths of the value of annual GDP.

The Constitution also specifies the manner in which taxes are imposed, as well as other public levies, the specifications of those subject to tax and the rates of taxation, as well as the principles for tax relief and remission, together with the categories of taxpayers exempt from taxation. The work of the State Treasury is also prescribed. Frameworks for the adoption and implementation of the state budget and related issues are also defined, as well as the competence and role of the Council of Ministers (the right to propose budget laws, the transitional budget, amendments to the budget, the public debt contracting statute, and the statute on giving financial guarantees from the state). Also, the Constitution details the role, functioning and competence of the Central Bank - the National Bank of Poland, as well as the Monetary Policy Council, which formulates annual monetary policy goals.

5. CONCLUSION

After a detailed analysis of the constitutional position of economy and public finances in nine EU member states and in our country, the basic directions of activities that need to be taken in the announced changes to the Constitution of the Republic of Serbia can be seen as:

- The part of the Constitution that regulates our public finances should include a binding provision relating to the permissible degree of total public debt (both external and internal), expressed as an appropriate percentage of GDP;
- Bearing in mind the importance of the budget deficit for the stability of the country and its structural reforms, it is necessary to introduce a special norm that will prescribe the maximum share of the budget deficit in GDP in the Constitution;
- There should be a binding provision on the existence of an Audit Court which should exercise control over the formation, organization and the use of financial resources of the state and the public sector. The introduction of this new provision is more significant, as there is already a European supranational Court of Auditors, and our country has a strategic commitment to join the EU as soon as possible.

Primarily entrepreneurship, but also small and medium-sized enterprises, are the most significant drivers of innovation initiative, technological progress and the development and dissemination of knowledge. Due to their characteristics, pri-

marily innovation and abundance, MESP is a key driver of development of the entire Serbian economy. Another proof of the exceptional importance of SMEs and the importance of fostering their development is the fact that one of the priorities of the Europe 2020 Strategy, the European Union Development Strategy, the Single Market Regulation of the European Commission and the Small Business Regulation is precisely the growth and financing of SMEs and the emphasis is on their dependence on the economic success of Europe. Although the improvement is visible, it is necessary to continue work towards reducing the barriers and costs of doing business. It is necessary to establish transparency of regulatory activities, involve all levels of government in reforms and improve the overall change process, in terms of adopting new regulations and repealing those that adversely affect the business climate and businesses in the country. Adequate administrative framework also ensures enhanced competitiveness of enterprises, volume of investments and overall development of the Serbian economy.

A number of European Commission findings in its 2019 progress report on Serbia related to the **regulation of the electronic communications market.** According to this document, legal framework in Serbia is not aligned with the EU regulatory framework from 2009 in the field of electronic communications. The operational and financial autonomy of the regulatory body RATEL is not fully secured, and there is room for improving the operator's access to telecommunications infrastructure (pipes, antennas, fiber optic cables and land telephone infrastructure).

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МОГУЋИ ПРАВЦИ ПРОМЈЕНА КЉУЧНИХ СЕГМЕНАТА РЕГУЛАТОРНОГ ОКВИРА ЕКОНОМИЈЕ У СРБИЈИ

1 Гојко М. Рикаловић, редовни професор, Економски факултет, Универзитет у Београду
2 Дејан С. Молнар, ванредни професор, Економски факултет, Универзитет у Београду

САЖЕТАК

У раду се, најприје, анализира институционални оквир привреде и јавних финансија у Србији, са посебним осврtом на третман сектора малих и средњих предузећа и предузетника, затим страних инвеститора, те дигиталне (информатичке) инфраструктуре. Посебан дио рада се бави динамиком придруживања Европској унији појединих земаља које су данас чланице ове интеграције, као и процесом учлањења Србије, будући да ће сматра да је овај процес кључна детерминанта институционалних услова наше земље. У трећем дијелу рада се сагледава третман јавних финансија у уставима изабраних земаља чланица Европске уније.

Кључне ријечи:
устав, регулаторни оквир, економија, јавне финансије, Србија, ЕУ.

MULTI-ATTRIBUTE DECISION-MAKING METHODS– INDIFFERENCE ASSESSMENTS

1 Željko Račić, University of Banja Luka, Faculty of Economics, Banja Luka
2 Saša Damjanac, IAEA-International Atomic Energy Agency, Vienna
3 Katarina Račić, University of Vienna, Vienna
4 Dunja Milić, Vienna University of Economics and Business, Vienna
*Corresponding author E-mail: zeljko.racic@ef.unibl.org
1 ORCID 0000-0001-7383-3431
2 ORCID 0000-0002-7297-6585
3 ORCID 0000-0002-4352-0175
4 ORCID 0000-0002-7077-8542

ARTICLE INFO

Review Article
Received: 05.08.2019.
Revised: 03.11.2019.
Accepted: 17.12.2019.
doi 10.7251/ACE1931089R
UDC 658.8:339.13]:005.96

Keywords: *multi-attribute decision-making methods, indifference methods, additive model, multiplicative model, multiple linear model, weighting.*

JEL Classification: C44.

ABSTRACT

Real situations are based on multiple attributes or criteria. If the assessment problem has multiple dimensions of value, then intuitive judgments can be very difficult. In many situations, the ultimate assessment seems very difficult, especially when the decision maker chooses one of a set of possible options in an unfamiliar environment. This paper analyzes indifference value measurement methods. Indifference value measurement methods rely on studies of indifference (indifference assessments) or comparison of strength of preferences. The values that the decision maker gives to the attributes reflect his preferences, ie. utilities. Utility is only a way to describe preferences. The process of determining (functions) values is only one form of sequential determination of utility.

1. INTRODUCTION

In principle, it is possible to combine the benefits of any single-attribute value measurement method, or any utility measurement method with any weighting procedure and the additive model. All possible combinations of these elements would create a large list of MADM (Multi-Attribute Decision Making Methods) procedures, only a few of which are applied in real situations.

The first combination, SMART (Simple Multi-Attribute Rating Technique), is a procedure of selection of elements that are simple and easy to apply. This com-

bination includes: a single-attribute direct numerical value estimation procedure; weighting procedure (ratio estimation) and the additive model.

The second combination, based on the value measurement theory, emphasizes the use of indifference assessments. This combination includes: difference value measurement and strength of preference assessment for constructing single-attribute value functions; weighting (cross-attribute strength of preference) and the additive model.

The third combination places emphasis on the fact that most of the available options are risky and that procedures should be appropriate for the construction of value functions. A multi-attribute utility theory, ie. a multi-attribute version of the Subjective Equivalent Utility (SEU) includes: variable probabilities or certainty equivalent methods for forming value functions, single-attribute utility; variable probability methods for weight construction and a multiplicative model.

In this paper, we analyze indifference value measurement methods.

2. PREVIOUS RESEARCH

Although the theory and science of decision-making under certainty conditions have existed for a long time, there has been no critical review of some of its parts, in particular, of indifference methods. Few authors have addressed this issue. There are several critical considerations for weighting methods that are integral to the additive, multiplicative, and multilinear forms of the indifference model.

Some authors (Miljković et al., 2017) introduce into the analysis a new weighted sum model that allows for a high degree of interference with the personal preferences of decision makers. The method consists of two main parts, normalization and weighting, which corresponds to our additive model. The advantage of this method is that it is easier to use qualitative and quantitative attributes and it has a wide range of applications.

Multi-criteria methods, which are based on the additive form of the model, allow a kind of "tradeoff" between attributes (criteria). When it comes to the tradeoff between attributes, the small value by the most important attribute can be recovered in the total value with the good values of the less important attributes (Žižović et al., 2016a). New methods of ranking of options have been defined assuming that the first attribute (criterion) is dominant (Žižović, 2018). Attribute value estimates are between 0 and 1. The assumption is that if the value of an

option in the dominant attribute (criterion) is 0, then its estimate is equal to 0, regardless of the values of the estimates in other attributes (criteria).

On the other hand, such a situation cannot occur by applying multi-criteria analysis methods based on the multiplicative forms of models. If an option does not satisfy the absolutely important attribute, then its total aggregation value is zero. It follows that ranking of options, from the set of options obtained by the multiplicative method, remains the same relative to the hypothetical option, even if the starting set of options is expanded by a new set of options. Therefore, neither option can be favored.

Some authors (Zardari et al., 2015) provide a broader overview of the weighting methods used in various Multi-Criteria Attribute Decision Making methods (MCDMs). The authors argue that the result of the decision-making process depends mostly on the objectivity of weighting, that is,on determining weights for each attribute (criterion).

3. INDIFFERENCE VALUE ESTIMATE METHODS

We will analyze three classes of indifference measurement methods, MIMV. These methods, somewhat more complex than SMART, differ not only in the way the value (utility) of individual attributes is determined, but also in the procedure of "aggregating" them.

The first of these is the difference value measurement method, which is based on the assumption of precisely measurable utility of attributes (on an *interval scale*), which are weighted and then the selection criterion is obtained using one of three models (additive, multiplicative or multilinear). The difference measurement method only estimates the strength of preferences (increase in utility). It is no different from a variable-weight SMART, except that it uses multiplicative and multilinear rules if additives are missing. This method does not allow for accurate mutual comparisons of individual values; in this case it is possible to compare only the differences, the intervals between the individual values. Therefore, it is about *interval scales* of preference measurement; equal differences in numbers on the interval scale represent equal differences in the observed property.

Another class of indifference methods for measuring values is called conjoint measurement theory. Unlike difference value measurement, which requires an estimate of the strength of preferences, conjoint measurement requires only *ordinal preferences*, and indifference estimates between multi-attribute objects. This method is based on *ordinarily measurable* utility, and the criterion value is calculated based on the additive and multiplicative model.

The third class of value measurement methods is based on a simple weak order model; it introduces the most rigorous assumption of cardinal measurability not only by individual attributes but also between attributes. The assumption here is that the decision maker is able to make precise comparisons ("tradeoffs") between options, in which the shortages will be compared by some attribute and compensated with the advantages of others.

3.1. Difference value measurement

MADM difference value measurements[1] are constructed on the notion of the relative value of options or the strength of the decision maker's preferences for the options considered. Since it is usually difficult to express such value estimates when it comes to multi-attribute options, difference measurement is based on a number of independence assumptions that allow the task of multi-attribute option estimate to be divided into single-attribute estimates.

Dyer and Sarin (1979) proposed two models of difference value measurement for the MADM case: additive and multiplicative. In addition to these two models, a multilinear difference measurement model is used.

3.1.1. Additive difference value measurement model

The most common form of MADM used to solve real problems is the additive form:

$$v(X) = \sum_{i=1}^{n} w_i v_i(x_i), \tag{1}$$

where:

X - multi-attribute object of estimate, option,

x_i - its realization in i attribute,

v_i - single-attribute marginal function of the value, utility[2] of an individual attribute, and

w_i - weight of i attribute.

[1] Dyer, J., Sarin, R. (1989). Measurable multi-attribute value functions, Operational Research, No. 27., p. 11.

[2] The value determination process is only one form of sequential value determination. When analyzing indifference methods it should be emphasized that these terms are synonymous.

As with the measurement of single-attribute differences, the assumption is that the additive, that is, the aggregate form "v" expresses the rank of preferences between options and the difference between individual values; these are *interval scales* of measurability. The final rankings (final values) represent the interval scale. The same differences between successive numerical values correspond to identical changes in the intensity of qualitative attributes.

The additive form further indicates that "v_i" can be constructed ignoring other attributes; that is, "v_i" represents a marginal value (utility) function defined for an attribute X_i, with other attributes fixed at some arbitrary level. Formally, the additive form is a strong assumption of independence called *additive difference independence* (ADI).

ADI requires that strength of preferences between two options, X_1 and X_2, which have identical fixed levels in some attributes, do not change when these attributes are fixed at another level. It is about the strength of preferences between two options of two attributes, with other attributes being constant. Some authors, such as Dyer and Sarin, simply call ADI the *difference independence*.

The actual construction of "v", "v_i" and "w_i" can be simple if the ADI assumption holds. Some single-attribute value functions remain unchanged with changes in the levels of other attributes. If, on the other hand, the decision maker considers this task of making such single-attribute estimates difficult or impossible without considering other attributes, ADI may be impaired.

3.1.1.1. Single-attribute value, utility functions

Value, utility functions are constructed with the help of: difference standard sequence method and bisection procedures. Comparisons of several different pairs of attributes were made using these two methods. The decision maker must be aware that the construction of value (utility) functions "v_i", in principle, via i attribute keeps other attribute levels constant.

Normally, we can construct the order of differences by placing equally spaced x_i, $x_i^{/}$, $x_i^{//}$, and so on, with the trait

$$\begin{aligned}&\left[(x_{1*},x_{2*},\ldots,x_i,\ldots,x_{n*}),(x_{1*},x_{2*},\ldots,x_i^{/},\ldots,x_{n*})\right]\sim\\&\sim\left[(x_{1*},x_{2*},\ldots,x_i^{/},\ldots,x_{n*}),(x_{1*},x_{2*},\ldots,x_i^{//},\ldots,x_{n*})\right]\end{aligned}\tag{2}$$

This complex equation of indifference is verbally translated as follows.

The decision maker prefers x_i over $x_i^{/}$ to the same extent to which he prefers $x_i^{/}$ over $x_i^{//}$, if the values of all other attributes are kept at their worst level.

In practice, the decision maker is unlikely to keep other attributes unchanged in any indifference assessment. This process generates many single-attribute value (utility) functions "v_i". Functional values are arbitrarily assigned to the end values "0" and "1", i.e. $v_i(x_{i*})$=0 and $v_i(x_i^*)=1$.

3.1.1.2. Weighting

Weighting "w_i" is the next step in measuring the value of differences. This is necessary because we have assigned equal endpoints in values (0 and 1) for each attribute.

If we did not determine the attribute weights by "w_i", we would imply that the increase in preference - utility obtained by moving from the worst to the best level in each attribute - was identical for all attributes. It is quite clear that this is not always true.

Let us compare the relative strength of the preferences of two attributes (from x_i^* to x_{i*}, the best versus the worst attribute level). One way to ask this question is to determine whether a decision maker would prefer to change x_i from x_{i*} to x_i^* or x_j from x_{j*} to x_j^*. Suppose all other attributes are constant (x_k, $k \neq i, j,$ constant); for example, at their worst level x_{i*}.

A decision maker evaluates the strength of preference as follows:

$$\left[(x_i^*, x_{j*}), (x_{i*}, x_{j*})\right] \sim \left[(x_{i*}, x_j^*), (x_{i*}, x_{j*})\right]. \tag{3}$$

This complex mathematical sentence can be expressed in words as follows.

Let us consider three options identical to each other with respect to all attributes except for *i* and *j*. It is quite clear that the decision maker prefers the option in which *i* attribute has a level x_i^* to the option in which *i* attribute has a level x_{i*}, keeping *j* attribute constant at the level x_{j*}. The same is true for options that differ in the above described way in *j* attribute, with *i* attribute being constant in x_{i*}

Let us consider now the relative strength of the decision maker's preference for the option described as x_i^* and x_{j*} compared to the option described as x_{i*} and x_{j*}. Is that strength of preference greater than, equal to, or less than the decision maker's strength of preference relative to the option described as x_{i*} and x_j^* compared to the option described as x_{i*} and x_{j*}.

If the decision maker thinks that the increase in utility from x_{i*} to x_i^* is greater than that from x_{j*} to x_j^*, then it follows that the strength of preference on the left side of equation (3) is greater; otherwise, it follows that the strength of preference on the right is higher. If the estimate of (value) difference on the left is higher, the conclusion is that, $w_i > w_j$, as can be seen from the following expression:

$$\left[w_i v_i(x_i^*) + w_j v_j(x_{j*})\right] - \left[w_i v_i(x_{i*}) + w_j v_j(x_{j*})\right] > \left[w_i v_i(x_{i*}) + w_j v_j(x_j^*)\right] - \\ - \left[w_i v_i(x_{i*}) + w_j v_j(x_{j*})\right]. \quad (4)$$

This expression can be simplified, so we have

$$w_i v_i(x_i^*) > w_j v_j(x_j^*) \text{ or } w_i > w_j.$$

To determine how much w_i is larger than w_j, we must reduce x_i^* to some central value $x_i^{/}$, examining the value $x_i^{/}$ of the indifference

$$\left[(x_i^*, x_{j*}), (x_{i*}, x_{j*})\right] \sim \left[(x_{i*}, x_j^*), (x_{i*}, x_{j*})\right]. \quad (4.1)$$

This difference implies $w_i v_i(x_i^{/}) = w_j v_j(x_j^*)$ or $\frac{w_j}{w_i} = v_i(x_i^{/})$.

Repeating this process for all attribute pairs should produce the desired results. This would give redundant information, which would give $\frac{n(n-1)}{2}$ weights, although only $(n-1)$ is needed to solve the entire weight group. However, it would be very difficult to make all $\frac{n(n-1)}{2}$ difference estimates for $n > 4$.

Suppose the analyst wants to construct $(n-1)$indifference equation as those stated earlier, using the attribute with the smallest possible increase in value, utility as a standard; this attribute is easy to spot by ranking the strengths of preferences of particular values. Let the attribute with the smallest possible increase in value be the utility of n attribute.

Solving $(n-1)$ indifference equation is based on reducing the value x in i attribute from x_i^* to $x_i^{/}$; if it were necessary to reduce x_n^* to obtain indifference, n attribute would have a greater possible increase in the value than i attribute.

Therefore, we can make ($n-1$) equation of indifference from the following form $\frac{w_i}{w_n} = v_i(x_i^{/})$. Together with the restriction $\sum_{i=1}^{n} w_i = 1$, we can solve $w_i = \frac{v_i(x_i^{/})}{\sum_{i=1}^{n} v_i(x_i^{/})}$.

It is these weights that go into the equation of the additive form of difference measurement.

3.1.2. Multiplicative difference value measurement model

If we cannot apply the additive model due to the *dependency*, while considering other attributes, in solving multi-atribute value (utility) problems, then a *multiplicative difference value measurement model* is suitable. The multiplicative, later multilinear model, requires some kind of, weaker or stronger, dependency. When working with the multiplicative and multilinear model, it is necessary to separate the interaction parameters from the weight questions. In general, what is interdependence? Interdependence is an objective link between attributes. The multiplicative difference value measurement model takes the form:

$$1 + wv(X) = \prod_{i=1}^{n} \left[1 + ww_i v_i(x_i)\right], \tag{5}$$

where "w" is a mutual influence parameter.

Its extended form shows more; it explains the presence (strength) of *mutual influences*:

$$v(X) = \sum_{i=1}^{n} w_i v_i(x_i) + \sum_{i<j} w w_i w_j v_i(x_i) v_j(x_j) + \sum_{i<j<m} w^2 w_i w_j w_m v_i(x_i) v_j(x_j) v_m(x_m) + \cdots +$$

$$+ w^{n-1} \prod_{i=1}^{n} w_i v_i(x_i). \tag{6}$$

In the previous complex equation, the first term on the right side of the equation is a known additive form of the difference value measurement, the second term refers to the dependence between a pair of attributes, the third term refers to the dependence between three attributes; and so on, down to the last term referring to the interdependence of the entire set of attributes.

