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TESTING THE LEVEL AND FACTORS OF INSTITUTIONAL RATIONALITY IN MONTENEGRO, SERBIA AND BOSNIA AND HERZEGOVINA

ABSTRACT. This paper analyzes the perception of the respondents in Montenegro, Serbia and Bosnia and Herzegovina regarding the level of institutional rationality and the deficit of basic selected factors that have a predominant impact on it. It uses and explains the conditional notion of institutional rationality as a specific form of bounded economic rationality. It starts from the basic hypothesis that during the long-lasting transition process there were four groups of inhibitors to the introduction and development of institutional rationality in the mentioned countries (rule of law, institutions, civil society and opportunistic behavior), the reason being their deficiency (underdevelopment). From the basic hypothesis, an auxiliary one arises - that overcoming the deficit of the mentioned inhibitors would have a direct and decisive impact on the increase in the level of institutional rationality, and thus, the impact on economic development. This primary hypothesis is experimentally proved throughout appropriate multiple linear regression analysis.

JEL Classification: P37, C39

Keywords: institutions, institutional rationality, alternative institutions, opportunistic behavior, regression analysis.

Introduction

Insufficient level of development of the institutions and dissatisfactory character of their use in practice represent a big problem in Montenegro, Serbia and Bosnia and Herzegovina. Many of the influential economists explained the importance of institutions for economic development. D. North (1987), R. Levine and W. Easterly (2003) concluded that development of institutions is the only variable that can explain the difference in the achieved level of development between countries.

The existence and reproduction of institutional deficit in the economic sense are reflected through the low level of institutional rationality. This problem is manifested through high transaction costs and bad economic indicators. Consequences are numerous, and some of the most significant ones are as follows: low living standard, economic downturn, insufficient motivation to increase economic efficiency, high monopolization, connections between

business and the authorities, degradation of production activity and national resources, underdeveloped ownership structure in entrepreneurial activities, boom of privileged entrepreneurship (individualism), high degree of non-market enrichment and social differentiation, significant scope of disinvestment, etc.

Due to the aforementioned, this paper analyzes perception of the level of institutional rationality (dependent variable) and its basic (selected) impact factors (independent variables) in the mentioned countries of South East Europe (SEE).

In these countries the official economic policy was, and still remains, neoliberal. Many authors emphasize that it actually experienced a fiasco, and that it was even abused by the establishments (nomenklatura) in power. For that reason, it is logical that it is blamed for all of the economic mistakes. Because, an economy is not comprised of economic entities only, which mutually interact, but there is also a system of institutions that guide and direct them.

The recent global economic crisis showed that neoliberal monistic theses of uncontrolled and self-regulatory market are ungrounded. An additional problem in the observed countries of SEE is the opportunistic activity of the so-called alternative institutions, which represent the very heart of the inhibitors to development. It is considered that out-of-market distribution of privileges lead to numerous conflicts not only between the different manners of organization of political and economic activity in the country, but within these social sub-systems as well. Besides, following the expressed institutional monism of a neoliberal type, it was suitable for the development of alternative institutions, which prevented the establishment and strengthening of pluralistic institutions (Delibasic, 2016, p. 150). Numerous economists from the SEE countries agree that deficit, rejection, ignoring and imitation of real institutional changes enabled for the domination of interest-oriented anti-institutional development inhibitors.

State regulation represents an important economic institution. Its function is to create the conditions for the development of all other economic institutions (market and property regulation) in accordance with the social preferences. In order to do that, it is necessary to have efficient legislative, judicial and executive power. For that reason, the rule of law is marked as the first factor of impact on the level of institutional rationality. The second factor of impact is the level of development and efficiency of pluralistic institutions. The third factor of impact is the development of the overall institutional environment, comprised of the civil society and the socio-cultural capital. Finally, the fourth important factor of impact is the existence of the opportunistic behavior (privileged, corruptive and non-market) and the corresponding alternative institutions – shadow ones (Infante and Smirnova, 2016, pp. 215-224).

Since in the considered countries, there is no reliable measurement (objective indicators) of the level of the aforementioned dependent variable (institutional rationality), or of the degree of influence of the four independent variables, we decided to conduct a comprehensive survey and determine the perception of the five groups of respondents in all analyzed countries, through their assessment of the mentioned variables. In doing so, we conditionally started from the fact that the institutions as regulators, coordinators and limiters of economic behavior contribute significantly to the objective existence of institutional rationality. Theoretically, institutional rationality can be conditionally accepted as a specific form of the so-called "bounded rationality", which acts as an alternative form of the neoclassical microeconomic rationality (see more in: Harstad and Selten, 2013, pp. 496-511).

This paper explains and discusses, conditionally, in a fragmented and strictly functional manner (through the prism of institutions as a key factor of economic development), the institutional rationality as a form of macro-economic constraints of economic agents. This is its essential difference as compared to the various theoretical

microeconomic proposals with bounded rationality (behavioral, experimental and psychological), which push the limits of the various theories of choice. In doing so, we accept the interpretation of Yerznkyan B. (2014, p. 29): "*The game is a metaphor to highlight economic effects, the players are economic agents and the rules of the game are the institutions*".