Interdependence[3] is obtained when the value of each attribute is multiplied by its weight (weight w_i), this product is multiplied by the mutual influence parameter "w" and then these products are added together.

If the number of terms for mutual influence increases, the value "w", that the product is multiplied by, also increases. Of course, if $w = 0$, this term becomes an additive model. Therefore, we see that "w" can move in the multiplicative difference measurement model, from one to a finite value. If $|w|$ becomes larger, the total mutual influence between all attributes becomes more difficult to calculate. This model makes all the mutual influences dependent on a single parameter and thus the values of the form "A depends a lot on B but much less on C" cannot be properly represented.

The multiplicative form is a kind of dependency we call the *Multiplicative Difference Independency* (MDI). Dyer and Sarin (1979) call them the weak difference dependency. MDI suggests that the effects of changing the value of an attribute pair from one physical measure to another can reduce or extend the value scale of those attributes and move the group elements up or down along the scale. The important feature is that the relative spacing (difference) of elements in the group remains unchanged. It is difficult to provide convincing examples where MDI is maintained and ADI is not maintained.

Speaking about multiplicative difference value measurement, let us consider an example for two attributes. In the multiplicative model, v_i and w_i can be estimated as in the additive model, but since the sum w_i will not be equal to one, n equation must be solved. Likewise, the mutual influence parameter must be specified.

Assuming that all $x_i = x_i^*$ and all v_i are such that $v_{i*} = 0 \ \wedge \ v_i^* = 1$, we notice that

$$1 + w = \prod_{i=1}^{n} (1 + ww_i). \tag{7}$$

In the case of two attributes, equation (7) becomes

$$1 + w = (1 + ww_1)(1 + ww_2), \tag{8}$$

or

$$w = \frac{1 - w_1 - w_2}{w_1 w_2}. \tag{9}$$

[3] Goodwin, P. (2008). Decision Analysis for Management Judgment 3rd Ed, Utah Valley University.

Since $0 \le w_i \le 1$, the formula (9) also shows limits for w:

$$-1 \le w \le \infty.$$

If $w_1 = w_2 = 0$, then $w = \infty$. If $w_1 = w_2 = 1$, then $w = -1$.

Of course, if $w_1 + w_2 = 1$, then $w = 0$, and the condition for applying ADI is satisfied.

3.1.3. Multilinear difference value measurement model

A multilinear difference value measurement model has no limitations in the form of terms of mutual influence and it says:

$$v(X) = \sum_{i=1}^{n} w_i v_i(x_i) + \sum_{i<j} w_{ij} v_i(x_i) v_j(x_j) + \sum_{i<j<m} w_{ijm} v_i(x_i) v_j(x_j) v_m(x_m) + \cdots +$$

$$+ \prod_{i=1}^{n} w_{1\ldots n} v_i(x_i). \qquad (10)$$

where w_{ij}, w_{ijm} are parameters of mutual influence. It is about the influence of the attribute value "j" on the attribute value "i".

The multilinear model permits any combination of terms of mutual influence and requires a weaker assumption of independence: *multilinear difference independence* (MLDI), which requires that multilinear difference independence (MLDI) is maintained for only one attribute, while other attributes are fixed. In other words, the strengths of preference in one attribute are unchanged if the values of other attributes are constant. This allows us to construct a single-attribute value function using difference standard sequence. In order to construct a model (10), we need to estimate the parameters of the mutual influence w_{ij}, w_{ijm}, and so on. In fact, when the number of attributes exceeds four, the number of necessary parameters of mutual influence becomes large and consequently the task of estimation becomes impossible. Even so, a multilinear difference measurement model can sometimes be useful, when some mutual influences are pre-identified.

Building multilinear difference measurement models, as opposed to additive and multiplicative building blocks, is sometimes possible or necessary when the decision maker works with a complex value tree.

Often, some options are independent, but weak mutual influence can occur in the attribute subgroups within one option, where the degree of dependency is determined by particular attribute values. The estimate v_i in a multilinear difference

measurement model exactly follows the procedures applied in the additive and multiplicative model. The estimate of the parameters of the mutual influence w_{ij}, w_{ijm} follows the procedures used in the multiplicative model as well as those that we can be identified as such.

3.2. Conjoint measurement method

Unlike difference measurement, which estimates the strength of preferences, the conjoint measurement method estimates only ordinal preferences and indifference between multi-attribute objects. This method is based on *ordinarily measurable values* (utilities) and the criterion value is calculated on the basis of the additive or multiplicative model. In the conjoint measurement method, we will construct the value functions without questioning the strength of preference among the attributes. The class of value measurement methods, conjoint measurements, includes:

1. additive conjoint measurement model,
2. multiplicative conjoint measurement model.

3.2.1. Additive conjoint measurement model

The process used requires attributes to be additive and independent of each other. Otherwise, the standard order constructed using this procedure would depend on the level of other attributes. The first additive version of the conjoint measurement method is based on the assumption called *joint independence* (JI). This assumption tells us about the independence between attribute subgroups, ie. independence between groups. In simple terms, JI requires that preferences between options that differ only in the attribute subgroup be independent of the level in the remaining attributes.

In its general form, JI requires that preferences in *any* attribute subgroup be independent of fixed levels in the remaining attributes. For example, when choosing between several job offers, our preferences for pay and benefit combinations are likely independent of, say, the size of the city where we work. The second additive version is based on the assumption called *single independence* (SI). This additive version is based on the fact that preferences between options determined on the basis of only *one* attribute do not change with changes in the value of other attributes; these are linear changes in the value. For example, the size of the apartment, its location and its rent can be represented by attributes that are SI. If the size of the apartment is important to us, then individually it does not matter where it is and how much it is priced. The most interesting cases of violation of

the JI condition are those in which the SI condition is satisfied. These violations are usually well-concealed and difficult to identify.

The process used to construct an additive function of the value "*v*" within the conjoint measurement method is called a *dual standard sequence* (Krantz, 1971), or *saw tooth* (Fishburn, 1967), that is *lock step* (China&Raifa, 1976). Here, we will briefly outline the basic idea behind this procedure. The process can be best represented in two dimensions: these are, say, two-attribute options given in a form (x_1, x_2).

We first arbitrarily choose a *zero point* on a scale, usually the worst available (possible) point, or the actual combination of attribute values, label them with (x_{1*}, x_{2*}), and suppose that the value function for the worst combination of attribute values equals zero, that is, we have that $v(x_{1*}, x_{2*}) = 0$.

Also, let us arbitrarily select the unit of value of the first attribute, mark it with x_1^1. Then we construct the effect of the second attribute, which is the effect x_2^1, which has the same difference in value. In order to guarantee equal differences in value, we assume that any increase in the second attribute equals the standard increase in the first attribute from, for example, x_{1*} to x_1^*; therefore, the standard effect is determined by the following estimates:

$$(x_1^1, x_{2*}) \sim (x_{1*}, x_2^1), \tag{11}$$

$$(x_1^1, x_2^1) \sim (x_{1*}, x_2^2), \tag{12}$$

$$(x_1^1, x_2^2) \sim (x_{1*}, x_2^3), \tag{13}$$

or, in general

$$(x_1^1, x_2^{i-1}) \sim (x_{1*}, x_2^i). \tag{14}$$

Graphically, this procedure can be represented by Figure 1, which shows a derived value function with two attributes.

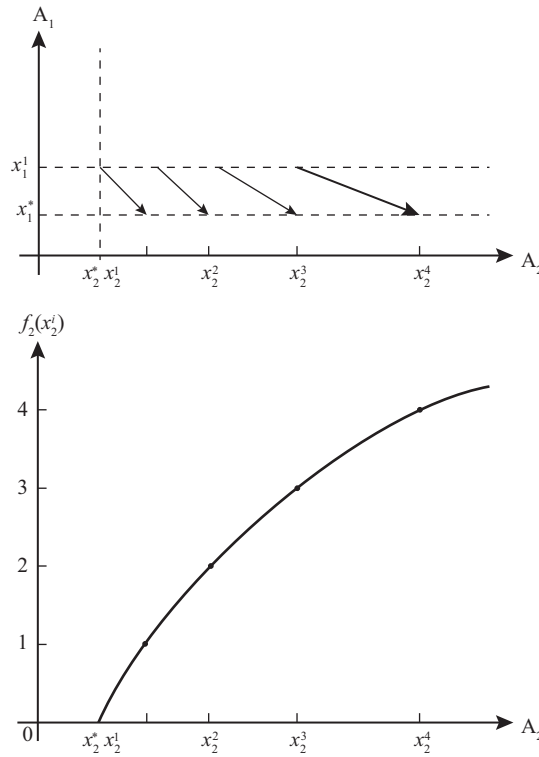

Figure 1. Illustration of a double standard series

3.2.2. Multiplicative conjoint measurement model

The conjoint measurement method is also developed to solve multiplicative model forms. Unlike the multiplicative and multilinear difference measurement model, the multiplicative conjoint measurement models are indeed multiplicative, having zero multipliers and cancellations. In fact, cancellations are necessary in these models. Such cancellation signs can be expressed by a multiplicative conjoint measurement model which has a form

$$f(x) = \prod_{i=1}^{n} f_i(x_i), \tag{15}$$

where levels of some "f_i" can produce neutral amounts (figures).

3.3. Weak order model

All of the methods described above take explicit or implicit assumptions about attribute independence. The model we are considering does not require the assumption of independence, but it does require very complicated modification procedures. This model is called the weak order model.

The weak order model assumes that only the decision maker is able to make consistent tradeoffs between multiple attributes. Tradeoff involves comparing options with at least two attributes; in other words, how much will we give up the value of the attribute "*i*", to increase the value of the attribute "*j*".In practice, the decision maker will not be able to consistently make multi-attribute comparisons for all attributes. The weak order model tries to systematize tradeoffs, that is, to make precise comparisons in which the disadvantages will be compared, compensated with advantages over others; it is ready to "trade", to make concessions to others because of the advantages of certain attributes.

The basic procedure for constructing value functions using the weak order model consists of the following substitution questions. We can make for each resultant multi-attribute value an equal result with certain constant values in all attributes except for *i* attribute. In other words, we find for each option *x* and *y*, having the same attributes, the following:

$$x = (x_1, x_2, ..., \hat{x}_i, ..., x_n) \sim (a_1, a_2, ..., \hat{x}_i^1, ..., a_n), \tag{16}$$

$$y = (y_1, y_2, ..., \hat{y}_i, ..., y_n) \sim (a_1, a_2, ..., \hat{y}_i^1, ..., a_n), \tag{17}$$

for some constant values a_{ij}, where $j \neq i$.

Here, and in what follows in the superscript, for tradeoff values of *i* attribute it means that in *r tradeoff* step this attribute value is changed to, say, $\hat{x}_i^r$.

After *tradeoff*, we determine the order of preference for *i* attribute; so, we construct the order of functions of value (utility) f_i.

The decision maker will prefer "*x*" over "*y*" if and only if

$$f_i(\hat{x}_i^1) \geq f_i(\hat{y}_i^1). \tag{18}$$

We can improve this *tradeoff* process by breaking it down into (n−1) step, as shown in the following example:

$$\begin{aligned} x = (x_1,\ x_2,\ ...,\ \hat{x}_i,\ ...,\ x_n) &\sim (a_1,\ a_2,\ ...,\ \hat{x}_i^1,\ ...,\ a_n) \\ &\sim (a_1,\ a_2,\ ...,\ \hat{x}_i^2,\ ...,\ a_n) \\ &\vdots \qquad\qquad \vdots \qquad\quad \vdots \\ &\sim (a_1,\ a_2,\ ...,\ \hat{x}_i^{n-1},\ ...,\ a_n). \end{aligned} \tag{19}$$

Later we can consistently show the same tradeoff for the option "*y*"; "*x*" would be preferred over "*y*" if and only if

$$f_i(\hat{x}_i^{n-1}) \geq f_i(\hat{y}_i^{n-1}). \tag{20}$$

4. CONCLUSION

The modern way of doing business requires from decision makers to increasingly make important business decisions in the face of constant changes in the environment and situations when exact data cannot be obtained for all the parameters that influence a business decision. On the other hand, wrong decisions can be catastrophic and irreversible, so decision makers need to be able to make low-risk decisions. This is achieved by modern methods using multi-attribute decision-making methods.

Indifference value measurement methods rely on studies of indifference (indifference estimates) or comparison of the strength of preferences. The values that the decision maker gives to the attributes reflect his preferences, that is utilities. Value functions have been calculated based on attributes expressed in units, but are expressed in some units of utility. The process of determining (function) values is only one form of sequential determination of utility. The paper analyzes three classes of indifference value measurement methods. These methods, somewhat more complex than SMART, differ from each other not only in the way the value (utility) of individual attributes is determined, but also in the procedure of "aggregating" them."

Of course, the use of these methods is not sufficient in itself, since the decision maker will always play a decisive role in defining the problem, determining weighting coefficients and evaluating the qualitative attributes.

The paper could not provide answers to all questions in the field of multi-attribute decision-making, but its content and structure will contribute to adequate assessment of the importance and application of indifference estimates in measuring attribute values.

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МЕТОДЕ ВИШЕАТРИБУТИВНОГ ОДЛУЧИВАЊА - ПРОЦЈЕНЕ ИНДИФЕРЕНТНОСТИ

1 Жељко Рачић, Универзитет у Бањој Луци, Економски факултет, Бања Лука
2 Саша Дамјанац, Међународна агенција за атомску енергију, Беч
3 Катарина Рачић, Универзитет у Бечу, Беч
4 Дуња Милић, Универзитет у Бечу, Економски факултет, Беч

САЖЕТАК

Реалне ситуације базирају се на вишеструким атрибутима или критеријумима. Ако проблем процјене има вишеструке димензије вриједности, тада интуитивна просуђивања могу бити веома тешка. У многим ситуацијама крајња процјена изгледа веома тешка, нарочито када доносилац одлуке врши избор једне из скупа могућих опција и то у условима непознатог окружења. У овом раду анализирају се методе индиферентности за мјерење вриједности. Методе индиферентности за мјерење вриједности ослањају се на истраживања индиферентности (индиферентних процјена) или поређења јачине преференција. Вриједности које доносилац одлука даје атрибутима одражавају његове преференције, тј. корисности. Корисност се сматра само начином за описивање преференција. Поступак утврђивања (функција) вриједности је само један вид секвенцијалног утврђивања корисности.

Кључне ријечи:

Методе вишеатрибутивног одлучивања, методе индиферентности, адитивни модел, мултипликативни модел, мултилинеарни модел, пондерисање.

ECONOMIC INEQUALITY AND POVERTY IN EUROPEAN UNION

1 Božana Škorić, University of Banja Luka, Economics faculty
2 Jelena Bjelić, Indirect taxation authority of Bosnia and Herzegovina
3 Marijana Nikolić, The Republic of Srpska Investment- Development bank
4 Luis Chirosa, University of Granada, Economics faculty
*Corresponding author E-mail: bozanaskoric@yahoo.com
1 ORCID ID: 0000-0002-5800-0762
2 ORCID ID: 0000-0001-9412-2006
3 ORCID ID: 0000-0003-2211-7085
4 ORCID ID: 0000-0002-1990-4099

ARTICLE INFO

Original scientific Article
Received: 15.07.2019
Revised: 26.11.2019
Accepted: 13.12.2019
doi 10.7251/ACE1931107S
UDC
005.96(4-672EU):[330.34:339.9

Keywords: *income inequality, poverty, Gini coefficient, risk of poverty, European Union.*

JEL Classification: F01, F15, F16, J11, J64.

ABSTRACT

Excessive accumulation and raising income inequality reflected on the high rates of poverty in the European Union countries. Economic literature has wide research on the link between income inequality and economic growth. However, knowledge about correlation between income inequality and poverty is scare. In this paper, we have proved that poverty is not synonymous for income inequality, but that is a product of income inequality. Income inequality, measured by the Gini coefficient, reflected the movement of the percentage of the population who are at risk of poverty. The coefficient of simple on correlation showed that income inequality affects the growth risk of poverty in the countries of the European Union. Besides poverty, as a consequence of income inequality, other socio-economic problems also appeared: the suppression of economic growth, the rise in crime rate, the decline in the quality of education and health, the political inequality growth. All these problems should warn governments to take economic policy for reducing economic inequality. The European Union, as an area of 28 member states, needs to carefully select economic policy instruments to reduce income inequality and ensure stable ground for economic growth. The differences between the level of development, the index of democracy, income and living standards in observed countries have influenced the difficulty in observing the problem and computing mathematical and statistical connection. Through equalization of incomes, the European Union could solve problems of poverty, social exclusion and democracy (measured by index of democracy).

1. INTRODUCTION

Inequality is a multidimensional process present in society from the very begin. According to the reports on global inequality of the International Monetary Fund (IMF, 2018) income inequality is the greatest challenge of the 21st century and the main cause of the increasing poverty in the European Union. World inequality report for 2018 (Alvaredo, 2018) points to an increasing problem of poverty in the world and income inequality as a cause. Economic inequality represents an inequitable distribution of money, power, authority and rights. The two basic categories of economic inequality are: income inequality and wealth inequality (Piketty, 2015). Some authors cite a collective inequality: inequality in distribution labor (income inequality) and inequality in distribution capital (wealth inequality). In this paper, we will use income inequality as a main type of economic inequality and we will use it as synonym for economic inequality. Today's income inequality is not justified because it has resulted in increasing stagnation and poverty as a growing socio-economic problem (Aristondo, 2018). During the last decades, income inequality has been rising in most of the countries in the world (Galbraith, 2014). Famous British sociologist Peter Townsend uses concept of social divisions and economic inequality to describe the process of increasing concentration of both wealth and poverty. Poverty is a product of inequality of distribution that causes the creation of a subclass of the economic system that refers to only one group of deprivileged individuals with the absence of any power and influence. The fact that the mechanisms of economic inequality lie at the root of every wealth and poverty lies in the frequently quoted saying of Bertolt Brecht: "The poor and rich man met and looked at each other. And the poor said to the rich: If I were not poor, neither would you be rich." The concept of income inequality shows that resources are incorrectly distributed within community as well as globally. Poverty is a concept of an economic class that arises because of the incorrect allocation of resources (material, financial, personnel, cultural), as groups of people with low income level, property, education, class consciousness and mentality. Factors of uneven regional development are differently interpreted in economic theory (Erić, 2013).

In this paper, we determined one main and three auxiliary hypotheses:

H0: Income inequality affects poverty rate in European Union.

H1: Income inequality causes many socio-economic problems in countries of European Union, such as: the suppression of economic growth, the rise in crime rate, the decline in the quality of education and health, the growth of political inequality.

H2: There is significant difference in income inequality in countries of European Union that affects difficult implementation of economic policy measures.

H3: Economic egalitarianism is in the function of long-term economic growth and social stability.

In this work, the goals are pragmatic for all users: European Union institutions, governments of countries in the European Union, researchers, scientific workers and public. They will have an insight into the problem of income inequality as the cause of many socio-economic problems: poverty, inequality in democracy and social inclusion. Main goal in sustainable development is to reduce income inequality within and among countries (United Nations, 2018). The main importance of income inequality is in solving the problems of poverty and creating a shared prosperity for all European Union countries (World Bank, 2018).

2. LITERARY REVIEW

Having researched the problem of income inequality and poverty, we can conclude that there are a plenty literary materials about these problems. What sets itself as a problem in research is that they are viewed separately. Our homework is correlated with collecting, classifying and bringing in relation data about income inequality and poverty in the European Union.

Durlauf gave seven Theorems which had been proven by mathematical formula. He gave redistributive schemes as mechanism that acts to complete those missing markets whose effects manifest themselves through inequality. The dynamic structure of the model, however, suggests that the equity and efficiency trade off embedded in different policies will be very complex (Durlauf, 1996). For most countries in the world today, growth reduces inequality and rich countries are more egalitarian than poor ones. However, there are exceptions. While global financial forces and changing financial conditions have played a powerful role affecting economic inequalities, there does not appear to be a single permanent trend to inequality (Galbraith, 2014). Studies show a mutual relationship inequality and economic growth and development (Jovanović Gavrilović, 2003, Knowles, 2003 & Piketty, 2015) and in some studies it is pointed out that distribution of income is a precondition for growth sustainability and development (Cornia & Martano, 2012 & Nikiforos, 2014). Piketty gave modern studies about poverty as a global economic problem and correlation between poverty and income inequality (2015). Researching was done on the observed households and their incomes which were randomly selected. The Household survey showed one of the biggest global problems of the concentration of economic power in

the hands of a particular elite that has an impact on all spheres of economic life. Large economic inequality and concentration of power can be reduced in two ways: "benevolent forces" (migration of the population, migration of capital, liberal markets) and "malignant forces" (wars, climatic disasters, diseases). The research on the issue of income inequality and poverty has shown a high degree of correlation and a long-term major problem for all countries of the world (Milanović, 2015). Critical review of Piketty's work was about what to do against the rise of economic inequality which is highly controversy and about agreement with Piketty's policy proposals such as higher taxation on income, wealth and inheritances dropped significantly (Rieder & Theine, 2019).

A growing number of research studies confirm global socio-economic problem about income inequality, poverty and other socio-economic problems. Wide research about income inequality in countries of European Union and there are research about income inequality between countries of European Union. The Gini coefficient for the 15 EU countries showed higher incomes inequality within countries and subregions than between countries themselves (Cowell, 2015). In comparison with income, wealth is substantially more unequally distributed than income in each country in European Union (Jantti, Sierminaska & Kerm, 2015). If we take Spain and Germany out of the picture for a moment, we see that the inequality ranking of wealth follows that of income. In line with previous studies, researchers find lower poverty rates when wealth is incorporated in the measurement of poverty compared to the traditional income poverty headcount but the impact differs largely between countries (Kuypers & Marx, 2016). The problem of poverty and social exclusion, as a product of economic inequality, researched by Finish economist´s Törmälehto and Säylä. As an empirical illustration, we augmented the current EU poverty indicator with an asset-based poverty measure. The wealth-augmented at risk of poverty and social exclusion measure (AROPE) changed levels of poverty, but yielded little surprises in the relative deprivation profiles by lifting the retired and the self-employed out of poverty relatively more. In their work, wealth included (Törmälehto & Säylä, 2013). In Spain, we have so many researches about income inequality and poverty (such as García-Sánchez et al., 2018, as state Caselli, Fracassi and Traveso, 2018). Perception of income inequality is also really important characteristic of inequality (García-Castro et al., 2018).

Beside Milanović (2015), Molnar researched problems with internal inequality and inequality between countries. These studies refer to the introduction of reliable indicators for measuring inequality, while the empirical research is based on an example of economic inequality and poverty in Serbia (Molnar, 2013). Research focusing on specific key aspects of economic inequality, as well as

economic inequality, by analyzing numerous theoretical, methodological and empirical views concerning the socio-economic phenomena aims to identify the following related and relevant aspects that affect the efficiency modern economy: a). economic inequality that has a stimulating effect on the creative, productive and innovative use of all production factors positively affects the functioning of the economy and is socially justifiable; b). high level of economic inequality which shows a tendency to further increase has a negative effect on the economic system indicators, as well as the stability of the society and the political environment, therefore resulting in weaker economic performance and lower economic growth rate; c). economic equality (certainly, not egalitarianism) by contributing to greater social and political stability, which in turn reflects positively on the economic stability and efficiency, is basic for greater modern economy and dynamic growth rates (Leković, 2015). The basic of the cause-effect relationship between inequality and the level of social well-being has shown that such connection exist only in the fulfillment of a very large number assumptions, starting from the independence of the functions of individual well-being, to the complete symmetry of the relationship between the individual's well-being and well-being of all others. Also, behaviors of people point to the existence of a strong asymmetry of this kind, and that individual respond far more to someone else's poverty than to the inequality (Begović, 2015). Income inequality and tax changes in European Union during financial crises 2009 was a study which shows from comparative analysis of implemented taxation reforms that the increase in the highest rates of income tax, which have increasing in the most EU member states, an indicator of cargo shifting crises to the highest income classes or re-updating the use of taxes on income for purpose of reducing income inequality (Šimurina & Barbić, 2016).

2.1. Quantitative measurement of inequality

If we want to have a relevant and rewarding research, the phenomenon of economic inequality needs to be quantified. It is necessary for it to be assigned a mathematical character in order to be able to observe connections and to purpose solutions to the problems that have arisen. Economic inequality is usually measured by several coefficients or indexes (Molnar, 2013): Gini coefficient, Theil's inequality index, coefficient S80/20, coefficient of variation and Atkinson's index of inequality.

Gini coefficient is the most popular measure of economic inequality. Its value ranges from 0 to 1, observed in absolute terms[1]. If we multiply the obtain index with 100, we get a percentage of the economic inequality of the given observation units (national state, region or globally). If its value is 0, we found ourselves in a state of complete equality. In the second, value 1 shows absolute inequality when one person has absolute full income or wealth. Formula for its calculation:

$$G = \frac{1}{2n^2\bar{y}} \sum_{i=1}^{n} \sum_{j=1}^{n} \left[y_i - y_j \right] \tag{1}$$

that means: y_i is the income of the i-th individual (observation units), y_j is the income of the j-th individual (observation units), n sample size or number of income recipients, $\bar{y}$ average income, $|y_i - y_j|$ the sum of absolute values of measured differences between income (each income pair of the i-th and j-th individual). Since the absolute difference in income is accounted twice $|y_i - y_j|$ and $|y_j - y_i|$ the total sum is divided by number 2. Also, as we can see in the directory, the sum of the absolute differences of income is divided by the square of the number of units of observation and the average income. In real life, the value of this index is never extreme (0 or 1), but ranges between these two numbers on a scale[2]. This index will be presented practically on the example of the European Union in the second part of the paper. Value 0 would show the absolute egalitarianism of the observation unit, which does not exist in the real economic life (nor existed, even in communist societies advocating the idea of economic equality).

Theil's inequality index starts from the idea of entropy[3] in the theory of information. When an event is completely predictable then the quality of the information it carries is low (the information has no value). A reversal is a conclusion in the case of a low probability outcome. If the income is evenly distributed between observation units, the income of each observation unit[4] is predictable. On the other hand, if there is economic inequality in the distribution of income, it is

[1] It was named by its inventor, the Italian statistician Corrado Gini, who created it 1912. It can be carried out directly from Lorenz's curve.

[2] Value 0 would show the absolute egalitarianism of the observation unit, which does not exist in the real economic life (not existed, even in communist societies advocating the idea of economic equality).

[3] Entropy is a measure of uncertainty associated with a random variable. Each independent variable $x_1, x_2, \ldots, x_n$ is assigned a certain probability value. The independent variable that has the lowest probability of outcome contains the most valuable information. The concept was introduced by Claude Shannon in 1948. in the book Mathematical Communication Theory.

[4] Observation units can be individuals or groups within a particular economy, country, region or the whole world.

more difficult to predict the income of the observed sample. On the other hand, if there is economic inequality in the distribution of income, it is more difficult to predict the income of the observed sample. This index was formulated by Henry Theil at the Erasmus University in Rotterdam. With its use, total inequality can be divided into three parts: inequalities within the region (inequality), inequality among regions (interdependence) and inequality within the subregion (between the subregion municipalities).

Coefficient S20/80 shows the ratio of total equivalent income of the 20% of the highest income population with respect to the total equivalent income of the 20% of the lowest income population. In this way a number is obtained indicating how many times the richest one-fifth of the population earns in comparison to one-fifth of the poorest. If multiplied by 100, we get the percentage or relative ratio of the specified sizes. This indicator is always higher than 1[5]because the top of any population always has and earns more than the lower classes in all countries of the world. It is most often used to determine inequality in revenue distribution (although it can be used as an indicator of inequality in the distribution of wages, wealth, inheritance and living standards). This index is often used in combination with the Gini coefficient.

The coefficient of variation CV is calculated as the standard deviation ρ and the arithmetic mean of the income for the observed population ȳ. It is calculated according to the formula:

$$CV = \frac{1}{\bar{y}}\sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(y_i - \bar{y}\right)^2} \tag{2}$$

where are: y_i income of the i-th individual (observation units), n sample size ie the number of recipients of income and ȳ average incomes. The value of this indicator ranges from 0 to the infinity. If there is complete equality in the distribution of income it is 0. If total economic inequality or all incomes are absorbed by one person, then he strives for infinity (increases without limit). If total economic inequality or all incomes are absorbed by one person, then it strives for infinity (increases without limit). It can also decompose on intragroup and intergroup inequality.

Atkinson's inequality index is the result of the belief that any measure of inequality implicitly reflects certain valuation estimates. It is necessary to determine

[5] And in the more charitable societies (such as the Scandinavian countries) coefficient S20/80> 1, if it would amount to ≤1 it would mean that the richest citizens of the country earn the same or less than the poorest 20% of the country's citizens.

the wrong of social well-being (social well-being in the function of individual incomes) and the degree of aversion to inequality. It is necessary to determine the curve of social well-being (ie social well-being in the function of individual incomes) and the degree of aversion to inequality. Aversion to inequality is a numerically expressed price that a company is willing to pay for reducing inequality. The lost growth is the price paid by society for economic inequality. As its value is higher, disparity in distribution is higher. Formula for calculating the Atkinson index:

$$A = 1 - \left[\frac{1}{n} \sum_{i=1}^{n} \left(\frac{y_i}{\bar{y}} \right)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$$

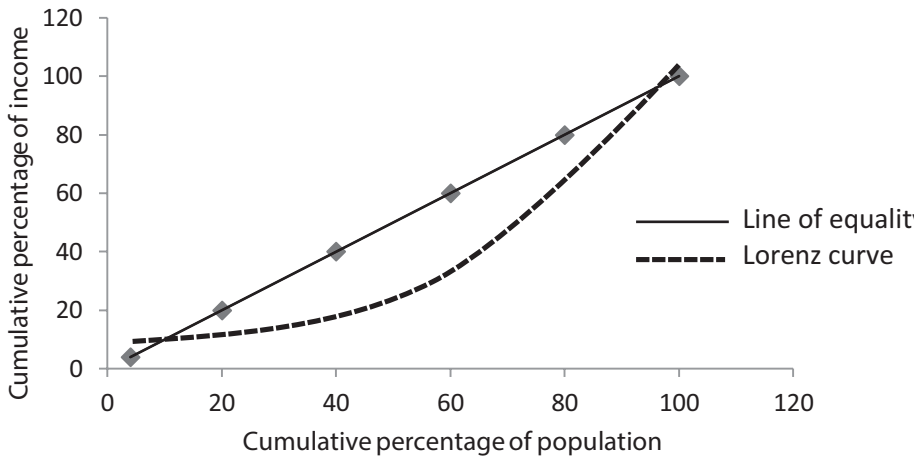
where are: y_i is the income of the individual (observation units), n the size of the sample or the number of recipients of income, $\bar{y}$ the average income, ε the degree of society's aversion to inequality, ranges from 0 to ∞. Difficult understanding and interpretation of this index is the main underlying of this index, which is why it is least used to express economic inequality in literature and practice. Due to the limited scope of work, the detailed disclosure of these indicators will be left to the interpretation of the reader. As a measurement unit of economic inequality in the European Union we will use the Gini coefficient.

2.2. Qualitative measurement of inequality

The terms of inequality and poverty are related but do not have the same meaning[6]. Inequality has a descriptive character that can always be discussed, while poverty has a prescriptive character, meaning that it carries a moral imperative of action (Šućur, 2001). Poverty is determined by economic inequality of distribution. Therefore, economic inequality is the cause (independent variable) and poverty is a consequence (dependent variable). Poverty is defined as a social phenomenon where a certain population of people lives below the appropriate line of disposable income or below the value of the average basket of goods needed for a normal human life. Consumer basket contains the value of goods and services necessary on a monthly basis to meet the minimum social needs (food, clothing, housing, cultural events and the like). The comparability of consumer spending between countries is a major problem for statisticians when compared to poverty. The consumer basket in Europe, which necessarily contains meat, is

[6] In numerous philosophical and political literature these terms are used as synonyms. However, in the economy there is a big difference between poverty and economic inequality. Poverty is the function of improper allocation of income and wealth, ie economic inequality.

not representative for India where animal meat is almost un-consumed. Differences in mentality, consciousness and culture make the basket of goods different and the very structure and the way of measuring poverty. Poverty and economic inequality are not in a perfect linear direct relationship. This means that if economic inequality increases by 1%, it does not have to mean that poverty grows for the same amount (coefficient of correlation is greater than one). If economic inequality grows, it does not have to mean the worse position of the poor in the same extent. Two countries may have the same degree of inequality in distribution and income and wealth, and have a different degree of poverty. Poverty is to a large extent correlated with economic inequality, but is the result of other factors (social policy, country development, social awareness, social transfers and so on). Strategies for reducing inequality in income distribution are significant for total poverty reduction, but they are not the only ones. Poverty is directly reduced by redistribution of income, ie by redeploying part of rich income to poor (through health, pension and social system). Reduction of poverty is also affected by redistribution, ie whether the redistributive value is effectively targeted at target categories[7]. Efficiency of income distribution can be depicted with the help of Lorenz's fault (Graph



Graph 1. Lorenz´s curve. Source: Authors.

Data on cumulative percentage of a country's population are available on the X axis and cumulative data on the percentage of income with which population of

[7] Abuse of rights is common in countries that do not have a strong legal system. Hiding real income through the "gray" economy and undeclared work enables individuals to absorb state social transfers and inefficient allocation of resources. In this way, the redistributive effect of the state is ineffective.

the country is available on the Y axis. If there was a perfect equality than each member of the population would have absorbed the same percentage of income, the line of equality would be a straight line at an angle of 45 degrees. In economic reality this case never happens. Every citizen gets a different income share, so she has a slightly convex positive slope. As the slope of the curve is bigger ie curve has more convex, the economic inequality of the distribution is higher. By taxing income, the state distributes the accumulation value and thereby affects the reduction of inequality. Extra-profit tax[8] moves Lorenz's slope to the left or towards the line of equality.

3. RESEARCH RESULTS

3.1. Economic inequality in the European Union

In the previous section, we have described the most widely used inequality measurement indices used in the world. These indexes are used in the European Union by international financial institutions such as the World Bank, the International Monetary Fund, the European Statistics Institute and others. Data, research and work on disparities in distribution for the European Union are contained in the Annual Reports and reviews of International Financial Institutions. Because of the limited work scope, the research job will be reduced to observing the inequality of distribution through the Gini coefficient. The reasons why we have decided to use this index are: the widespread use of this coefficient and the ease of interpretation. It was formulated by the Italian statistician and sociologist Gini Corrado in 1912. in his work "Variability and Changeability". Organized by the Organization for European Co-operation and Security (shortened OECD), its usage as a tool for the statistical and economic analyzes that relate to XX. centuries. It is important for keeping the taxation and social benefits policy in Europe in order to direct the funds in proper way and to stimulate economic sustainability and growth. There are a lot of mathematical derivations of the Gini coefficient formula that we will not deal with because it is not a subject of the research. We will only emphasize that its value can be to the interval [0, 1]. In case of complete economic equality its value would be 0. This would mean that every member of the community has an equal share of wealth and income. In economic reality this case does not exist because it would mean born with the same possibilities and without inheritance. On the other hand, full economic inequality would bring this index to 1. This would mean that the total wealth and all revenues are owned by one person, which is again impossible in real economic

[8] Extra profit represents the profit of the most successful companies that have in the monopoly of pricing and operating conditions. That are a global transnational companies whose total revenue exceeds the budgets of some countries where they are doing business.

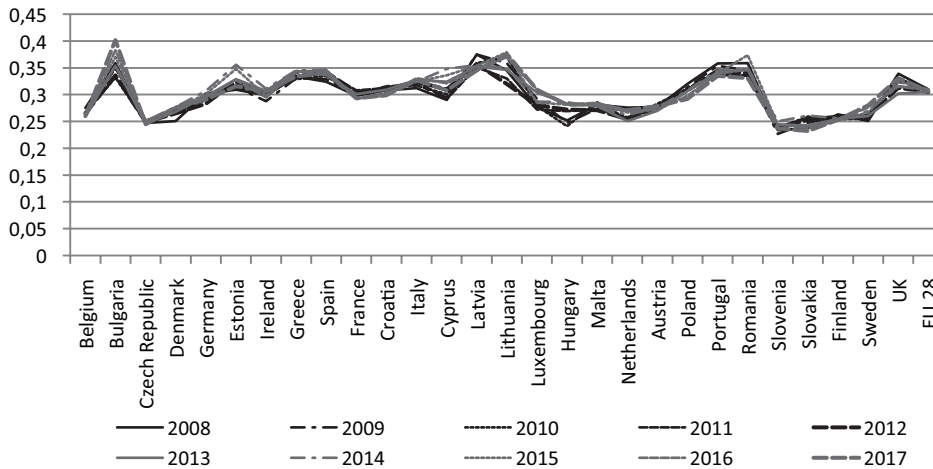
life. We began the research by observing the Gini coefficient movement in the European Union as one of the most appropriate indicators of inequality distribution. The period of observation refers to the decade (2008 - 2017). Data for the previous 2018. did not available on the official EUROSTAT site, which is why they were not included in the analysis.