1. Theoretical approach to the economic rationality models

Most authors believe that the essence of economics consists of the analysis of rational choice, by which people are trying to maximize their utility, i.e. in the alternative use of limited resources by the economic operators to satisfy their unlimited needs. Due to the different scientific approaches, the category of economic rationality was given a much wider meaning than the usual neo-classical interpretation (*homo economicus*) and a totally different meaning. It can be viewed at two levels of action (individual and social), as follows: a) the characteristic of a rational and designed human activity (under the influence of certain institutions); and b) immanent characteristic of social systems, which is manifested through the regulations and directing of the economic behavior of individuals and organizations through the institutions (adapted based on: Drašković, 2010).

In both cases, in analytical-methodological terms, there is no doubt an impact of the institutions, primarily economic ones. Economic institutions involve, conditionally speaking and in general terms, the following: state regulation, market regulation and property regulation. The first approach starts from the analysis of initial motives of human economic behavior. A man has a creative, entrepreneurial, productive, consumption, psychological, cultural, moral, ideological and other individuality. But, in all situations when faced with a choice, a man is usually, in one way or the other, more or less aimed at maximizing his own benefit.

This is why it is considered that economic behavior is always closely connected with the problem of a rational individual choice. Research of the concept of rationality made the understanding of many economists even more complex (see e.g. Vriend, 1996, p. 264; A. Smith, 1981) – the ones who believe that rationality always refers to the pursuit of one's own interest. The above and similar understandings were used for apologetic and vulgarized interpretations of individualism and its extremely monistic absolutization. This is particularly the case in the neo-liberal interpretations. J. Elster (1996, p. 24) defined economic rationality in a similar way, as "*finding the best means to achieve the given goals*". However, he rightfully noted that "*the thesis that there are rational choices in every situation is incorrect*" (Ibid, p. 5).

The second approach is broader, as it includes social systems as sets of individuals and organizations. It starts from their control, regulation and coordination by economic institutions, objectively given as the external frame, which stimulates and limits their economic behavior. We believe that in this case it is necessary to bear in mind one important methodological explanation. Namely, the behavior of economic agents in practice may be affected by two types of economic institutions, as follows: a) monistic, which can be dominantly dirigist (state ones) and/or liberal (market ones – Osipov, 2012); and b) pluralistic, which require a combination of all (general) economic institutions: state, market and ownership regulation.

This paper analyzes and conditionally defines institutional (bounded) economic rationality, which is based on a pluralistic type of institutions. It is taken as a general basis and a prerequisite for economic development. It is investigated, but through the prism of the level of deficit of the selected impact factors. It is logically assumed that low level of institutional rationality of a pluralistic type involves domination of monistic and alternative

institutions. The latter ones are understood as anti-developmental and anti-civilizational, as they are oriented towards non-market and opportunistic behavior, i.e. towards a narrow circle of privileged individuals and groups in the society.

By nature, a human is free to choose. But, he always does so in social circumstances involving numerous limitations. These limitations include, inter alia, resource, IT, cognitive, observing and institutional ones. R. Coase (1984, p. 230) and many others wrote about this. Having that in mind, the literature considers (V. Draskovic and M. Draskovic, 2012) three basic (typical) theoretical models of economic behavior of humans, as follows: rational behavior, irrational (spontaneous) behavior and institutional (post-rational) behavior.

The Nobel Prize winner, O. Williamson (1985, p. 45) identifies three basic forms of rationality, as follows: a) strong form (maximization), which represents a choice of the better option out of all the available alternatives (the principle observed by the neoclassic theory), b) weak form (organic rationality) and semi-strong form (bounded rationality), which is accepted, as a cognitive assumption in various interpretations, in the transaction cost economics, because individuals and organizations are economically striving for rational action, but in reality, they only have that capacity to a limited extent (Delibasic, 2014). Let us recall that H. Simon (1961, p. xxiv) defined bounded rationality as “human behavior (that) is intendedly rational but only limitedly so” due to cognitive deficits. In transaction cost economics O. Williamson (1975, 1985) relied on Simon’s definition of bounded rationality, and assumed that actors are bounded rational. However, Foss (2003) believes that interpretation of Williamson (2014) is more focused on incomplete contracts.

1.1. The importance of institutions

Individuals and organizations make choices and adopt decisions while observing the framework imposed by the existing institutions. This means that in practice institutions act as frameworks, coordinators, regulators, limiters and controllers of individual and organizational rationality. Although the impact of the institutions is exogenous with regard to the processes of rational behavior and choice, it is very significant, because it guides the behavior of individuals and organizations in a reliable manner, and rationalizes their interaction.