Table 1. Gini coefficient for the countries of the European Union for the period 2008.-2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Belgium	0,275	0,264	0,266	0,263	0,265	0,259	0,259	0,262	0,263	0,26	-
Bulgary	0,359	0,334	0,332	0,35	0,336	0,354	0,354	0,37	0,383	0,402	-
Chezch Rep.	0,247	0,251	0,249	0,252	0,249	0,246	0,251	0,25	0,251	0,245	-
Denmark	0,251	0,269	0,269	0,266	0,265	0,268	0,277	0,274	0,277	0,276	0,279
Germany	0,302	0,291	0,293	0,29	0,283	0,297	0,307	0,301	0,295	0,291	-
Estonia	0,309	0,314	0,313	0,319	0,325	0,329	0,356	0,348	0,327	0,316	-
Ireland	0,299	0,288	0,307	0,298	0,305	0,307	0,311	0,298	0,295	0,306	-
Grecee	0,334	0,331	0,329	0,335	0,343	0,344	0,345	0,342	0,343	0,334	-
Spain	0,324	0,329	0,335	0,34	0,342	0,337	0,347	0,346	0,345	0,341	-
France	0,298	0,299	0,298	0,308	0,305	0,301	0,292	0,292	0,293	0,293	-
Croatia	0,308	0,315	0,316	0,312	0,309	0,309	0,302	0,304	0,298	0,299	-
Italy	0,312	0,318	0,317	0,325	0,324	0,328	0,324	0,324	0,331	0,327	-
Cyprus	0,29	0,295	0,301	0,292	0,31	0,324	0,348	0,336	0,321	0,308	-
Latvia	0,375	0,375	0,359	0,351	0,357	0,352	0,355	0,354	0,345	0,345	0,356
Lithuania	0,345	0,359	0,37	0,33	0,32	0,346	0,35	0,379	0,37	0,376	-
Luxembourg	0,277	0,292	0,279	0,272	0,28	0,304	0,287	0,285	0,31	0,309	-
Hungary	0,252	0,247	0,241	0,269	0,272	0,283	0,286	0,282	0,282	0,281	0,287
Malta	0,281	0,274	0,286	0,272	0,271	0,279	0,277	0,281	0,285	0,282	-
Netherlands	0,276	0,272	0,255	0,258	0,254	0,251	0,262	0,267	0,269	0,271	-
Austria	0,277	0,275	0,283	0,274	0,276	0,27	0,276	0,272	0,272	0,279	-
Poland	0,32	0,314	0,311	0,311	0,309	0,307	0,308	0,306	0,298	0,292	-
Portugal	0,358	0,354	0,337	0,342	0,345	0,342	0,345	0,34	0,339	0,335	-
Romania	0,359	0,345	0,335	0,335	0,34	0,346	0,35	0,374	0,347	0,331	-
Slovenia	0,234	0,227	0,238	0,238	0,237	0,244	0,25	0,245	0,244	0,237	-
Slovakia	0,237	0,248	0,259	0,257	0,253	0,242	0,261	0,237	0,243	0,232	-
Finland	0,263	0,259	0,254	0,258	0,259	0,254	0,256	0,252	0,254	0,253	0,259
Sweeden	0,251	0,263	0,255	0,26	0,26	0,26	0,269	0,267	0,276	0,28	-
UK	0,339	0,324	0,329	0,33	0,313	0,302	0,316	0,324	0,315	0,331	-
EU 28	0,31	0,306	0,305	0,308	0,305	0,305	0,31	0,31	0,308	0,307	-

Source: EUROSTAT´s database, Gini coefficient of equivalised disposable income-EU- SILC survey, (2019). Aviliable at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di12&lang=en.

EUROSTAT collected data from the Household Survey conducted every year in the countries of the European Union. Most of the issue is based on total household income or part of household income that is not included in tax claims. The sample ranges from 20-30% of the population, and emphasis is placed on a uniform distribution of respondents on a variety of grounds: place of residence, gender, age, class affiliation and the like. Analyzing the table it can be concluded that the highest average inequalities[9] in the distribution of total income were observed in the following countries: Bulgaria (0.3574), Latvia (0.3568), Romania (0.3568), Portugal (0.3437) and Greece (0.3380). On the other hand, countries which are not egalitarian in Europe and are average for the past 10 years are: Slovenia (0.2394), Slovakia (0.2469), Czech Republic (0.2491), Sweden (0.2641) and Denmark (0.2692). Based on Table 1, data can be presented using Graph 3.



Graph 2. Gini Coefficient Movement in EU Countries 2008 – 2017.
Source: Author's illustration.

3.2. Poverty in the European Union

We have seen the movement of income inequality in the European Union for the period 2008-2017. We will now share the economic inequality of distribution income with poverty in the European Union and how it affects the phenomenon of poverty. On the one hand, inequality in income distribution may encourage citizens to improve their situation through work, additional efforts, innovations or the acquisition of new skills. On the other hand, income inequality is associated with poverty and social exclusion. The creators of economic policy, the govern-

[9] The average Gini coefficient is obtained as a sum of all coefficients in the observed period divided by the number of years (ie the aggregate is divided by 10).

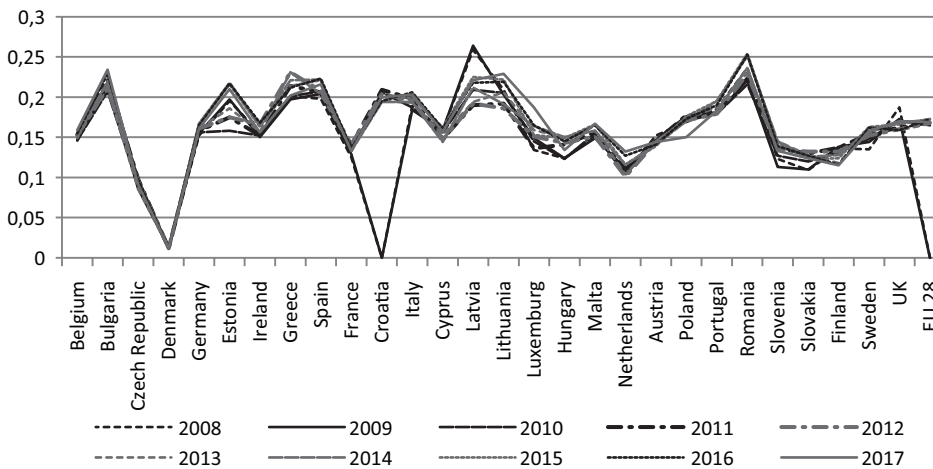
ment and society as a whole could not fight with poverty and social exclusion without analyzing economic inequality in society. Data on inequality in income distribution are important for assessing real poverty, because the distribution of resources can affect the breadth and scale of poverty. Poverty is defined as a social phenomenon where a certain population of people lives below the appropriate line of disposable income or below the value of the average basket of goods needed for a normal human life. Every year, the European Union's statistical site collects data on the percentage of the population on the poverty line ie on the border which provides the consumer with the necessary goods for a decent life.

Table 2. Movement of the population at risk of poverty in EU countries in the period 2008.-2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018.
Belgium	0,147	0,146	0,146	0,153	0,153	0,151	0,155	0,149	0,155	0,159	-
Bulgary	0,214	0,218	0,207	0,222	0,212	0,210	0,218	0,220	0,229	0,234	-
Chezch Rep.	0,090	0,086	0,090	0,098	0,096	0,086	0,097	0,097	0,097	0,091	-
Denmark	0,012	0,013	0,013	0,012	0,012	0,012	0,012	0,012	0,012	0,012	0,013
Germany	0,152	0,155	0,156	0,158	0,161	0,161	0,167	0,167	0,165	0,161	-
Estonia	0,195	0,197	0,158	0,175	0,175	0,186	0,218	0,216	0,217	0,210	-
Ireland	0,155	0,150	0,152	0,152	0,166	0,157	0,164	0,163	0,168	0,156	-
Grecee	0,201	0,197	0,201	0,214	0,231	0,231	0,221	0,214	0,212	0,202	-
Spain	0,198	0,204	0,207	0,206	0,208	0,204	0,222	0,221	0,223	0,216	-
France	0,125	0,129	0,133	0,140	0,141	0,137	0,133	0,136	0,136	0,133	-
Croatia	-	-	0,206	0,209	0,204	0,195	0,194	0,200	0,195	0,200	-
Italy	0,189	0,184	0,187	0,198	0,195	0,193	0,194	0,199	0,206	0,203	-
Cyprus	0,159	0,159	0,156	0,148	0,147	0,153	0,144	0,162	0,161	0,157	-
Latvia	0,259	0,264	0,209	0,190	0,192	0,194	0,212	0,225	0,218	0,221	0,233
Lithuania	0,209	0,203	0,205	0,192	0,186	0,206	0,191	0,222	0,219	0,229	-
Luxemb.	0,134	0,149	0,145	0,136	0,151	0,159	0,164	0,153	0,165	0,187	
Hungary	0,124	0,124	0,123	0,141	0,143	0,150	0,150	0,149	0,145	0,134	0,128
Malta	0,153	0,149	0,155	0,156	0,151	0,158	0,158	0,166	0,165	0,167	-
Netherlands	0,105	0,111	0,103	0,110	0,101	0,104	0,116	0,116	0,127	0,132	-
Austria	0,152	0,145	0,147	0,145	0,144	0,144	0,141	0,139	0,141	0,144	-
Poland	0,169	0,171	0,176	0,177	0,171	0,173	0,170	0,176	0,173	0,150	-
Portugal	0,185	0,179	0,179	0,180	0,179	0,187	0,195	0,195	0,190	0,183	-
Romania	0,236	0,221	0,216	0,223	0,229	0,230	0,251	0,254	0,253	0,236	-
Slovenia	0,123	0,113	0,127	0,136	0,135	0,145	0,145	0,143	0,139	0,133	-
Slovakia	0,109	0,110	0,120	0,130	0,132	0,128	0,126	0,123	0,127	0,124	-
Finland	0,136	0,138	0,131	0,137	0,132	0,118	0,128	0,124	0,116	0,115	0,120
Sweeden	0,135	0,144	0,148	0,154	0,152	0,160	0,156	0,163	0,162	0,158	-
UK	0,187	0,173	0,171	0,162	0,160	0,159	0,168	0,166	0,159	0,170	-
EU 28	-	-	0,165	0,169	0,168	0,167	0,172	0,173	0,173	0,169	-

Source: Author´s calculation, single data from EUROSTAT.

Those data EUROSTAT obtained the Household Survey conducted every year in the countries of the European Union. Most of the issues are based on total family employment, income, a way of meeting basic and "higher" needs, the way of living, nutrition and education. The living conditions of respondents have a significant impact on the formation of poverty, as well as investment in education and health care. Analyzing the table, it can be concluded that the highest average poverty risk in the European Union is observed in the following countries: Romania (0.2349), Bulgaria (0.2184), Latvia (0.2184), Greece (0.2124) and Lithuania (0.2062). On the other hand, the average population for the past 10 years which have the lowest risk of poverty, living in the EU, lives in the following countries: Denmark (0.0122), Czech Republic (0.0928), Netherlands (0.1125), Slovakia (0.1229) and Slovenia (0.1339). Based on Table 2, data can be presented with the Graph 4.. Since data for 2008. and 2009. do not exist for Croatia and EU-28, the graph will present data for 2010.-2017.



Graph 3. Movement of the population at risk of poverty in the European Union countries in the period 2010-2017. Source: Author's illustration.

3.3. Impact of income inequality on poverty and other socio-economic problems

A large number of economists have shown that there is a direct link between economic inequality and economic growth. Kuznets drew the curve that referred to the fact that the economic inequality is the product of economic growth. Economic inequality is in function of economic growth and any economic growth affects the increase in inequality to a certain

point, after which it falls. These cycles are known as Kuznets cycles. We will start from this assumption that poverty is in the function of economic inequality. The coefficient correlation will find out how much extent income inequality explains poverty. With the help of the 3B STAT, we will introduce economic inequality as the independent variable X ie the Gini coefficient from Table 1. Poverty, measured by the index of population in risk of poverty is placed as a dependent variable Y (data from Table 2). Due to huge amounts of data, this statistic program is unable to process data for all countries. That is why we pooled the data for each country individually and found that there is correlation in the movement of inequality and poverty. Here we will present data for Bulgaria with a high degree of income inequality, but also a high percentage of population exposed to risk of poverty. The results are given in the following table.

Table 3. The coefficient of correlation between income inequality and poverty in Bulgaria

10.05.2019. 18:23 Analyse number: 1, econometrics		
Variables		
X: Gini coefficient		Y: Risk of poverty
Standard error of correlation coefficient	0,1982	P 0,0024544
F test statistics	4,3472	
Ho: In the basic set there is NO linear correlation		
H1: In the basic set there is linear correlation		
Conclusion:		
In testing the zero hypothesis that in the basic set there is no linear correlation the obtained p-value of 0.0025 shows		
that in the basic set there is a linear link at the significance level of 0.01 since the p-value is <0.01		
We conclude that the coefficient of correlation r IS statistically significant.		

Source: Author's calculation in 3B STAT.

Data of other countries are also easily counted in the software program. The results for some countries will not show any statistical significance of correlation because the percentage of the population at risk of poverty is near the figures referring to the Gini score. Mathematical formulas will get a p-value that is larger than the tabular value because proximity of numbers and duplication of operations. For technical reasons, the hypothesis is partially proven if we rely on processing in this program. However, if we logically consider the movement of economic inequality and poverty in the countries of the European Union, the conclusion is unique. Countries with large income inequality (such as Romania

0.3568 and Bulgaria 0.3574) have a high percentage of the population at risk of poverty (in Romania, 23.49% and Bulgaria 21.84% on average for the previous 10 years). Countries with economic equality (such as Czech-0.2491 and Denmark-0.2692) have the lowest percentage of the population exposed to poverty (in Denmark, 1.22% and 9.28% in the Czech Republic over the past ten years). The data from Tables 1 and 2 clearly show that income inequality affects growth of poverty in European Union countries, leading to the main hypothesis of research which is partly proven. Apart from direct impacts of economic partially on poverty, disparities in the distribution of incomes and wealth also affect other socio-economic problems in the country. Socio-economic problems are the result of poverty, economic inequality and social exclusion of individual groups and we formulate them in a couple of theses useful for research:1. Inequality stifles economic growth; 2. Inequality reduces the security of the country and affects the growth of crime; 3. Inequality affects the falling quality of health and quality of life; 4. Inequality decreases the quality and the rate of education; 5. Economic inequality increases political inequality.

4. DISCUSSIONS

The results we have come across show that there is a correlation between income inequality and poverty. The main hypothesis about the direct impact of economic inequality on poverty and other socio-economic problems is proved partially. The restriction in this study refers to the 3B STAT statistical program which does not recognize in the formulas real economic life. In some cases (countries) it has shown that there is no correlation between economic inequality and poverty. This happened because of the proximity of dependent and independent variables. This was the biggest limitation in the overall research. Economic logic has been countered by mathematical principles and we have confirmed that mathematics can help and illuminate some problems in the economy (not all). The main aim was to show that countries facing poverty have to pay more attention to the problem of economic inequality. Poverty and socio-economic problems have the root in the improper distribution of income. This was shown by the data and movement of the graph of the Gini coefficient and the percentage of the population at risk of poverty. The aim is to point to income inequality as the cause of many socio-economic problems. The governments of the member states should adopt economic policies that affect the greater egalitarianism of society. The governments of these countries would have to devote the issue of income inequality to avoid socio-economic problems such as poverty, social exclusion and political instability. The question arises: What are the steps and measures that should be taken? The problem could be solved in a number of ways, such as: redistribu-

tion of income through the social system, taxation of wealth or limitation of maximum income. These measures could be the subject of research in the future. Also, this research has shown that economically developed countries (Denmark, Sweden, the Czech Republic) have an egalitarian system of income distribution and do not have socio-economic problems with unemployment, poverty, living standards and democracy. The democracy index that shows the country's political stability has shown in these countries the complete stability of democracy and the political system. It has provided a high rate and quality of education, nutrition, security and economic growth.

The aim of this study was to compare this research with other studies in the field of economic inequality. In history, economic inequality was synonymous with poverty. Poor societies are societies with pronounced income inequality. However, we have proven that economic inequality is the cause of poverty and the consequence of the problem. Research in economic literature has linked economic inequality with economic growth. Simon Kuznjec has pointed to the economic growth gap that has emerged as a result of economic inequality. In the short term, income inequality affects economic growth. In the long run, economic growth stagnates and then economic activity falls. The socio-economic dimension of the problem is not seen in the old economic research. This problem is a newer date and only in the 21st century economists are beginning to deal with it. We have based this research on the real data of the European Union, so that could make certain conclusions and confirm links. This work could be a good basis for more advanced research in the area of economic inequality and the socio-economic consequences of this problem

5. CONCLUSIONS

Inequality of income in the European Union, measured by Gini coefficient, shows the difference between the member states. When we brought it into relation with the percentage of population at risk of poverty, the results showed that there is statistically significant impact of economic inequality on the growth of poverty in most of the European countries. Observing the curves of the movements of these two parametars (Gini index from 0,2692 to 0,3574 and the absolute share of the population at risk of poverty from 0,0122 to 0,2349) we can conclude that a direct linear conection between the observed parameters which have proved the impact of income inequality on the growth poverty in the countries of the European Union.

The unequal distribution of income, wealth and value in the national economy is the source of the other socio- economic problems. Problems are reflected in

suppressing economic growth, reducing the level of security and increasing the percentage of crimes, reducing health and quality of life, reducing the rate and quality of education and increasing political inequality. Index of democracy, on the example of the European Union, has shown that there are differences in conducting of the electoral process and democracy. When it comes to the economic inequality of the countries and regions of the European Union, a direct linear link is established between the growth of economic inequality and the existence of socio-economic problems in the implementation of democratic process in the observed countries. The direct impact of economic inequality on the growth of socio-economic problems (such as the implementation of full democracy) has been identified in the observed countries.

Recommendations for the countries of the European Union, which Bosnia and Herzegovina itself aims at, are based on economic egalitarianism as a concept of sustainable development and stable development. A stable and sustainable development in long term is not possible determinant of any economic policy unless it is based on equality income, wealth or other values as well as on other values that exist in society: cultural, scientific, technological, safety and health.

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ЕКОНОМСКА НЕЈЕДНАКОСТ И СИРОМАШТВО У ЕВРОПСКОЈ УНИЈИ

1 Божана Шкорић, Универзитет у Бањој Луци, Економски факултет
2 Јелена Бјелић, Управа за индиректно опорезивање БиХ
3 Маријана Николић, Инвестиционо- развојна банка Републике Српске
4 Luis Chirosa, Универзитет у Гранади, Економски факултет

САЖЕТАК

Прекомјерна акумулација и растућа неједнакост у расподјели дохотка одразиле су се на високе стопе сиромаштва у земљама Европске уније. У економској литератури постоје обимна истраживања на тему утицаја економске неједнакости на привредни раст. Међутим, знање о смјеру корелације између сиромаштва и економске неједнакости је скромно. У раду смо доказали да сиромаштво није синоним за економску неједнакост него је производ исте. Неједнакост у расподјели дохотка мјерена Gini коефицијентом одразила се на кретање постотка популације изложене ризику од сиромаштва. Коефицијент просте корелације показао је да је неједнакост у расподјели дохотка утицала на раст ризика од сиромаштва у земљама Европске уније. Поред сиромаштва, као посљедица неједнакости у расподјели дохотка, долази и до других социо-економских проблема: гушење економског раста, раста стопе криминалитета, смањење квалитета образовања и здравља, раста политичке неједнакости. Набројани проблеми би требали да буду упозоравајући за Владе земаља да предузму мјере економске политике за смањење економске неједнакости. Европска Унија, као заједница од 28 земаља чланица, треба пажљиво да бира инструменте економске политике како би смањила неједнакост у расподјели дохотка и осигурала стабилно тло за економски раст. Разлике између нивоа развоја, индекса демократичности, прихода и животним стандардима у посматраним земљама су утицале на потешкоће у посматрању проблема и рачунању математичке и статистичке везе. Кроз уједначеност расподјеле прихода, Европска унија би могла ријешити проблеме сиромаштва, социјалне искључености и демократије (мјерено индексом демократичности).

Кључне ријечи:

економска неједнакост, сиромаштво, *Gini* коефицијент, ризик од сиромаштва, *ЕУ*.

Претходна саопштења
Preliminary Communication

THE IMPACT OF MICROFINANCE INSTITUTIONS ONECONOMIC GROWTH IN NIGERIA

1 Orok Bassey Ekpenyong, Department of Economics, Imo State University, P.M.B.2000, Owerri, Nigeria
2 Patrick Nwaeze Nnamocha, Department of Economics, Imo State University, P.M.B.2000, Owerri, Nigeria
*Corresponding author E-mail: orokekpenyong@yahoo.com
1 ORCID ID: 0000-0002-1253-3360
2 ORCID ID: 0000-0002-1521-711X

ARTICLE INFO

Preliminary Communication
Received: 22.09.2019
Revised: 02.10.2019
Accepted: 23.12.2019
doi 10.7251/ACE1931129E
UDC 336.773:330.34(669)

Keywords: *microfinance institutions, economic growth, loans.*

JEL Classification: C21, D12

ABSTRACT

The study adopted a descriptive analysis and graphical approach in expressing the readily available data between 1992 and 2017 on how the microfinance institutions affected the following economic indexes used in the study: agriculture and forestry, mining and quarrying, manufacturing and food processing, real estate and construction, transport/commerce and other subsectors of the economy. The purpose of the study was to investigate the unimpressive performance of microfinance institutions in Nigeria over the past two decades. The result indicated that the loans from microfinance institutions had a positive impact on the selected macroeconomic sector and enhanced sector al productivity of the country as illustrated graphically in the study, and had a positive effect on the gross domestic product of Nigeria. Though, with a significant improvement in the operational modalities of the microfinance institutions, there will be an improved output, which will have a multiplier effect on the agriculture and forestry, mining and quarrying, manufacturing and food processing, real estate and construction, transport/commerce and other subsectors of economy as alighted in the study. The study, therefore, recommends that interest rates should be reduced on the loans given to the alighted subsectors to enhance economic growth.

1. INTRODUCTION

Nigeria is a country located in West Africa with a coast on the Gulf of Guinea and Atlantic Ocean. Neighboring countries include Benin, Cameroon, Chad, and Niger. The geography ranges from southern coastal swamps to tropical forests, woodlands, grasslands and semi-desert in the north. The government system is a federal republic; the chief of state and head of government is the president. Nigeria has a mixed economic system which includes a variety of private freedom, combined with centralized economic planning and government regulation. Nigeria is a member of the Economic Community of West African States (ECOWAS)[1].The growing awareness of the potential of microfinance in poverty reduction, economic growth and development, coupled with the emergence of several highly successful and fast growing microfinance institutions (MFIs), has effectively put the issue of microfinance on the political agenda of most developing countries. Consequently, the supervisory authorities of such institutions have taken active measures to address the issues of microfinance by developing an appropriate regulatory and supervisory framework based on the particular features and risk associated with these activities. There is a new challenge for developing an appropriate regulatory and supervisory framework for the microfinance service. It is significant to note that the characteristics of microfinance clients are distinct, their credit methodology is different and, in many cases, the ownership structure of the institutions is not the same as the one typically found in conventional financial institutions. In this regard, a risk based supervision shall be implemented which would focus mainly on: an effective governance and ownership structure, a responsive lending methodology, accurate and up-to-date knowledge of borrower characteristics, an appropriate management of information system, adequate internal control mechanisms and procedures. The concept of microfinance is not a new development; its origin can be traced back to 1976, when Muhammed Yunus set up the Grameen Bank as an experiment on the outskirts of Chittagong University campus in the village of Jobra, Bangladesh (Khan &Rahaman, 2007). Since then several microfinance institutions have been founded and succeeded in reaching the poor and also derived new ground breaking strategies with the time for the fulfillment of their vision. These included the provision of collateral – free loans to the poor, especially in rural areas at full cost interest rates that are payable in frequent installments. In recognition of microfinance, the United Nations celebrated 2005 as the year of micro credits (Roy, 2003). As a result, this financing instrument is perceived worldwide as a very effective tool against hunger and poverty eradication, and for rural economic development. The level of poverty has been linked with measures of its

[1] https://globaledge.msu.edu/countries/nigeria (retrieved on 29/10/2018)

economic development and, therefore, it is important not to address the issue of poverty independently, but empower poor people to the point of developing their rural communities through stretching of their productive capacity in the form of microfinance institutions. Economic activities are seen to have grown sporadically in these areas due to the activities of Grameen Bank, and this has attracted notable attention of the communities and of this research work, as it makes obvious the prospects of microfinance banks in Nigeria in realizing economic development via micro and small businesses. This study analyzes the contribution of loans and advances of microfinance banks to the growth of the agricultural and forestry sector, mining and quarrying sector, manufacturing and food processing sector, real estate and construction sector, transport/commerce and other related sectors of the Nigeria economy that make an overall economic development.

Microfinance institutions**:** These are financial institutions that are involved in providing financial services to the poor who are traditionally not served by the conventional financial institutions (Awoyemietal, 2015).

What is economic development? The term 'economic development' refers to the long-term changes in the system of production and distribution of goods and services affecting human welfare. In contrast to **'**economic growth' it involves changes in the *form* as well as the *scale* of economic activity. In common usage, development is usually assumed to be by the definition a good thing. However, the students of development cannot assume this. Economic development is almost always fickle in its effects – some benefit at others' expense, long-term gain may require short-term pain (and vice versa), and one person's indicator of progress may be another person's indicator of regress (Caree, 2002).

Statement of a problem and a specific objective of the study

The study is therefore concerned with the basic research question: How have microfinance institutions contributed to the selected sectors of the economy in Nigeria: agriculture and forestry, mining and quarrying, manufacturing and food processing, real estate and construction, transport/commerce and other subsectors of the economy?

The specific objective of this study is "to investigate how microfinance institutions have contributed to the growth of agriculture and forestry, mining and quarrying, manufacturing and food processing, real estate and construction, transport/commerce and other sectors of the economy".

2. LITERATURE REVIEW

Theoretical review

The first wave of theoretical work on microfinance, formulated by Greg Fischer and Maitreesh Ghatak, focused exclusively on joint liability. The term joint liability can be interpreted in several ways which can be divided into two categories. First, under explicit joint liability, when one borrower cannot repay the loan, group members are contractually required to repay instead of the borrower. Such repayment can be enforced through the threat of common punishment, typically the denial of future credit to all members of the default group or by drawing on a group savings fund that serves as collateral. Second, the perception of joint liability can be implicit, that is, borrowers believe that if a group member defaults, the whole group will become ineligible for future loans even if the lending contract does not specify this punishment. One form in which this can happen is when the microfinance organization itself chooses to fold its operations when faced with delinquency (Onakoya, etal2013).

The Grameen model

The Grameen model was set up by Yunus, and it is currently referred to as the most successful model in the microfinance industry. The Grameen Bank finds the economically active poor who are excluded from formal financial services and helps them by providing financial services. The Grameen Bank also emphasizes the mobilization of savings. It is a kind of institution that provides small loans to the poor, especially women in Bangladesh, using innovative ways of getting around their borrowing constraint. The Bank has been enormously successful in generating sustainable livelihoods, reducing poverty and driving development in Bangladesh (Khan &Rahaman, 2007).

The closed economy under Laissez-faire

Dual economic theory

At least three distinct models can be distinguished within seminal article by Arthur Lewis entitled “Economic development with unlimited supplies of labor”. The simplest describes a single modern enclave or capitalist nucleus that expands by attracting migrants from a traditional low-productivity hinterland. Profits earned within the enclave are reinvested in new capital stock and this further raises demand for labor. However, wages do not rise because the extra demand is met through immigration. Thus profits remain high and can continue to be reinvested in new capital stock. Within this model there is no trade in goods with the hinterland, which exists only as a labor reserve. Three assump-

tions underpin this simple model. The first is the classical assumption of unlimited supply of labor at a slight premium to the wage in the traditional sector. Empirical support for this assumption was provided in the form of evidence that non-capitalist agrarian institutions often encouraged population to grow beyond the point at which the marginal product of labor was equal to the marginal return. The second assumption is of the existence of a dynamic business class (or state cadre) that reinvests the bulk of profits in new capital stock within the enclave. This assumption highlights the potential importance of the development of 'entrepreneurial culture' and the evolution of institutions conducive to risk taking and investment. The third assumption is of balanced growth of supply in goods and services (hence responsive allocation of capital and skilled labor) to meet changing patterns of demand (for both wage and investment goods) as growth proceeds. This assumption highlights the possibility that growth may also be constrained by sector specific bottlenecks and the terms of external trade. Even without relaxing these assumptions, the model can readily be extended to accommodate more complex labor and capital allocation. With respect to labor, it explains how labor absorption into the modern enclave is governed not only by the simple wage differential, but also by the costs and probability of finding employment there. This explains why rural migration can persist even when there is widespread unemployment within the modern enclave. With respect to capital, on the other hand, the model highlights how economic growth can be expressed as a function of the rate of saving (determined within this model by the profit rate) and the marginal rate of return on capital in the modern enclave. For example, 20 per cent saving rate combined with a marginal return on capital of 5 percent gives a growth rate (assuming zero depreciation) of 4 per cent per year. This explains the preoccupation of classical development economists with mobilizing extra capital. It also provides an explanation for increasing inequality (or appropriation of the surplus over subsistence needs by the dynamic capitalist class) in the early stages of economic development. Applying the concept of surplus labor to the entire world economy as a closed system highlights the importance of continued access to a pool of cheap labor (particularly in China and India) to global profit and hence growth rates (Wang, 2012).

It is a relatively simple step from the above dual economy model to a two-sector model in which the traditional sector is defined as rural and agricultural, whereas the modern sector is mainly urban and industrial. Relations between the sectors can then be extended to include product market specialization according to comparative advantage. In addition to surplus labor, the traditional sector now provides the principal wage (food) and raw materials as well as being an additional source of demand for industrial goods and a part of the arena for savings

mobilization. The inter-sectoral terms of trade then get particular significance. If this swings in favor of industry then industrial profits and reinvestment will rise, but rural demand for industrial goods will be reduced. Conversely, high agricultural prices will reduce industrial investment but increase demand. The important implication is that expansion of the modern industrial sector may be held back by a failure to raise productivity of the generally larger population working in agriculture. Hence agricultural transformation, rather than industrial modernization may be the key constraint to economic development.

Within this framework, the market structure in both sectors becomes an important determinant of economic growth. For example, mark-up pricing of industrial goods in small modern industrial enclaves is likely to undermine attempts to stimulate agriculture through price incentives alone. Meanwhile, agrarian structure will determine how any surplus income over and above subsistence requirements is distributed, and how it is allocated between investment and consumption goods. But market structure itself changes with economic development. For example, rural to urban migration (and accompanying changes in institutions and culture) may proceed to the point at which the opportunity cost of labor in the agricultural sector ceases to be zero. Further migration will then raise food prices as well as change demand and supply of labor in each sector. At this point dualism has disappeared and the economy comes to resemble an orthodox neoclassical general equilibrium model (Copestake,1999).

Empirical literature

Nnamocha, Igwemma & Ekpenyong (2017) did an extensive analysis of microfinance institutions and the development of micro, small and medium scale enterprises in Imo state. The research was aimed at investigating the impact of microfinance institutions and the development of micro, small and medium scale enterprises in Imo state. The specific objective is to investigate the implication of microfinance institution loans on the growth of micro, small and medium enterprise, the future benefit from positive growth of MSME and determine the factor of MSME growth in Nigeria. Using the Likert scale in analyzing the collated primary data, the findings presented show that more males are involved in MSME. Most entrepreneurs are married couples aged between 31 and 40. Most of the business owners are retail traders, with SSCE, and formone to five year oldbusinesses. Total amount estimate invested in business prior to loan was between ₦51,000 and ₦100,000 and majority of the business are currently valued at between ₦201,000 and ₦500,000 and the net worth of business before receiving loan was between ₦101,000 and ₦200,000 and the current income

after the issuance of loan was between ₦201,000 and ₦500,000. On the average, respondents agreed that microfinance institutions enhance the MSME growth and low interest rate loans from MFI and impact positively on the net income of MSME. One of the tables shows that the highest profitability level of MSMEs will increase the employment level and lead to economic growth and another indicates that the entrepreneur gender affects the effective running of the MSMEs. It is recommended that interest rates on loans issued by MFIs to MSMEs should be reduced in order to encourage their growth and the concept of MSME development should be modernized into an innovative technological base.

Adewale, Afolabi&Abumare (2015) investigated the trends in micro, small and medium enterprises (MSME) as a tool in fostering economic growth and development in Nigeria. MSMEs have a significant and pivoted role in the economic development of any country in the world. They form the backbone of the private sector; they make up over 90 percent of enterprises and fully developed MSMEs will no doubt contribute greatly to the Nigerian Economic development by providing employment, marketing goods and services, growth and development of the rural areas and growth of indigenous entrepreneurship in Nigeria and will be a catalyst and the real engine of growth. However, Nigeria's MSMEs are at present bedeviled by a lot of challenges and hardships. There area number of bottlenecks, serious undercapitalization, and difficulty in gaining access to bank credits, corruption, and lack of transparency. The study is anchored on two theoretical frameworks, "the bigpush theory of development and the active learning model" of Erickson and Pakes (1995). The methodology adopted in the study is content analysis. The paper therefore recommends that it is imperative to create the right and favorable policies for MSMEs, provide the necessary business support and development services like establishment of business support centers, vertical linkage of MSMEs with large enterprises, and also organize MSMEs into clusters for better effectiveness.

Afolabi and Oni (2015) examined the impact of microfinance bank on micro, small and medium scale enterprises (MSMEs) in Nigeria. Survey questionnaire was used to collect data from the respondents who are stakeholders of micro, small and medium scale enterprises (MSMEs). We find that there are challenges of accessing credit facilities, the micro credit programs that will increase self-employment, create jobs and enhance economic growth. However, some bank customers do not pay their interests when due. It was recommended that the supervisory agency (CBN) should ensure that microfinance banks operate in line with the microfinance policy objectives of increased credit access to micro, small and medium scale enterprises(MSMEs) for sustainable development. Also, the monitoring department of the microfinance banks should make regular

on-site visits to the MSMEs to carry out continuous monitoring and ensure the approved credit facilities are used appropriately.

Igbatayo (2015) examined the pivoted roles of micro, small and medium enterprises in economic growth and development in Nigeria, with their potential in employment generation and the transformation of livelihoods, which is particularly instructive. MSMEs in Nigeria employ more than 32 million people across the nation. It has been recently revealed that there are 17,261,753 or 99.8% of micro enterprises, while small enterprises accounted for about 21,264 or 0.12% and medium enterprises accounted for about 1,654 or 0.01% of the total. Despite the acknowledged potentials of MSMEs in the economy, policy makers have failed to provide the enabling environment for the survival and prosperity of these enterprises. It is therefore recommended that there is a need for concerted efforts aimed at fostering access to funding various activities associated with MSMEs, as funding is critical to the survival and prosperity of this outcome.

Nasiru&Mohd (2016) did a study on the types of microfinance institutions in Nigeria. Microfinance institutions (MFIs) are considered important financial institutions in Nigeria. These institutions contribute significantly to the country's economic as well as social development. Surprisingly, despite their important role, there is little research as well as information on the nature of MFIs in Nigeria, in particular with regard to the types of MFIs in the country. In an attempt to narrow the information and research gaps in the area of MFIs, this study examines different types of MFIs operating in Nigeria. Data for the study was collected from 121 MFIs through questionnaires. The results of the analysis of data indicate that not only there are five specific types of MFIs in Nigeria but they also differ from each other in terms of their ownership, organizational characteristics and lending practices.

Murad and Idewele(2017) wrote the article "The impact of a microfinance institution on economic growth of a country: Nigeria in focus". The study examined the impact of a microfinance institution on economic growth of a country, thus using Nigeria as a case study. The study employs the multiple regression analysis given that data are cross-sectional and time series. Secondary data of all commercial banks were extracted from the Central Bank of Nigeria statistical bulletin and annual reports. Data used in this model are time series secondary data for the period from 1992 to 2012.The findings of the study show that microfinance loans have a significant positive impact in the short run economic performance in Nigeria. Microfinance loans enhanced consumption per capita in the short run with an impressive coefficient, although loans of these banks do not have a significant impact on economic growth in the long run. Microfinance invest-

ment, however, has a significant impact on economic performance in Nigeria in the long run. Although microfinance loans are relevant in the growth process in Nigeria, other measures such as boosting agricultural production and taking appropriate steps to enhance income per capita are equally important in boosting economic growthin Nigeria. It is recommended that microfinance institutions should loan to improve consumption in the short run, while the long run goal should be to improve investment and other capital accumulation.

3. HISTORY, CHALLENGES AND OBJECTIVES OF MICROFINANCE INSTITUTION IN NIGERIA

History of microfinance institutions in Nigeria

The Nigerian business environment offers several entrepreneurial opportunities. Despite the numerous advantages of being an entrepreneur, an average Nigerian citizen seems to prefer a salaried job which has led to high unemployment rate in the country. It is worth noting that the bedrocks of any nation's industrial development are entrepreneurial activities, but unfortunately, there is uneasy access to the conventional loan from the commercial banks to start up a small or medium scale enterprises, and the resultant effect of this situation is high poverty rate, high unemployment rate and economic dependence on foreign countries since collateral security is the yardstick for securing loan in commercial banks in case of repayment default. An average citizen in Nigeria cannot provide such collateral security, which makes it difficult for them to access loans from commercial banks and constitutes a great setback to entrepreneurial develop in Nigeria. The evolution of microfinance in the 1970s was to break the barricade to access capitals by low income individuals for the developmental purposes. Microfinance banking in Nigeria could be categorized mainly into two sources: formal and informal sources of microfinance. While it could be very easy to trace the origin of the formal sources of microfinance in Nigeria, the origin of the informal sources of microfinance is only traceable to the practices among ethnic nationalities without any known precise date. Sources of informal microfinance include money lenders, landlords, friends, relations among others. There is also the Rotating Savings and Credit Association (ROSCAs)within which members contribute certain amount of money regularly to a pooled fund of the association. This fund is shared among the members in turns until all the members of the association have taken money. ROSCAs can be traced back to 16 century in Nigeria and are best thought of as a form of social capital known in variance names across ethnic groups. ROSCAs is known as Esusu or "Ajo" among the Yorubas, Isusu or Atu

among the Igbos, Osusu among the Edos, Adashi among the Hausa, Dashi among the Nupes and Etibe among the Efiks (Okorie&Miller, 1976). It should be noted that several unwritten guidelines based on mutual agreements are used to administer ROSCAs. Members feared defaulting completion of contribution cycle as this could lead to a serious consequence including social alienation amongst the people. The formal finance sector is made up of formal finance institutions such as commercial banks, microfinance banks, international development agencies, etc. The earliest attempt to facilitate formal microfinance banking is the establishment of the People's Bank of Nigeria(PBN) in 1988. This bank was founded mainly to cater for the savings and credit needs of the small business owners who not only have little savings capacity but also could not meet the stringent conditions usually required by the commercial bank before granting loan facilities (Adeoye and Emmanuel, 2015).In 1990, Community Bank was established with the objective of providing financial services to the rural areas and micro-enterprises in the urban centers. In December 2005, the Central Bank of Nigeria (CBN) issued the regulatory and supervisory guidelines for microfinance banks **(**MFBs) in Nigeria under which existing community banks, universal banks and non-governmental microfinance institutions (NGO-MFIs) were to operate under the newly enacted unified regulations (Adeoye&Emmanuel, 2015).