The level of compliance between institutions, organizations and individuals directly affects the motivation of economic subjects, the way of business regulation, and economic development. Alternative institutions are a classic example of conflict of individual behavior and institutional structure.

Deficit of institutions of state, market and property regulation, as well as their abuse have lead to the affirmation of opportunistic and quasi-institutional behavior, and consequently to the formation and strengthening of alternative institutions. In such institutionally deficient and deformed conditions, economic choice has been reduced and social and economic crisis have been reproduced in the observed SEE countries, in the long run.

Although the neoinstitutional theories accepted the neoclassical principle of methodological individualism, yet, their dominant analysis methodology is holism. This means that the institutions are primary, and individuals are of secondary importance. In addition, they accepted and affirmed the following facts: a) the information is limited and specialized, b) economic processes depend on the effects of social factors, i.e. on what some authors call socio-cultural capital and c) the "institutional man" (as opposed to the utility maximization) minimizes transaction costs in the presence of fraud (conditionally: opportunistic behavior), assymetric information, coercion and alternative institutions.

Neoinstitutional theories do not deny the basic and universal attributes of homo economicus: rationality, sovereignty (autonomy) in decision-making and choice, the

subordination of emotion to the exact calculation (own interests and preferences), acting in accordance with the interests and in conditions of full awareness/ information. But they put the mentioned behavior in the context of universal norms and rules of behavior – institutions, which essentially act in a dual way: restrictive and motivating. Therefore, the economic rationality under the influence of institutions is objectively manifested as a bounded institutional rationality (of a pluralistic type). It is explained by the fact that a man is a social being, an inseparable element of social environment. For that reason, when choosing a man does not follow (respect) his own interests only, but also numerous limitations imposed by habits, norms and rules of behavior, customs, changes in the environment, institutions, ideology, law, moral codes, etc. Institutions as standards of behavior define the trajectory of social and economic development, while culture ensures its sustainability (Sueldo and Streimikiene, 2016, pp. 90-105). Let us recall the words of D. Landes (1998, p. 516): *“If we learned anything from the history of economic development, it is that culture makes all the difference“*.

In his various researches D. North (1981; 1984; 1987; 1990; 1991; 1994) explained that social and economic development vectors follow the logic of real strengthening and development of all (thus, pluralistic) institutions. In correlation with the knowledge progress, this leads to the creation of new technologies and risk reduction, thus, to the creation of new institutions. D. Acemoglu *et al.* (2004) concluded that states with weak institutional (and monistic, alternative – author’s comment) structures are much more prone to crises, measured by the production downturn and other economic indicators.

An important conclusion for our research is the one of these and other authors that economic development requires, inter alia, the following: a) ensuring full independence of the judiciary from the executive, in order to provide for the full protection of property rights (see, for example, La Porta, Lopez-de-Silanes, Pop-Eleches & Shleifer, 1997; 1998; 2004), b) strict limitation of powers of the executive and political parties in the field of property relations, c) elimination of vitiating dependencies between corruption among government officials on the one hand, and market institutions and competition, on the other hand, d) eliminating the possibility of public and hidden illegitimate appropriation of private benefits by government officials and e) eliminating the possibilities of entrepreneurs’ monopolistic access to the political decision-making centers (Fernandez-Guadano, 2015, pp. 192-200).

In the beginning of the post-socialist transition, little was known and written about the institutions. The works referred more to the theoretical elaboration, rather than the implementation of real institutional change in practice. Application of monistic neoliberal economic policy in the analyzed SEE countries ignored not only the theoretical recommendations, but the experience of developed countries, as well (Mesaric, 2012). There is no doubt that in the developed countries strong, high quality and efficient institutions ensure the control over all social processes and eliminate the possible destructive effects and tendencies. They particularly prevent failure of the institutions. The disintegration of the former country and the war environment in SEE countries have contributed significantly to the establishment of institutional improvisation and imitations, which reproduced the institutional vacuum and quasi – institutional violence.

D. North, J. Wallis and B. Weingast (2009) explained the effects of violence in society and suggested ways of limiting it. They understand violence as various forms of social pathology: non-market appropriation of rent, buying of votes, corruption, use of privileges, existence of interest-based coalitions, ignoring the people, protectionism towards its own people, etc. They came to the conclusion that violence can be exercised in two ways: political manipulation of the economy in order to develop privileged interest groups and institutional stimulation of political and economic competition, in order to create a stimulating development conditions.

In this regard, the aforementioned authors (Ibid) analyzed and explained characteristics and differences between the so-called natural state (with limited access to political and economic resources) and the state of order (with open access), which is characteristic of the institutionally developed countries. The first type corresponds to the existence of numerous limiting quasi-institutional and other development factors. The second type is characteristic of the institutionally developed countries, with numerous motivating development factors. The above theoretical and methodological concept has enabled North, Wallis and Weingast (Ibid) to thoroughly investigate violence as a key social problem. Accordingly, they posed the basic dilemma: to rob or to create, to coerce or to produce?

In countries with the order of limited access there are some organizations and groups of alleged and self-appointed elites, which extract rent based on privileges and some tacit, non-market, "special rights". These "rights" are created in the institutionally underdeveloped, deficient and "vacuum" environments, characterized by the dominance of personal relationships and "connections". For that reason, the order is unstable and volatile, politics are connected with the economy and dominate it, privileged elites as a minority directs the majority, alternative institutions are dominant (and they are extremely personified). Organizational structures are very unstable, and the institutional structure is weak and more formal. Strengthening and concentration of privileges and the consequent enrichment of rare and privileged individuals, criminalization of the economy and society, social stratification, impoverishment and apathy of broad layers of the population, futile promises of a better life and institutional changes, as well as various other expensive improvisations by the economic "reformists" led to the conversion of vice into ideals.

1.2. Definition of institutional rationality

In a survey we offered to the respondents there is an explanation that institutional rationality of a limited type is a hypothetical model, which presupposes the existence of institutional pluralism along the lines of developed countries. This model promotes and provides for limited rational economic behavior of individuals and organizations, because it directs such behavior through advanced, efficient and pluralistic institutions. In this way, uncertainty, violence, opportunistic behavior and transaction costs are reduced, and the effects of alternative institutions are discouraged, suppressed and punished.

Unlike instrumental rationality (*homo oeconomicus*) and procedural rationality (*homo psihologicus* – see more in: Winter, 1986; North, 1990), B. Yerznkyan (2012) proposed the concepts of institutional man and institutional rationality. This relates to the economic order in which all institutions (formal and informal) affect economic development in a realistic, positive and pluralistic manner. In such an order, economic balance is considered to be relative, and its stability predominantly depends on the quality of the institutional environment.

Individuals are institutional actors, who meet the same (or similar) and unique possibilities of choice. The choice is always institutionally conditioned, by the preferences of the actors. Although the rationality of individuals is limited by their cognitive and computational capabilities, their objective decisions, views and behavior have an institutional character as well as their adaptation, state B. Yerznkyan, M. and N. Grgurevic Delibasic (2014, pp. 24-25).

Economic literature shows that developed and pluralistic institutional environment is a necessary framework for economic development. This refers to the combination of efficient formal and informal institutions in general, i.e. state, market and ownership regulation (in the economic sphere) and the legal state, political democracy, social capital and all other social subsystems (in the social sphere – Vveinhardt and Andriukaitiene, 2015, pp. 205-210).

It is important to mention that the model of institutional rationality implies institutional pluralism, which stimulates economic activity, sanctions opportunism, has a positive impact on economic results and distribution of resources, reduces transaction and transformation costs, stipulates and protects property rights, encourages the formation of various forms of organizations, optimizes contracts, etc.

2. Methodological approach in the research of perception of institutional rationality in Montenegro, Serbia, and Bosnia and Herzegovina

Taking into account the aforementioned theoretical interpretation, as well as the practice of developed countries, dominated by developed and efficient institutional pluralism, in this paper we decided to explore: a) the role and importance (conditionally speaking: level) of institutional rationality as a specific type of limited economic rationality and b) its basic limiting factors/ inhibitors. The study included perception of 600 respondents in the three SEE countries.

For the purpose of this research there are two important methodological aspects to take into account:

- For a better and easier understanding of the survey, we called the limited rational behavior of institutional – pluralistic type "institutional rationality", because we identified it with the so-called post-rational type of bounded rationality, dominated by pluralistic, developed and efficient institutions. We used the aforementioned term as a dependent variable. It hypothetically reflects the state of a mixed economy and society, which has by far demonstrated its strengths and success in practice in the developed countries, and it is confirmed as such in the works of many economists.
- The research is based on an attempt to verify (or discard) the basic hypothesis, according to which in the three analyzed SEE countries there is a significant correlation between the defined dependent variable and four independent variables. At the same time, some basic components (characteristics) of the institutional monistic (or: quasi-monistic) regime were defined as independent variables, because objectively there a deficit of these components in the observed countries.

Selective choice of the mentioned independent variables is the result of our subjective belief that the establishment and operation of a modern and sustainable economic development (Ciegis, Dilys and Mikalauskiene, 2015, pp. 106-109), which is dominated by the economic behavior of institutional rationality of a limited and pluralistic type (among other conditions), requires the following factors: a) the rule of law (as a guarantor of freedom, the absence of all forms of privileges and protection of property rights), b) developed, pluralistic and efficient institutions (as regulators that civilization proved as efficient), coordinators, controllers, stimulators and limiters of behavior), c) a developed civil society and socio-cultural capital, and d) consistent fight against opportunistic behavior (privileged and non-market behavior) and appropriate alternative institutions. In all that, we have abstracted many other significant factors of impact (global, social, political, economic, educational, resource and other factors).