Challenges faced by microfinance banks in Nigeria

Regulatory challenge: Regulation of microfinance banks operations is directly under the Central Bank of Nigeria. Given that the CBN has other overwhelming responsibilities to perform, microfinance banking regulation is not as regular and thorough as that of commercial banks. Considering the overview of the performance of small and medium enterprises in Nigeria, past policies made limited impact on the micro-enterprises sector.

Corruption, embezzlement and frauds: The case for regulatory challenges is worsened by the fact that it paves way for other sharp practices to flourish within microfinance banks. It is usual to find cases of large-scale mismanagement of bank's resources, granting of credit facilities without recourse to due process for the purpose of making personal gains, reported cases of massive frauds on the part of bank staff irrespective of their cadres, etc.

Misplaced philosophy, ethics and culture: When microfinance banks recruit workforce mostly inherited from the commercial banks, there is tendency for misplacing the philosophy, ethics and culture of microfinance banking by those old commercial bank staff.

Lack of skilled human capital: Unlike the big commercial banks, microfinance banks lack access to capital base with which they could run their specialized training institutions to groom their force. This coupled with poor remuneration of staff by microfinance banks has led to recruitment of poorly skilled manpower, very high turnover, and in some cases, microfinance banks are left with no option other than employing retired, fired and rejected staff from the commercial banks.

Lack of public confidence and high operational costs: The regular policy reforms in the microfinance banking sector have led to the liquidation of microfinance banks in different parts of Nigeria. For instance, the withdrawal of the license of 224 microfinance banks in 2010 has badly damaged public confidence in these banks (Acha, 2012). In line with the directives of Central Bank of Nigeria, most microfinance banks are usually established in the rural areas where basic facilities such as electricity, good roads, water supply and other infrastructural services lack. These usually put them at disadvantage position when compared with the commercial banks.

Objectives of microfinance institutions in Nigeria

It is aimed at contributing to rural transformation, and promoting linkage programs between universal/development banks, specialized institutions and microfinance banks.

It makes financial services accessible to a large segment of the potentially productive Nigerian population which otherwise would have little or no access to financial services.

It promotes synergy and mainstreaming of the informal subsector into the national financial system, and enhance service delivery by microfinance institutions to micro, small and medium enterprises (CBN, 2017).

Prior to the promulgation of the indigenization decree, the lending of predominantly foreign-owned commercial banks to indigenous firms was abysmally low. During the period, the Central Bank through the Central Bank Credit Guidelines issued directives to financial institutions to extend certain percentages of their total loans to businesses in which Nigeria equity participation is not lower than 50%. The percentage allocation increased from 35% in the late sixties to 90% for fiscal year 1984 (CBN, 2015).

4. METHODOLOGY

The secondary date used reflected the period of study (1992 – 2017), with the variable alighted below as independent and dependent respectively: real gross domestic product, agriculture and forestry, mining and quarrying, manufacturing and food processing, real estate and construction, transport/commerce and other subsectors of the economy, eachepitomizing the contribution of microfinance to various sectors of theeconomy in Nigeriaand how it affects GDP.A descriptive analysis is usedin explaining the graphical illustrations, as alighted in the table below.

Data collected:

Year	RGDP (₦ billion)	Ag&Fo (₦ billion)	Min&Qua (₦ billion)	M&FP (₦ billion)	RE&Co (₦ billion)	TrC (₦ billion)	Others (₦ billion)
1992	19,620.19	29.5	3.7	19.9	14.6	45.6	22.5
1993	19,927.99	123.2	5.7	129.6	47.5	280	68.5
1994	19,979.12	155.4	32.2	201	34.9	513.8	283.3
1995	20,353.20	98.6	17.9	124.8	102.6	575.7	210.2
1996	21,177.92	229.4	17.6	155.4	92.7	695	210.1
1997	21,789.10	367.4	28.5	200	105.2	729.9	187.8
1998	22,332.87	962.7	31	299.4	67.1	1,042.70	123.9
1999	22,449.41	1,007.20	27	293.5	71.9	1,447.80	110.9
2000	23,688.28	1,248.40	33.5	363.8	89.1	1,794.40	137.5
2001	25,267.54	447.4	12	130.4	31.9	643.1	49.3
2002	28,957.71	1,467.70	39.3	427.7	104.8	2,109.80	161.6
2003	31,709.45	3,389.30	90.9	987.6	241.9	4,871.90	373.2
2004	35,020.55	3,865.60	103.6	1,126.40	275.9	5,556.60	425.6
2005	37,474.95	9,704.90	260.2	2,828.00	692.8	13,950.30	1,068.60
2006	39,995.50	505.2	449.3	492	2,554.40	5,078.30	7,370.90
2007	42,922.41	701.8	624.1	683.4	3,548.20	7,054.10	10,238.60
2008	46,012.52	3,354.30	412.4	2,006.30	2,139.20	23,962.50	10,878.40
2009	49,856.10	4,736.90	569.7	2,275.70	2,421.10	28,314.20	19,898.10
2010	54,612.26	5,102.90	520.4	2,172.90	2,257.40	25,975.90	16,956.90
2011	57,511.04	4,679.20	329.4	1,728.90	1,725.50	36,114.90	6,350.50
2012	59,929.89	5,056.80	524	2,482.60	4,222.30	59,774.30	8,067.90
2013	63,218.72	4,803.10	603.3	2,937.30	2,616.00	53,409.50	29,686.50
2014	67,152.79	7,735.70	187.1	3,156.50	5,486.50	58,821.80	7,033.50
2015	69,023.93	11,761.50	390.9	3,372.80	5,218.30	117,759.40	108,822.60
2016	67,931.24	15,058.50	181.3667	3,591.03	7,042.57	141,013.47	127,650.30
2017	68,814.43	18,537.70	75.16667	3,808.78	8,343.72	173,188.42	167,218.35

Source: CBN Statistical Bulletin 2017 edition

RGDP =f (Ag&Fo, Min&Qua, M&FP, RE&Co, TrC, Others) ..... 1.

Microfinance institution has contributed to the following macroeconomic sectors in Nigerian economy as represented in the table above: Ag&Fo, Min&Qua, M&FP, RE&Co, TrC, Others.

Mfi = Ag&Fo, Min&Qua, M&FP, RE&Co, TrC, Others ..... 2.

RGDP = f(mfi) ..... 3.

Graphical description of variables

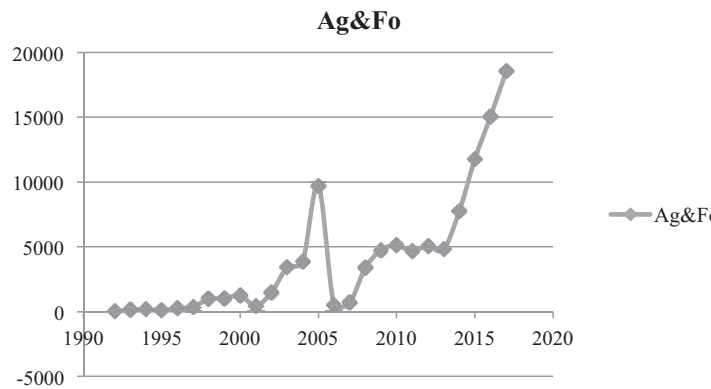

Figure 1. Agriculture and forestry: Ag &Fo

The above table is the graphical illustration of how the microfinance institution impacted the agriculture and forestry subsector of the economy in Nigeria. The chat shows that between 1992 and 1994 there was a stable sectoral growth in the economy, with a diminishing growth returns in 1995 and a rise between 1996 and 2000 in the growth of sectors, which increased the rate of food supply in the sector. Though, production declined from 1467.70 to 447.0(Nbilion) in 2001. From 2002 to 2005 the rate of growth consistently increased and decreasedin 2006. From 2007 to 2010, the growth of sectors became stable at an increasing rate, but became inconsistent fluctuation between 2011 and 2013, and from 2014 to 2017, there was a consistent growth in the agriculture and forestry subsector, as the same had a positive effect on the economy in Nigeria at large.

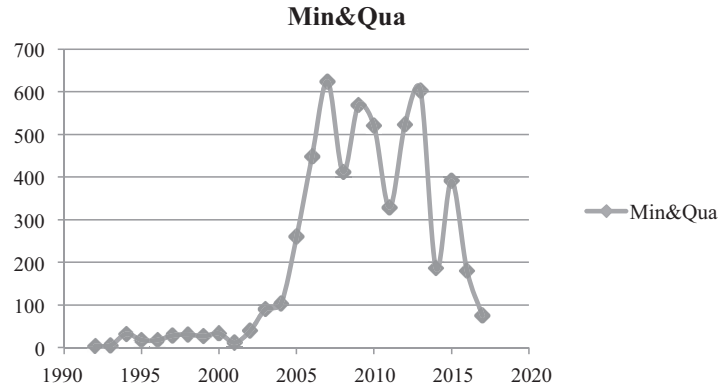

Figure 2. Mining and quarrying: Min&Qua

The above is a graphical illustration of how the microfinance institution affected the mining and quarrying subsector and the effect it had on the economy in Nigeria between 1992 and 2017. The chat shows that between 1992 and 1994, there was an increase in MFI's impact on mining and quarrying, but it experienced decreasing returns from 1995 to 1996, only to pick up again from 1999 to 2002. From 2003 to 2007 there was an increase in MFI's impact on the stipulated subsector, with diminishing returns in 2008, picking up in 2009 and diminishing from 2010 to 2011. Between 2012 and 2013 the subsector experienced an increasing return, which dropped in 2014, but with a sustained growth from 2015 to 2016. In 2017 the sector's outcome dropped drastically.

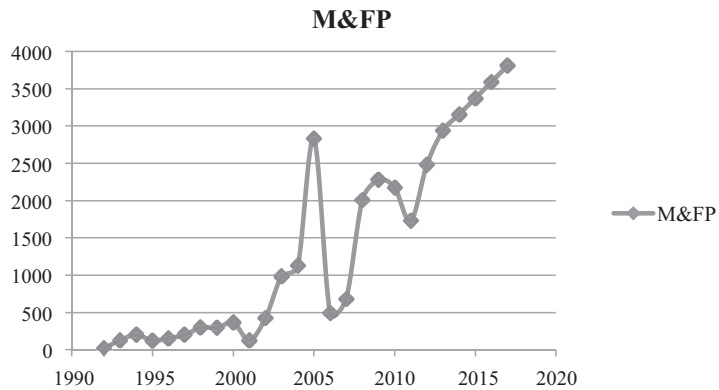

Figure 3. Manufacturing and food processing: M&FP

The above is a graphical illustration of how MFI's helphad an impact on the manufacturing and food processing subsector of the economy in Nigeria between

1992 and 2017. The chat above shows that between 1992 and 1994, there were increased returns in the manufacturing and food processing subsectors production, which dropped in 2001, but with an increased impact from 2002 to 2005, reduced in 2006, but increased from 2007 to 2010. The sectors output dropped to 1,728.90(N Billion) in 2011, but with a consistent increase from 2012 to 2017.

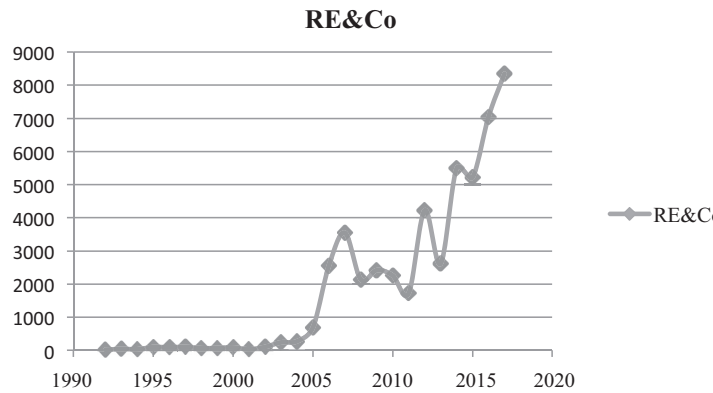

Figure 4. Real estate and construction:RE&Co(N Billion)

From 1992 to 1995 there was a consistent increase in productivity, but with a slight decrease from 102.6(N Billion) to 92.7 (N Billion) in 1996; it increased to 105.2 in 1997. Though reduced from the initial impact in 1998, it consistently increased from 1999 to 2010 as indicated in the graph above. With a fluctuation impact from 2011 to 2015,it experienced an increase from 2016 to 2017.

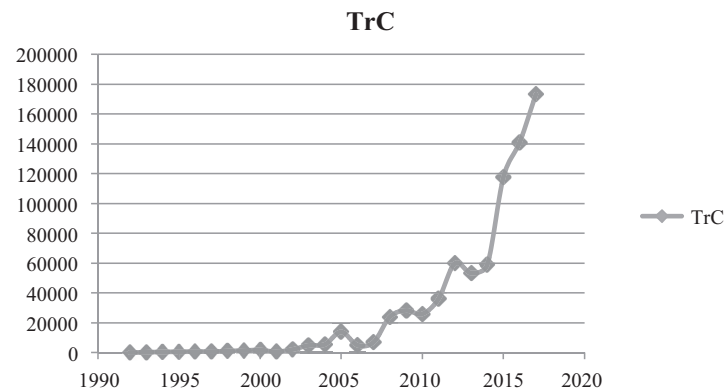

Figure 5. Transport/commerce:TrC

Transport and commerce: From 1992 to 2000, there was a consistent impact of microfinance institution on the transport and commerce subsectors, but the same

dropped in 2001. From 2000 to 2005 there were increasing returns in sectoral productivity, but reduction in 2006 from 13950.30 to 5,078.30. From 2007 to 2009 it picked up, but dropped in 2010. From 2011 to 2017 there was a consistent increased impact.

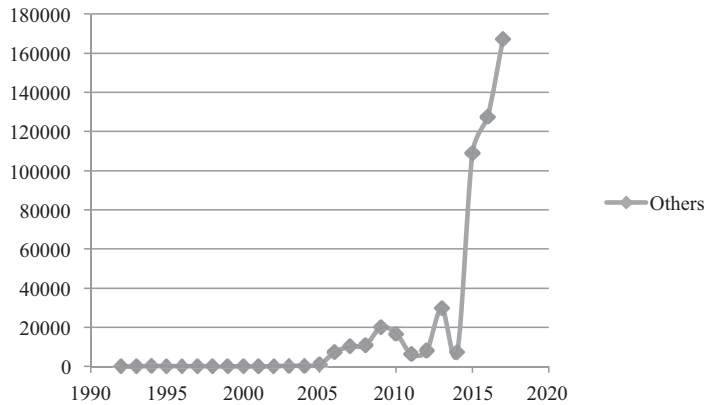

Figure 6. Other sectors of economy

Other sectors of economy indicate that the same experienced an increase from 1992 to 1996. In 1999 it decreased and picked up in 2000 to N137.5 Billion. In 2001 it dropped to N49.3 Billion, but from 2002 to 2009 there was an increase. In 2010 it reduced drastically by 2011, but picked up from 2012 to 2013. It increased and decreased in 2014, but experienced an increase from 2015 to 2017.

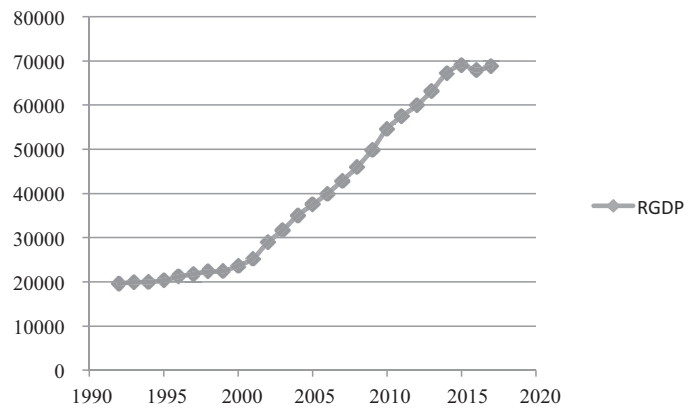

Figure 7. RGDP

It showed consistent growth in the GDP within the stipulated period covered.

5. CONCLUSION

The study concludes that microfinance institution loans have a positive impact on the selected macroeconomic sector and enhance sectoral productivity of the country as alighted in the table above and the gross domestic product of Nigeria. Therefore, it is inline with the work of Murad and Idewele (2017) and serves as a backbone of the sectors which is in line with works of Adewale, Afolabi and Abumare (2015). Though, with significant improvement in the monitoring of its modus operandi, there will be an improved output, which will have a multiplier effect on the alighted sectors. The study therefore recommends that interest should be reduced on the loans given to the above alighted sectors to enhance economic growth. Budgetary allocation in the aforementioned macroeconomic sector should be improved for a sustained economic growth. It is hoped that the study will guide the policy makers and microfinance institutions in the formulation and implementation of macroeconomic policies which may affect the stability of the economy in Nigeria.

Acknowledgements

The authors acknowledge Dr. Emmanuel, the Department of Statistics, Imo State University and Dr. OluwafemiLaolu, the Department of Business Administration, University of Lagos for providing the necessary guidance and materials for the successful completion of this research paper, as well my seminar coordinator, Prof. P.N.Nnamocha, my coauthor, who guided me through to the end of the same, from which I extracted these pieces and referenced authors.