2.1. Conditional explanations (definitions)

The respondents were offered clear explanations (conditional definitions) of all the mentioned factors, which appear as one dependent variable (institutional rationality) and four independent variables, as follows:

- Institutional rationality represents a hypothetical model (order) that affirms limited rational economic behavior of individuals and organizations, which is directed through the

developed, efficient and pluralistic institutions and which discourages suppresses and sanctions the actions of alternative institutions and privileges of the government nomenclatures.

- Rule of law involves legally limited, controlled and responsible political rule that ensures and guarantees the existence of freedoms, human rights and security, reliable institutions, general democracy and legality.
- Institutions are rules, coordinators, regulators and limiters of human behavior, a prerequisite for economic development, general framework for mutual interaction between individuals and organizations, stimulators of lawful behavior.
- Civil society is a set of voluntary social organizations and an opposite of the state structures, market rules and family-based interest groups. It represents an objective instrument for the protection of people from the authorities. Socio-cultural capital is comprised of the general social relations and values (culture, religion, moral, ideology, tradition, habits, trust, codes of conduct, mentality) and represents a meta-framework and environment in which institutions exist and operate.
- Opportunistic behavior is contrary to the legal/ lawful behavior, because it represents profitable departure from the agreed conditions, planned and hidden actions of the economic agents in accordance with their own interests, which is contrary to the moral norms and the interests of the other economic agents. Alternative institutions (shadow ones) are parallel institutions, which are based on the illegal, non-market. Quasi-institutional and annuity-oriented behavior, based on privileged interests and opportunism. They are a classic example of conflict between individual (and organizational) behavior and institutional structure. Alternative institutions have personified, illegal, socio-pathological and destructive character. They have a dysfunctional effect on the real institutional change, as they lead to the institutional fiasco and affect the reduction of social and economic choices.

In a sense, we used the econometric research by D. Acemoglu, S. Johnson, I. Robinson and Y. Thaicharoen (2004) as a conceptual model for the mentioned research. They explored the degree of stability of the weak institutional structures in developing countries. However, our study was aimed at demonstrating the respondents' perception of the degree of destabilizing (inhibiting) effect of the selected dependent variables on the institutional rationality in the analyzed SEE countries. As a basis for our research we used a survey to examine perceptions of 600 respondents, evenly distributed – 200 respondents in each country: Montenegro, Serbia and Bosnia and Herzegovina. All respondents were divided into five categories of 40 experts: university professors and assistants (doctors and masters of sciences), entrepreneurs, employees in state authorities, pensioners and the unemployed (all with university and higher education).

3. Application of multiple linear regression analysis on a specific problem

The idea is to determine a mathematical model using multiple linear regression analysis, that is, a functional relationship between the dependent variable (Y): *level of limited institutional rationality* and independent variables (X_1 , X_2 , X_3 and X_4): (a) *deficit of the rule of law*, (b) *deficit of developed, pluralistic and efficient institutions*, (c) *the underdevelopment of civil society and socio-cultural capital*, and (d) *opportunistic behavior (privileged and non-market) and appropriate alternative institutions*, respectively.

Our goal is to estimate the realistically expected mean value of the dependent variable (\bar{Y}), based on individual estimation of the respondents. Since the respondents have estimated, through a survey and on their own discretion, the dependent variable Y and independent variables (X_1 , X_2 , X_3 and X_4), our task is, in line with the requirements of multiple linear

regression, to determine the coefficients $(b_0, b_1, b_2, b_3, b_4)$ and to calculate \bar{Y} , using equation (1):

$$\bar{Y} = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 \quad (1)$$

Where

\bar{Y} – is the mean expected value of the dependent variable;

b_0 – is Y-axis intercept, determined on the basis of an appropriate sample;

b_1, b_2, b_3, b_4 – are coefficients of variables $X_i, i = \overline{1,4}$, respectively, or slopes of the corresponding lines.

This practically means that for any new value of each independent variable from a predefined interval, we can estimate the value of the dependent variable. It should be said that \bar{Y} is „average“ estimated value, because it is the mean value of the probability distribution of possible values of Y for a given value $X_i, i = \overline{1,4}$. To determine \bar{Y} is used the least-squares method (Bertskas *et al.*, 2008). In fact, our goal here is to determine the coefficients $(b_0, b_1, b_2, b_3, b_4)$, so as to minimize the sum of squared errors (SSE), which is represented by formula (2):

$$SSE = \sum_{k=1}^n (Y_k - \bar{Y}_k)^2 = \sum_{k=1}^n (Y_k - (b_0 + b_1X_{1k} + b_2X_{2k} + b_3X_{3k} + b_4X_{4k}))^2 \quad (2)$$

Where

Y_k – is actual value of the dependent variable, given by the k respondents ($k = \overline{1, n}$);

\bar{Y}_k – is the estimated value of the dependent variable on the basis of the model, in the case of k respondents ($k = \overline{1, n}$);

n – is the total number of respondents (per 200 in Montenegro, Serbia and Bosnia and Herzegovina), $k = \overline{1, n}$.

Using the least-squares method, here is actually determined a straight line, which minimizes the sum of vertical differences for each pair of points (Balakrishnan et al., 2007, p. 551). In other words, identified is a straight line that best fits the given set of points, by determining the optimal value of Y-axis intercept (b_0), as well as coefficient (b_1, b_2, b_3, b_4) , in order to obtain a more accurate value of \bar{Y} for the given (estimated) values of $X_i, i = \overline{1,4}$ and Y (for $\forall k, k = \overline{1, n}$). The realization of multiple linear regression is very complex, and therefore it is better to leave it to the computer. For this purpose can be used: SPSS (Sheridan and Coakes, 2013; Pallant, 2011), special Excel VBA tools as Excel Modules Solver, which we used in our analyzes, and other similar tools.

3.1. A brief description of analyzed statistical values

In addition to the forecasted average value of the dependent variable \bar{Y} and vector $(b_0, b_1, b_2, b_3, b_4)$, based on the model applied here, determined can be the following statistical values: mean absolute deviation, mean square error, mean absolute percent error, standard error of regression estimate, correlation coefficient and coefficient of determination.

The formulas used to calculate these values are given below, as well as their brief explanations.

Mean absolute deviation (MAD), indicates the numbers on how much the value of the dependent variable, obtained through multiple regression analysis, corresponds to the estimated value by the respondents, or in other words, to what extent the model reflects the perception of the respondents (3).

Mean square error (MSE) is the mean value of squares of the individual errors of assessment. In other words, if we have n number of respondents, MSE value is calculated using the formula (4). MSE points expressed deviations.

Mean absolute percent error (MAPE), indicates the error between the estimated value and value of dependent variable as a percentage, obtained by using the model. MAPE is the simplest statistical value for interpretation (5).

The formulas for determining the values of the previously generally described errors in the model are given below:

$$\text{MAD} = \sum_{k=1}^n |A_k - F_k| / n \quad (3)$$

$$\text{MSE} = \sum_{k=1}^n (A_k - F_k)^2 / n \quad (4)$$

$$\text{MAPE} = 100 \sum_{k=1}^n [|A_k - F_k| / A_k] / n \quad (5)$$

Where

A_k – is an actual value of a variable (value estimated by respondents), $k = \overline{1, n}$;

F_k – is an estimated value (by model), $k = \overline{1, n}$;

n – is a number of respondents (per 200 in Montenegro, Serbia and Bosnia and Herzegovina).

Standard error of the regression estimate (SE), is also called the standard deviation of regression. This statistical value is suitable for the formation of the so-called confidence intervals around the regression line. It indicates how much the value of the dependent variable, obtained by the model, can vary (numerically) (6).

Correlation coefficient – r, is used to estimate the strength of linear relationships. Generally, if correlation coefficient is higher than 0.6, it is considered to be a strong linear relation (7).

Coefficient of determination – r^2 , is a value between 0 and 1, which indicates to what extent (percentage) dependent variable depends on the independent variables included in the model. E.g. if r^2 is 60%, it means that the value of the dependent variable 60% depends on the independent variables in the model, and 40% on other factors (variables) that are not included in the model (8).

General formulas for calculating the standard deviation, correlation coefficient, and coefficient of determination are given below:

$$\text{SE} = \sqrt{\sum (A_k - F_k)^2 / (n - 2)} \quad (6)$$

$$r = \frac{n \sum A_k F_k - \sum A_k \sum F_k}{\sqrt{[n \sum A_k^2 - (\sum A_k)^2][n \sum F_k^2 - (\sum F_k)^2]}} \quad (7)$$

$$r^2 = \left\{ \frac{n \sum A_k F_k - \sum A_k \sum F_k}{\sqrt{[n \sum A_k^2 - (\sum A_k)^2][n \sum F_k^2 - (\sum F_k)^2]}} \right\}^2 \quad (8)$$

Where

A_k – is an actual value of a variable ($k = \overline{1, n}$);

F_k – is an estimated value ($k = \overline{1, n}$);

n – is a number of respondents (per 200 in MNE, SRB, and BaH).

3.2. Examination and analysis of the results

The respondents, namely per 40 experts (university professors and assistants), entrepreneurs, employees in state bodies, retirees, and the unemployed (with university and higher education) from Montenegro, Serbia and Bosnia and Herzegovina (a total of 200 per each listed country), were asked to estimate the dependent (Y) and four independent variable in the model (X_1, X_2, X_3 and X_4), each with a number on a scale from 1 to 5. In fact, respondents were supposed to estimate the *level of institutional limited rationality* (dependent variable), as well as the extent to which the following independent variables: (a) *deficit of the rule of law*, (b) *deficit of developed, pluralistic and efficient institutions*, (c) *the underdevelopment of civil society and socio-cultural capital*, and (d) *opportunistic behavior (privileged and non-market) and appropriate alternative institutions* - affect the dependent, or the level of limited institutional rationality. Also, the values of statistical parameters, described in the previous chapter, have been determined in order to analyze the reliability of the resulting predictive model.