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УТИЦАЈ МИКРОФИНАНСИЈСКИХ ИНСТИТУЦИЈА НА ЕКОНОМСКИ РАСТ НИГЕРИЈЕ

Екпењонг, О.Б, Економски факултет, Државни универзитет у Имо, Овери, Нигерија
Намоча, П.Н, Економски факултет, Државни универзитет у Имо, Овери, Нигерија

САЖЕТАК

Студија користи дескриптивну анализу и графички приступ приликомизношења лако доступних података између 1992. и 2017. године о утицају микрофинансијских институција на економске показатеље који су коришћени у студији: пољопривреда и шумарство, рударство и ископавање, производња и прерада хране, некретнине и грађевинарство, транспорт, трговина и остали сектори привреде. Сврха студије била је истражити неимпресивни учинак микрофинансијских институција у Нигерији у посљедње двије деценије. Резултат је показао да су кредити микрофинансијских институција имали позитиван утицај на одабрани макроекономски сектор и да су повећали секторску продуктивност земље, као што је графички приказано у студији, те да су имали позитиван утицај на бруто домаћи производ Нигерије. Премда, уз значајно побољшање оперативних модалитета микрофинансијских институција, доћи ће до побољшаног резултата који ће имати вишеструки утицај напољопривреду и шумарство, рударство и ископавање, производњу и прераду хране, некретнине и грађевинарство, транспорт, трговину и остале секторе привреде обухваћене студијом. Према томе, студија препоручује да се каматне стопе смање на кредите за остале секторе како би се побољшао привредни раст.

Кључне ријечи:

микрофинансијске институције, привредни раст, кредити.

THE APPLICATION OF FAIR VALUE ACCOUNTING IN BOSNIA AND HERZEGOVINA

1 Amira Pobrić, University of East Sarajevo, Faculty of Economics Brčko
*Corresponding author E-mail: amira.pobric@gmail.com
ORCID ID:0000-0001-8902-7223

ARTICLE INFO

Preliminary Communication
Received: 15.06.2019
Revised: 03.11.2019
Accepted: 09.12.2019
doi 10.7251/ACE1931149P
UDC
005.915(497.6):[657.6:336.76

Keywords:
fair value accounting, Bosnia and Herzegovina, non-financial assets, financial companies, non-financial companies, company size.

JEL Classification: M41

ABSTRACT

This study investigates the application of fair value accounting in companies in Bosnia and Herzegovina. The study was conducted on a sample of 190 companies. The application of fair value accounting causes a lot of controversy related to the relevance and reliability of fair value information. It is believed that the extent to which fair value measurement is used reflects attitudes of financial statement preparers about the usefulness of this model at its best. The findings of this study suggest that most companies in Bosnia and Herzegovina do not have tendency to apply fair value accounting. It is found that half of the companies in the sample do not use fair value accounting at all. Almost half of the companies that use fair value accounting use it just because they own assets that require fair value measurement. Fair value accounting is much more used in financial and larger companies than in non-financial and smaller companies. Companies mostly use fair value accounting for the measurement of investment property. However, they use it for the measurement of intangible assets at a minimum. The findings also suggest that the application of fair value accounting increases the uncertainty in financial statements. The quality of fair value disclosures is very low. Numerous companies do not disclose information on fair value hierarchy and valuation techniques that were used for fair value measurement. Companies that disclose this information mostly use indirectly observable inputs (Level 2) for fair value measurement and these create a lot of room for earnings management.

1. INTRODUCTION

The fair value concept is an approach to measurement of assets and liabilities by applying market prices (mark-to-market) or reasonable approximation of market prices (mark-to-model). This concept is not new, it dates back to the past century. The volume of its application to accounting is increasing. Major accounting standard setters, such as the International Accounting Standards Board (IASB), have encouraged convergence of accounting practice towards fair value accounting. The IASB have considered fair value as a possible measurement in almost every standard (He, Wright & Evans, 2018). The current financial reporting practice is a mix of fair value accounting and historical cost accounting.

Greater use of fair value measurement has caused a lot of controversy and vigorous debates among regulators, accounting researchers, practitioners and various market participants. Fair value proponents defend their view that fair value accounting is superior to historical cost accounting, as it improves the relevance and timeliness of accounting information and therefore, it improves financial reporting quality. They believe that fair value better reflects the current financial state of reporting entities and enables a better assessment of past performance. Researchers mostly agree that fair value provides useful information regarding amounts, timing and uncertainty of future cash flows (Šodan, 2015).

While proponents promote the opinion that fair value is the most relevant measurement basis for financial reporting, others express concerns about the reliability of fair value accounting. Opponents think that fair value is not as creditable and verifiable as historical cost and that its use leads to the failure of the historical cost model which performs well and is well understood (Al-Khadash & Abdullatif, 2009).

Fair value relevance is largely based on the concept of market efficiency. In theory, fair value provides an unbiased measure of assets and liabilities on the reporting date, as the items are expressed at their market values. It also summarises current assessment of time value of money and risk. In this way, fair value provides users with relevant and reliable information that is useful for decision-making (He et al., 2018).

In practice, the prerequisite of market efficiency is not met. Market prices of certain assets are not available in the absence of an active market. In such circumstances, fair value is either based on the market prices of similar items (Level 2 fair values), or on the best estimates of management (Level 3 fair values). Fair value estimates are likely to be subject to errors or managerial manipulation. It decreases accounting information reliability. If the application of fair value leads to significant distortions in a statement of financial position and a statement of

profit or loss, it is possible that investors make wrong investment decisions. This can result in more information asymmetry and agency conflicts between investors and managers (Wang & Zhang, 2017; Bick, Orlova & Sun, 2018).

It is the fact that fair value accounting has arisen from developed economies. Its creators assumed that it would be implemented in deep and liquid markets with developed financial reporting practice. Most empirical studies that have proven the superiority of fair value accounting over historical cost accounting used data from developed economies. There is little evidence on whether emerging economies are capable of adapting to fair value accounting. It is not clear if fair value accounting is superior to historical cost accounting in emerging economy environments with insufficiently developed markets (Peng & Bewley, 2010).

The aim of this study is to investigate to what degree the application of fair value accounting in Bosnia and Herzegovina is performed. It is assumed that the process of applying fair value accounting is particularly challenging for companies in Bosnia and Herzegovina because this country lacks many elements of an efficient market that are necessary in order to implement fair value accounting successfully. It would be interesting to scrutinize to what degree fair value accounting is used when financial statement preparers are given an option to choose between fair value accounting and historical cost accounting.

Apart from the introductory section, the paper is structured as follows: section 2 gives an overview of the previous fair value studies, section 3 explains the research design, section 4 illustrates the findings of the study, and section 5 discusses findings and gives closing observations.

2. LITERATURE REVIEW

Various studies on fair value accounting have been conducted over the past decades. The majority of these studies have investigated usefulness of fair value information for the investors on capital market. Empirical studies prove disagreement of the findings. On one side, studies have found that information about fair value assets and liabilities are relevant for decision-making (Song, Thomas & Yi, 2010; Jones & Smith, 2011). Some researchers have endorsed that fair values have predictive ability for bank cash flow and earnings (Evans, Hodder & Hopkins, 2014; Ehalaiye, Tippett & van Zijl, 2017). On the other hand, studies show that in the situation when fair values are not determined based on reliable observable inputs, fair value estimates are less relevant (Goh, Li, Ng & Yong, 2015; Kolev, 2019). Al-Khadash & Abdullatif (2009) have discovered that the application of fair value accounting may distort the financial result and mislead the users of financial statements in circumstances when the financial markets are

inefficient and uncertain. The studies also prove that the application of fair value accounting leads to the increase in volatility of financial results (Novoa, Scarlata & Solé, 2009; Sun, Liu & Cao, 2011).

Some researchers have endeavoured to contribute to resolving the dilemma between fair value accounting and historical cost accounting by investigating the application of fair value measurement and its impact on accounting policy choice. They provide feedback on what companies do in practice. They believe that the level of application of fair value model manifests at its best attitudes of financial statement preparers about the usefulness of this model in circumstances where preparers have an option to choose between fair value and historical cost model.

Institute of Chartered Accountants in England and Wales (ICAEW) have conducted a survey on the implementation of International Financial Reporting Standards (IFRS) and Fair Value Directive in the European Union (EU) (ICAEW, 2007). Associated with this study, the application of fair value accounting under IFRS is much less extensive than it is sometimes assumed. It implies that 28% of EU companies that prepare financial statements in accordance with IFRS use fair value model for investment property, just 4% of companies use it for property, no company uses it for plant and equipment and no company uses it for intangible assets.

Cairns, Massoudi, Taplin & Tarca (2011) have investigated the application of fair value measurement by listed companies in the United Kingdom (UK) and Australia. They came to almost identical results as ICAEW (2007). Their results show very little voluntary use of fair value model, except for investment property. Such results suggest that most companies in the UK and Australia prefer a conservative approach to financial reporting. When it appears that companies are given an option, whether to apply a historical cost or a fair value model, they tend to choose a historical cost model.

Christensen & Nikolaev (2013) have conducted a study on a sample of UK and German companies. They selected UK and Germany because these countries are historically at opposite ends of the spectrum in terms of applying fair value accounting under the local general accepted accounting principles (GAAP). Specifically, for non-financial assets, German GAAP required only historical cost accounting, whereas UK GAAP allowed either historical cost accounting or fair value accounting for property, plant and equipment and required only fair value accounting for investment property. IFRS expands the available valuation practices in both the UK and Germany. According to IFRS, both fair value accounting and historical cost accounting are allowed for property, plant and

equipment, investment property and intangible assets. This research has detected complete omission of the fair value accounting application to intangible assets. The application of fair value to property, plant and equipment both in the UK and Germany is at the extremely low level. Only 3% of the total sample use fair value accounting for at least one asset class under property, plant and equipment. It is interesting that 44% of UK companies that used fair value for property, plant and equipment under local GAAP switched to historical cost accounting upon the IFRS adoption. Only 1% of German companies switched to fair value for at least one class of these assets upon the IFRS adoption. In the UK fair value is more common for investment property, but 23% of companies switched to historical cost accounting once they were no longer constrained to the use of fair value by the accounting regulation. In Germany 23% of companies switched from historical cost to fair value once they were no longer constrained to historical cost by the accounting regulation. It has been found that financial companies are more likely to use fair value accounting than non-financial companies. Christensen & Nikolaev (2013) have concluded that options in IFRS do not encourage German and UK companies to switch to fair value accounting and that companies generally perceive that the benefits of fair value accounting do not exceed their costs.

Yoo, Choi & Pae (2018) have investigated the use of fair value option for property, plant and equipment on a sample of South Korean companies. This option was introduced during the global financial crisis. They find that at that time a relatively high number of South Korean companies used fair value accounting. Unlike EU countries where the rate of companies that apply fair value did not exceed 5%, during the global financial crisis, in South Korea 18% of companies used this valuation model. The authors assume that public companies are more likely to choose fair value accounting than private companies, because public companies are more likely to resolve information asymmetry between managers and external stakeholders via publicly available financial statements. This hypothesis has not been confirmed. The authors reveal that private companies had tendency to use fair value for property, plant and equipment as well as public companies. The findings can be interpreted in a way that during the period of financial turmoil highly leveraged private companies use fair value for the purpose of managing their debt-to-equity ratio and to avoid the credit crunch.

Jung, Pourjalali, Wen & Daniel (2013) have investigated whether companies in the United State (US) would choose the fair value option for non-financial assets. This option is not allowed for US companies. Authors investigated what companies would do if this option was available. Less than 10% of a sample indicated that they would use fair value accounting for non-financial assets. This discovery is consistent with findings of other studies, which implies that companies are not

willing to use fair value accounting for non-financial assets in the situation when they are given an option. Authors also find a higher likelihood to adopt the fair value accounting for non-financial assets among larger, more leveraged companies, companies with more non-financial assets and companies with expertise in fair value measurement. Due to the fact that few companies prefer the fair value option, one should be careful about generalizing these findings.

3. RESEARCH DESIGN

This study investigates the application of fair value accounting in companies of Bosnia and Herzegovina. They have had a conservative approach to financial reporting in this country for many years. Historical cost accounting was the only option. Companies have had the opportunity to use fair value accounting since 2006 when IFRS was implemented for the first time. The application of fair value accounting has been required or allowed for more than ten years. It would be interesting to discover to what degree companies use this valuation method today.

The study is designed to answer the following questions: How many assets are measured at fair value? How many companies use fair value accounting? What valuation techniques are mostly used for estimating the fair value? What inputs for estimating the fair value are frequently used? Are there any differences in the application of fair value accounting among companies, taking into account their size and business sector which they belong to?

The study was conducted on a sample of 190 companies. The sample structure, designed according to the business sector they belong to and a company size, is shown in Figure 1.

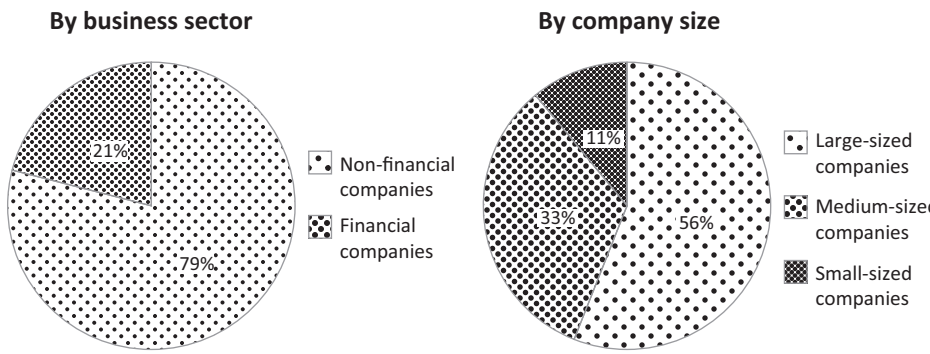

Figure 1: Structure of the sample
Source: Author's analysis

The initial objective was to conduct the study on a sample of listed companies. Listed companies are exposed to more pressure to provide relevant information to shareholders. They pay more attention to solving the problem of information asymmetry. It is assumed that the financial reporting practice is more developed in listed companies than in other companies. Therefore, it can be expected that listed companies will use fair value accounting more than other companies.

Initially, a sample of 162 listed companies was created. The sample consisted of companies which are listed on Banja Luka Stock Exchange or Sarajevo Stock Exchange and whose complete financial statements are publicly available. The analysis showed that the sample contained not more than 12 financial companies. In order to increase the share of financial companies in the sample, 28 financial companies, banks and insurance companies, which were not listed on the stock exchange, were added to the sample. In this way, a sample of 190 companies was obtained.

The data required for the study were collected from the financial statements of the companies for 2017. All companies in the sample prepare financial statements in accordance with IFRS. The total assets of companies in sample are 42 billion BAM, the total liabilities are 27 billion BAM and the total equity are 15 billion BAM. About 66% of total assets belong to financial companies that make up 21% of the sample.

4. FINDINGS

The findings of the study are presented in this section. Table 1 documents the share of assets for which the application of fair value accounting is required or allowed in the total assets. This indicates the maximum share of assets that can be measured at fair value. This does not imply that these assets are really measured at fair value. The last line in the table indicates the share of assets that, according to IFRS, cannot be measured at fair value. For the whole sample, the share of assets that can be measured at fair value is significantly lower than the share of assets that cannot be measured at fair value. The shares of these assets are significantly different in financial and non-financial companies and among large, medium and small-sized companies.

The share of assets that can be measured at fair value is smaller in financial companies than in non-financial companies. It may seem unexpected because in developed countries financial companies invest considerable funds in securities that are measured at fair value. The financial market in Bosnia and Herzegovina has not been sufficiently developed. Therefore, financial companies do not

invest a lot of funds in securities. Investments in securities are not an important source of income for them. Most of the financial companies included in the sample are banks. More than 80% of bank assets are loans that are measured at amortized cost.

Table 1. The percentage share of assets for which the use of fair value is required or allowed in the total assets

Assets	Total sample	By business sector		By company size		
		Non-financial companies	Financial companies	Large companies	Medium companies	Small companies
Assets that can be measured at fair value	31.05	72.98	9.58	30.06	72.32	82.83
Intangible assets	0.85	2.03	0.25	0.86	0.43	0.35
Property, plant and equipment	24.53	68.29	2.13	23.97	47.81	55.34
Investment property	1.02	2.16	0.44	0.54	21.55	18.93
Biological assets	001	0.03	0.00	0.00	0.28	0.00
Available-for-sale financial assets	4.30	0.44	6.28	4.36	1.75	8.23
Financial assets at fair value through profit or loss	0.33	0.04	0.48	0.33	0.49	0.00
Assets that cannot be measured at fair value	68.95	27.02	90.42	69.94	27.68	17.17

Source: Author's analysis

Table 2 documents the share of assets measured at fair value in total assets. Based on the data in Table 1 and Table 2, it is obvious how many assets can be measured and how many assets are really measured at fair value. Although 31% of total assets can be measured at fair value, less than 14% of total assets are measured at fair value. When it comes to non-financial companies, the share of assets measured at fair value is very low compared to the high share of assets that can be measured at fair value. When it comes to financial companies, the difference between these shares is not big due to the high share of financial assets in assets that can be measured at fair value. When considering large, medium and small-sized companies, it can be noticed that as the size of the company decreases, the share of assets that can be measured at fair value increases and the share of assets that are measured at fair value is approximately equal.

Table 2 also documents data about the percentage share of assets measured at fair value for each type of assets. Exactly 100% of available-for-sale financial assets and financial assets at fair value through profit or loss are measured at fair value because companies are required to measure these assets in such a way. It is interesting to observe how many assets are valued at fair value when companies

can make a choice between fair value and historical cost. The application of fair value is optional to property, plant and equipment, investment property and intangible assets. The share of assets that are measured at fair value is the highest for investment property. However, it is the lowest for intangible assets. For large companies, almost 70% of the total value of investment property are measured at fair value. The share of intangible assets that are measured at fair value is lower than 10%. Small and medium-size companies do not measure intangible assets at fair value. The share of biological assets that are measured at fair value is extremely low. Biological assets should be measured at fair value only if fair value measurement is reliable, otherwise it should be measured at historical cost.

Table 2. Percentage share of assets measured at fair value

Assets		Total sample	By business sector		By company size		
			Non-financial companies	Financial companies	Large companies	Medium companies	Small companies
Total assets	Value in millions BAM	42.292	14.316	27.976	41.321	924	47
	Measured at fair value (%)	14	13	7	14	13	13
	Measured at other bases (%)	86	87	93	86	87	87
Intangible assets	Value in millions BAM	360	290	70	356	4	0.2
	Measured at fair value (%)	9	10	7	9	0	0
	Measured at historical cost (%)	91	90	93	91	100	100
Property, plant and equipment	Value in millions BAM	10.374	9.777	597	9.906	442	26
	Measured at fair value (%)	36	36	24	37	15	5
	Measured at historical cost (%)	64	64	76	63	85	95
Investment property	Value in millions BAM	433	310	123	225	199	9
	Measured at fair value (%)	43	39	46	68	15	7
	Measured at historical cost (%)	57	61	54	32	85	93
Biological assets	Value in millions BAM	4	4	-	1	3	-
	Measured at fair value (%)	1	1	-	0	2	-
	Measured at historical cost (%)	99	99	-	100	98	-
Available-for-sale financial assets	Value in millions BAM	1.820	63	1.757	1.800	16	4
	Measured at fair value (%)	100.00	100	100	100	100	100
	Measured at historical cost (%)	0.00	0	0	0	0	0

Assets		Total sample	By business sector		By company size		
			Non-financial companies	Financial companies	Large companies	Medium companies	Small companies
Financial assets at fair value through profit or loss	Value in millions BAM	139	5	134	134	5	-
	Measured at fair value (%)	100	100	100	100	100	-
	Measured at historical cost (%)	0	0	0	0	0	-

Source: Author's analysis

Table 3 illustrates the number and the percentage share of companies that use fair value accounting. About 50% of companies that are covered in the sample use fair value accounting. Around 22% of all companies use it just because they hold assets that require measurement at fair value and 28% of all companies use it voluntarily. Almost all financial companies use fair value accounting, and most of them just because they are required. The share of companies that use fair value accounting is higher for financial companies than for non-financial. The size of the company also affects the application of fair value accounting. Not only do larger companies use it more often than smaller ones for the reason that they invest in securities more than smaller companies, but also because they voluntarily choose to use fair value accounting more frequently.