3.3. Discussion on the results of multiple regression analysis

Using Excel Modules Solver are obtained the results of multiple regression analysis, for all categories of respondents, and for each of the analyzed countries, Montenegro, Serbia and Bosnia and Herzegovina. In fact, determined are coefficients in a function of the dependent variable, that is, the slice on the Y-axis (b_0) and coefficients (b_1, b_2, b_3, b_4) which correspond to the independent variables, $X_i, i = \overline{1, 4}$ seriatim. Based on these values and average values, estimated by the respondents, for each of the independent variables, are calculated „average“ values of the dependent variable \overline{Y}_s . These values are shown in Table 1. Using model are obtained the values: 2.465; 2.426 and 2.470, respectively for the case of Montenegro, Serbia, and Bosnia and Herzegovina. Given that the participants have evaluated the level of limited institutional rationality by one number on a scale of 1 to 5, this is a relatively low level.

Based on the mean estimated values of influences caused by independent variables (denoted here as F1, F2, F3 and F4) on the dependent variable, which are relatively high in all cases (see *Tab. 1* and *Tab. 3*), particularly in the case of unemployed and pensioners, it can be concluded as follows: unemployed have lost confidence in the independent functioning of the

system institutions due to their vulnerable social-economic position, as well as the pensioners, who are dissatisfied with their low pensions and the like.

Table 1. Mean values of the dependent variable \bar{Y}_s in the case of Montenegro, Serbia, and Bosnia and Herzegovina (integral)

	Montenegro (MNE)				Serbia (SRB)				Bosnia and Herzegovina (BaH)			
	F1	F2	F3	F4	F1	F2	F3	F4	F1	F2	F3	F4
	3.50	3.68	3.44	4.00	3.56	3.72	3.27	4.08	3.61	3.79	3.39	4.07
b_0	5.211				4.748				4.837			
b_1	-0.117				-0.423				-0.219			
b_2	-0.038				-0.130				-0.277			
b_3	-0.459				-0.172				-0.031			
b_4	-0.155				0.057				-0.103			
\bar{Y}_s	2.465				2.426				2.470			

Source: own.

Tab. 2 contains numerical values: mean absolute deviation (MAD), mean square error (MSE), mean absolute percent error (MAPE), standard error of the regression estimate (SE), correlation coefficient (r), and coefficient of determination (r^2).

Table 2. Errors, coefficients of correlation and determination

	Montenegro (MNE)	Serbia (SRB)	Bosnia and Herzegovina (BaH)
MAD	0.481	0.494	0.468
MSE	0.371	0.371	0.363
MAPE	22%	24%	23%
SE	0.617	0.617	0.610
r	0.565	0.562	0.447
r^2	0.320	0.315	0.200

Source: own.

Based on the data in Tab. 2, we conclude the following:

- (i) Mean absolute percent error in all three analyzed cases (Montenegro, Serbia, and Bosnia i Herzegovina) is low and amounts seriatim: 22%, 24% i 23%;
- (ii) \bar{Y}_s value can vary based on standard error of regression estimate (SE) for the values: ± 0.617 in the case of Montenegro, ± 0.617 in the case of Serbia, and ± 0.610 in the case of Bosnia and Herzegovina;
- (iii) Correlation coefficient values (r) are below 0.6 in all three analyzed cases, suggesting a linear dependence, which is slightly weaker than the one that could be considered „strong“;
- (iv) Coefficient of determination (r^2) indicates that \bar{Y}_s is determined in only 32% on the basis of the dependent variables in the model, for example, in the case of Montenegro, and that, 68% depends on other factors, which are not included in the model. Aforesaid is explained by the following factors: *first*, the survey included five groups

of respondents, of which three groups of people, who in some way have a satisfactory position in society, and a relatively benevolent perception of institutional rationality (in general, and in relation to pensioners and the unemployed as socially disadvantaged and negative categories), and *second*, the respondents are experts, who know the effects of many other socio-pathological factors, the crisis in legacy and paternalism, the modest resources, the negative impact of the civil war and economic sanctions, etc. Similar conclusions can be drawn in the case of Serbia, and Bosnia and Herzegovina.

Following are the graphs (*Fig. 1-3*) showing the actual values of the dependent variable Y, determined on the basis of subjective estimation of 200 respondents in Montenegro, Serbia, and Bosnia and Herzegovina, as well as those calculated by the model, that is, \bar{Y} .