Table 3. Share of companies that use fair value accounting

Assets	Total sample	By business sector		By company size		
		Non-financial companies	Financial companies	Large companies	Medium companies	Small companies
Total number of companies	190	150	40	106	63	21
Companies that use fair value						
No. of companies	95	58	37	71	20	4
% of companies	50	39	92	67	32	19
Companies that use fair value accounting only because they have to						
No. of companies	42	22	20	30	10	2
% of companies	22	15	50.00	28	16	9.5
Companies that have chosen to use fair value accounting						
No. of companies	53	36	17	41	10	2
% of companies	28	24	42	39	16	9.5

Source: Author's analysis

Table 4 also presents the number and percentage share of companies that use fair value accounting, but data is organized by type of assets that can be measured at fair value or at historical cost. About 60% of companies that have investment property measure them at fair value. Around 23% of the companies use fair value for at least one asset class in property, plant and equipment, 15% use fair value for all types of property, plant and equipment, 8% use it only for property, mostly for land, 20% of the companies that have biological assets measure them at fair value and only 6% of the companies that have intangible assets measure them at fair value.

Table 4. Share of companies that use fair value accounting by type of assets

	Assets	Total sample	By business sector		By company size		
			Non-financial companies	Financial companies	Large companies	Medium companies	Small companies
Intangible assets	No. of companies that own assets	148	111	37	95	42	11
	No. of companies that use fair value	9	7	2	9	0	0
	% of companies that use fair value	6	6	5	9	0	0
Property, plant and equipment	No. of companies that own assets	190	150	40	106	63	21
	No. of companies that use just fair value	29	26	3	25	4	0
	% of companies that use just fair value	15	17	7.5	24	6	0
	No. of companies that use fair value and historical cost	16	8	8	10	4	2
	% of companies that use fair value and historical cost	8	5	20	9	6	10
Investment property	No. of companies that own assets	75	48	27	44	24	7
	No. of companies that use fair value	30	17	13	23	6	1
	% of companies that use fair value	60	35	48	52	25	14
Biological assets	No. of companies that own assets	10	10	0	4	6	0
	No. of companies that use fair value	2	2	0	0	2	0
	% of companies that use fair value	20	20	0	0	33	0

Source: Author's analysis

Table 5 presents the structure of assets measured at fair value by fair value hierarchy. The fair value hierarchy refers to the inputs used to measure the fair value

of an asset. Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets that the company can access on the measurement date. Level 2 inputs are observable inputs other than Level 1 quoted prices, such as quoted prices for similar assets in active markets, quoted prices for identical or similar assets in markets that are not active, etc. Level 3 inputs are unobservable inputs that should reflect the assumptions that market participants would use when pricing the asset.

Table 5. Fair value hierarchy

Assets	Total sample	By business sector		By company size		
		Non-financial companies	Financial companies	Large companies	Medium companies	Small companies
Assets measured at fair value (in millions BAM)	5.870	3.720	2.150	5.747	117	6
Assets measured at fair value by using						
Level 1 inputs (%)	14	0.20	39	14	7	0
Level 2 inputs (%)	18	0.00	49	19	0	0
Level 3 inputs (%)	1	0.03	3	1	0	0
Unknown inputs (%)	67	99.77	9	66	93	100

Source: Author's analysis

For most of the fair value assets, inputs used to measure fair value are unidentified. According to IFRS 13 – *Fair Value Measurement*, reporting entities are required to disclose information on these inputs (IASB, 2018). This information should be available in notes to the financial statements but numerous companies do not disclose them. This is particularly noticeable for non-financial companies and for small and medium-sized companies. According to fair value hierarchy, the structure of fair value assets can be analysed just for companies that disclose this information. These companies mostly use indirectly observable inputs (Level 2) to measure fair value. A low asset ratio is measured using unobservable inputs (Level 3).

Table 6 illustrates the structure of fair value assets by valuation techniques that were used for determining the fair value. The objective of valuation technique application is to estimate the price at which an orderly transaction to sell the asset or to transfer the liability would take place between market participants on the measurement date under current market conditions (IASB, 2018). Three widely used valuation techniques are the market approach, the income approach and the cost approach. Market approach is a valuation technique that uses prices and other relevant information generated by market transactions, including identical or comparable assets. Income approach is defined as a valuation technique

that converts future cash flows or income and expenses to a single discounted amount. Cost approach is a valuation technique that reflects the amount that would be required currently to replace the service capacity of an asset. In some cases, companies use a single valuation technique. In other cases, the use of multiple valuation techniques is more appropriate.

Table 6. Valuation techniques used to measure fair value

Assets	Total sample	By business sector		By company size		
		Non-financial companies	Financial companies	Large companies	Medium companies	Small companies
Assets measured at fair value (in millions BAM)	5.870	3.720	2.150	5.747	117	6
Assets measured at fair value by using						
Market approach (%)	15	1	41	16	6	0
Income approach (%)	10	0	26	10	0	0
Cost approach (%)	0	0	0	0	0	0
Multiple approach (%)	15	22	2	14	32	0
Unknown approach (%)	60	77	31	60	62	100

Source: Author's analysis

For most of the fair value assets, the data about valuation techniques used to measure fair value are not available in notes to the financial statements. This problem is more prevalent in non-financial companies than in financial ones, as well as in smaller companies than in larger ones. Companies that have disclosed data about valuation techniques mostly apply market and multiple approach to measuring fair value. There are differences referring to the volume of application of valuation techniques between non-financial and financial companies, as well as between large and medium-sized companies. Non-financial companies mostly use multiple approach for measuring fair value, while financial companies mostly use market approach. In large companies, market and multiple approaches to measuring fair value are approximately equally used. In medium-sized companies, a multiple approach to measuring fair value is dominantly used. No small-sized company has disclosed data on valuation techniques.

5. DISCUSSION AND CONCLUSION

In this study, the application of fair value accounting in Bosnia and Herzegovina is examined. The study was conducted on a sample of 190 companies. The findings prove that a low asset ratio is measured at fair value for two reasons. The first reason lies in the fact that the share of financial assets which require measuring at fair value in total assets is insufficient. The second reason signi-

fies that a reasonably small number of companies choose to use fair value accounting for non-financial assets. Half of the companies in the sample do not use fair value accounting at all. Almost half of the remaining companies use it just because they hold assets that require measurement at fair value. Obviously, most companies in Bosnia and Herzegovina do not have tendency to use fair value accounting. Based on the findings of other studies, it can be assumed that the reasons for their unwillingness to use it are related to: difficulties in obtaining fair value information; lack of technical knowledge and professional judgement skills relating to fair value among accountants, auditors and asset appraisers; complexity of fair value standards; high costs of measuring fair value, etc. (ICAEW, 2017; Christensen & Nikolaev, 2013; Jung et al., 2013). Active market for non-financial assets is not often available. When active market is not available, fair value is determined based on assessment of managers, which is one of the main challenges to the application of fair value for non-financial assets. Still, various companies have decided to use fair value accounting and they have reasons to make such a decision. Their reasons are probably related to the perception that fair value more reliably reflects the value of the assets, an urge to improve the quality of accounting information and desire to manage earnings (ICAEW, 2017).

This study shows higher application of fair value accounting than it was elaborated in studies mentioned in Section 2. It does not necessarily mean that fair value accounting is much more used in Bosnia and Herzegovina than in Australia, the UK (Cairns et al., 2011), Germany (Christensen & Nikolaev, 2013) and other EU countries (ICAEW, 2007). All the studies mentioned in Section 2 were conducted on data relating to the first year after the implementation of IFRS. Their results show to what degree fair value accounting was used more than ten years ago. Probably, the degree of their use has changed so far. Therefore, the findings of these studies are not comparable. However, if the use of fair value accounting is really higher in Bosnia and Herzegovina than in some economically developed countries, this could happen due to the fact that companies in Bosnia and Herzegovina considerably rely on the debt market when it comes to financing. Christensen & Nikolaev (2013) have found a positive association between the application of fair value for non-financial assets and reliance on debt financing. Highly leveraged companies that access debt market are commonly required under their credit arrangements to provide valuations of collateral. Creditors are interested in the fair value of assets because they aim to know their liquidation value. The application of fair value accounting for non-financial assets usually increases the likelihood of overstating the book value of assets, resulting in a decrease in

leverage ratio and thus enhanced borrowing capacity (Yoo et al., 2018; Jung et al., 2013; Christensen & Nikolaev, 2013; Aljinović Barać & Šodan, 2011).

This study indicates that financial and larger companies use fair value accounting much more than non-financial and smaller ones. The impact of company size on the application of fair value accounting is probably related to the cost of using this concept. The application of fair value accounting causes direct and indirect costs. Direct costs include appraisal fees when an independent valuer is employed, increase in audit fees and increase in record-keeping costs, whereas indirect costs are mainly opportunity costs related to the time and effort managers spend on selecting items which will be measured at fair value, reviewing fair values of the selected items, and the discussion of these values with auditors (Yoo et al., 2018, p. 98). A large amount of these costs are fixed costs. These costs are not as significant for larger companies as for smaller ones because larger companies can achieve the effects of economies of scale.

This study confirms the findings of other studies which indicate that fair value accounting is more frequently used for investment property than for other non-financial assets (ICAEW, 2017; Cairns et al., 2011; Christensen & Nikolaev, 2013). Property markets are generally more liquid and property prices have increased recently. The fair value of investment property can improve profitability indicators because the gain or loss arising from the change in fair value is recognised in profit or loss for the period in which it arises. The gain or loss arising from a change in fair value of other non-financial assets that can be measured at fair value is recognised in equity as revaluation surplus. This gain or loss does not affect the profit or loss for the period it arises in.

When it comes to property, plant and equipment companies measure land at fair value. This can be related to the fact that depreciation is not calculated on land. One of the consequences of the application of fair value accounting for depreciable assets is the increase of the depreciation base which decreases future reported financial results through increased depreciation costs. By selecting fair value accounting for land, companies can increase the value of assets and equity without worrying about the detrimental effect of the increased depreciation base on their future reported financial results. The decision to use fair value is not random and it is made when benefits outweigh costs.

The findings of this study suggest that the application of fair value accounting in companies of Bosnia and Herzegovina increases the uncertainty in their financial statements. The quality of fair value disclosures is very low, particularly for non-financial companies. Numerous companies do not disclose information at the level of fair value hierarchy and valuation techniques that were used for

fair value measurement. Therefore, it is not possible to identify the inputs that were used in determining fair values, nor the ways in which fair values were determined. Companies that disclose this information in their financial statements mostly use indirectly observable inputs (Level 2) to measure fair value. Prior studies on fair value measurements imply that assets based on lower-level fair value inputs (Level 2 or Level 3) are less transparent, associated with greater valuation uncertainty and subject to more discretion (Xu, 2019, p. 109). IFRS 13 requires detailed disclosures for Level 3 fair value assets but there are no such disclosure requirements for Level 2 assets. This suggests that Level 2 fair value measurements create more room to manage earnings than Level 3 fair value measurements. All this increases information risk and information asymmetry.

The findings of this study can be useful for financial statement preparers, users of financial statements and regulators. One should be careful about generalizing the findings because the sample is comparably small. These findings can be extended in the future research by examining the characteristics of companies that use fair value accounting for non-financial assets. It would be interesting to investigate whether profitability, leverage, proportion of non-financial assets to total assets, etc. stimulate the decision to use fair value accounting.

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ПРИМЈЕНА РАЧУНОВОДСТВА ФЕР ВРИЈЕДНОСТИ У БОСНИ И ХЕРЦЕГОВИНИ

1 Амира Побрић, Универзитет у Источном Сарајеву, Економски факултет Брчко

САЖЕТАК

Циљ ове студије јесте утврђивање степена употребе рачуноводства фер вриједности у компанијама у Босни и Херцеговини. Студија је спроведена на узорку од 190 компанија. Узорак чини 150 нефинансијских и 40 финансијских компанија, односно 106 великих, 63 средње и 21 мала компанија. Подаци потребни за студију су прикупљени из финансијских извјештаја компанија за 2017. годину. Све компаније у узорку састављају финансијске извјештаје у складу са МСФИ. Употреба рачуноводства фер вриједности изазива бројне контроверзе које се тичу релевантности и поузданости информација о фер вриједности. Вјерује се да степен употребе модела фер вриједности на најбољи начин одражава ставове састављача финансијских извјештаја о корисности овог модела. Резултати ове студије показују да већина компанија у Босни и Херцеговини не жели да користи рачуноводство фер вриједности. Половина компанија у узорку уопште не користи рачуноводство фер вриједности. Скоро половина компанија које користе рачуноводство фер вриједности, користе га само зато што имају средства која морају да се мјере по фер вриједности. Финансијске компаније користе рачуноводство фер вриједности много више него што то чине нефинансијске компаније, а веће компаније га користе много више од мањих. Добровољно, компаније користе рачуноводство фер вриједности највише за мјерење инвестиционих некретнина. То може да буде посљедица чињенице да фер вриједност инвестиционих некретнина може да побољша показатеље профитабилности јер се добит или губитак који произлази из промјене фер вриједности признаје у рачуну добитка и губитка у периоду у којем настаје. Компаније бирају да мјере по фер вриједности земљиште прије него било коју другу групу средстава у оквиру некретнина, постројења и опреме. Избором рачуноводства фер вриједности за земљиште, компаније могу повећати вриједност имовине и капитала без бриге о штетном учинку повећане амортизационе основе на њихове будуће финансијске резултате. Компаније

најмање користе рачуноводство фер вриједности за мјерење нематеријалних средстава. Одлука да се користи фер вриједност није случајна и јавља се када користи превазилазе трошкове. Такође, резултати указују на то да употреба рачуноводства фер вриједности повећава неизвјесност у финансијским извјештајима. Квалитет објелодањивања о фер вриједности је веома низак. Знатан број компанија не објелодањује информације о хијерархији фер вриједности и техникама процјене које су коришћене за мјерење фер вриједности. Компаније које објелодањују ове информације, углавном користе индиректно уочљиве инпуте (II ниво) за мјерење фер вриједности који стварају много простора за управљање резултатом.

Кључне ријечи:

Рачуноводство фер вриједности, Босна и Херцеговина, нефинансијска средства, финансијске компаније, нефинансијске компаније, величина компаније.

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ARTICLE INFO

Original scientific Article
Received: xx.xx.2019.
Revised: xx.xx.2019.
Accepted: xx.xx.2019.
doi:
UDK
xxx

Keywords:

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JEL Classification: C44.

ABSTRACT

The abstract should contain a maximum of 250 words. The abstracts should avoid any abbreviations and mathematical formulas.

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1. INTRODUCTION

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Introduction is the first section of an IMRAD paper. Its purpose is to state clearly the investigated problem and provide the reader with relevant background in-

formation. It states the objectives of the work and provides an adequate background, avoiding a detailed literature survey or a summary of the results.

The purpose of the Introduction should be to supply sufficient background information to enable the reader to understand and evaluate the results of the present study without the need to refer to previous publications on the topic. Introduction should be written mostly in the present tense. /Times New Roman, 12/

2. MATERIALS AND METHODS

Materials and methods are the second section of an IMRAD paper. Its purpose is to describe the experiment in such detail that a competent colleague could repeat the experiment and obtain some or equivalent results. It should provide enough details to allow the work to be reproduced. Already published methods should be indicated with a reference: only relevant modifications should be described.

3. RESULTS

Results are the third section of an IMRAD paper. Its purpose is to present the new information gained in the study. It should be clear and concise. Results are the core of a paper. The Results section shouldn`t start with describing methods that were inadvertently omitted from the Materials and Methods section. Results must be written in the past tense.

4. DISCUSSIONS

The final section of an IMRAD paper. Its purpose is to fit the results from the current study into the preexisting fabric of knowledge. The important points will be expressed as conclusions. This should explore the significance of the results, not repeat them. A combined *Results and Discussion* section is often appropriate. Avoid extensive citations and discussion of published literature.

Many papers are rejected by journal editors because of a poorly written Discussion section.

5. CONCLUSIONS

The main conclusions of the study may be presented in a short Conclusions section, which may be a separate section or form a subsection of a *Discussion* or *Results and Discussion* section. Conclusions should provide a summary of important findings and their implications for the area of research.

ACKNOWLEDGEMENTS

Collate acknowledgements in a separate section at the end of the article before the references and do not place them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g. help with language, writing assistance or proof reading, etc.). It should be brief.

Conflict of interests

The authors declare there is no conflict of interest.

REFERENCES

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Mehmet, O. S. (2012). An investigation of violence against teachers in Turkey. *Journal of Instructional Psychology*, 39(1).

Stead, G. (2005). Moving mobile into the main-stream. Paper presented at the mLearn 2005: *4th World Conference on m-Learning*. Cape Town, South Africa. http://www.mlearn.org.za/CD/papers/Stead.pdf

Stošić L. (2010). *Information education and children's development*, Инновационный потенциал субъектов образовательного пространства в условиях модернизации образования, Россия, Ростов-на-Дону), pp. 252-258, УДК 378, ISBN 978-5-8480-0797-8

Stošić, L., & Stošić, I. (2013). Diffusion of innovation in modern school. *International Journal Of Cognitive Research In Science, Engineering And Education (IJCRSEE),* 1(1), http://www.ijcrsee.com/index.php/ijcrsee/article/view/7

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Tables should always be cited in the text in consecutive numerical order.

For each table, please supply a table caption (title) explaining the components of the table.

Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.

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Example:

Table 1. Comparison of characteristic values obtained by PCA and threshold values obtained by the parallel analysis

Serial number of components	The actual characteristic values of PCA	Values obtained by parallel analysis	Decision
1	5,716	1.5595	Accept
2	1,913	1.4326	Accept
3	1,107	1.3287	Reject
4	0,967	1.2433	Reject

Source: Author's calculation

PAPER TITLE – IN ANOTHER LANGUAGE, SIZE 16

1 Corresponding Author Affiliation (10pt regular, center align)
2 First Co-Author Affiliation (if different from Author Affiliation) (10pt regular, center align)
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If a paper is written in Serbian, an abstract is translated into English and given in an extended form as a summary. Also, paper title and affiliation are given in English. If a paper is written in English, an abstract is given in Serbian in extended form. Also, paper title and affiliation are given in Serbian.

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