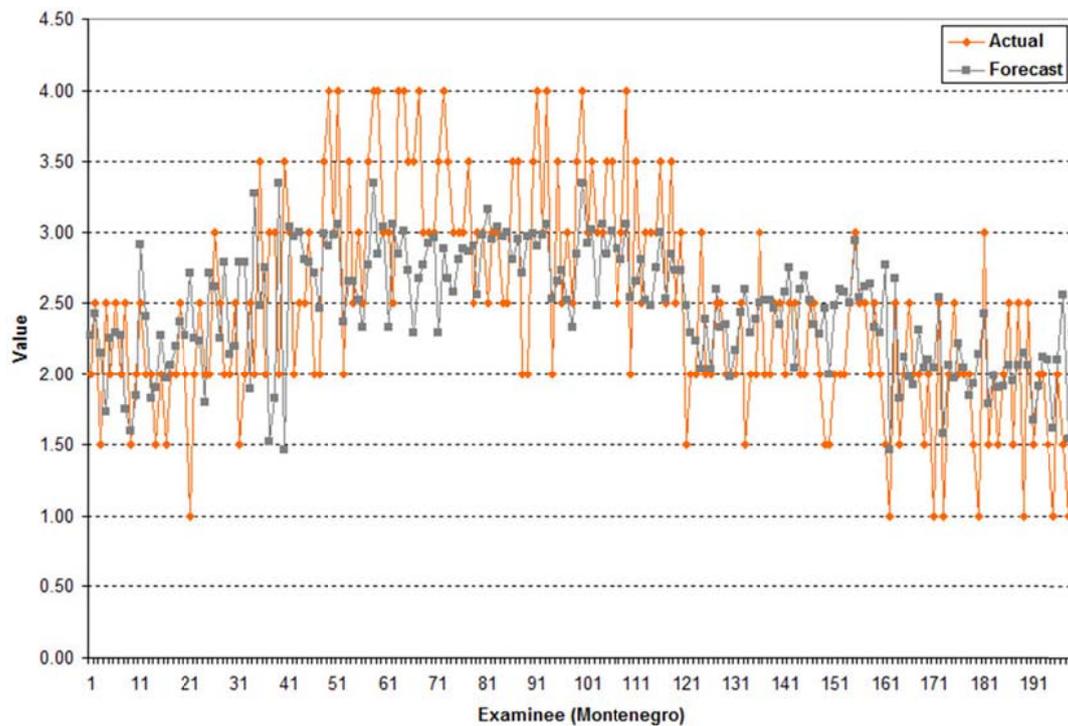


Figure 1. The values of the dependent variables, estimated by respondents and those determined by the model, in the case of Montenegro

Source: own.

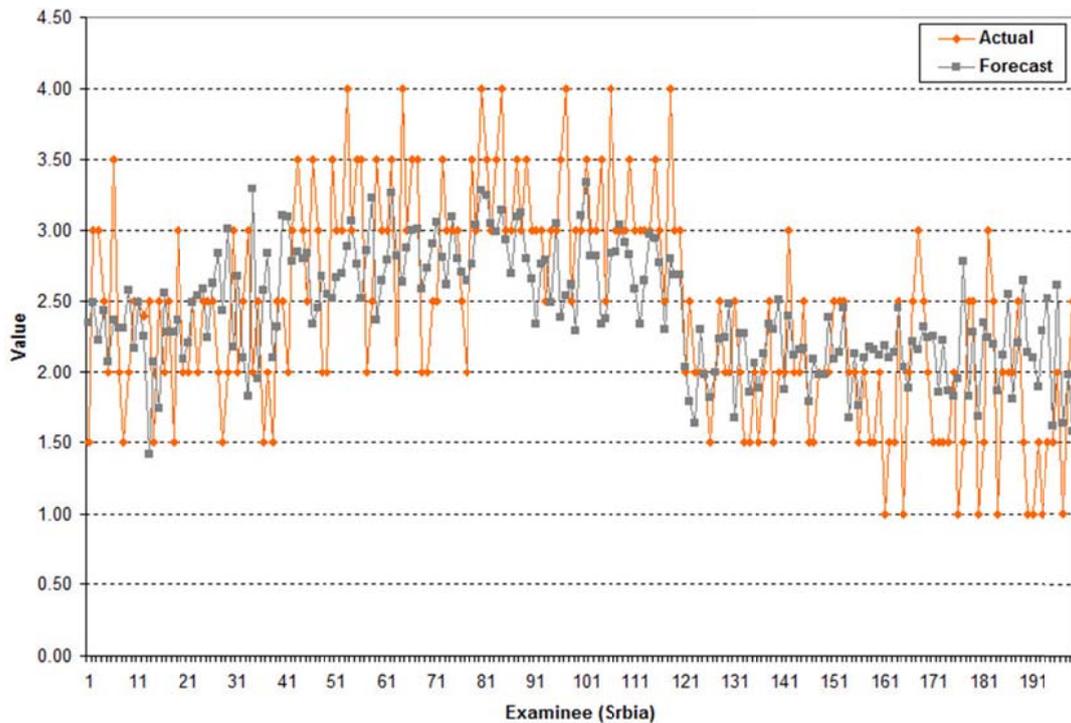


Figure 2. The values of the dependent variables, estimated by respondents and those determined by the model, in the case of Serbia
Source: own.

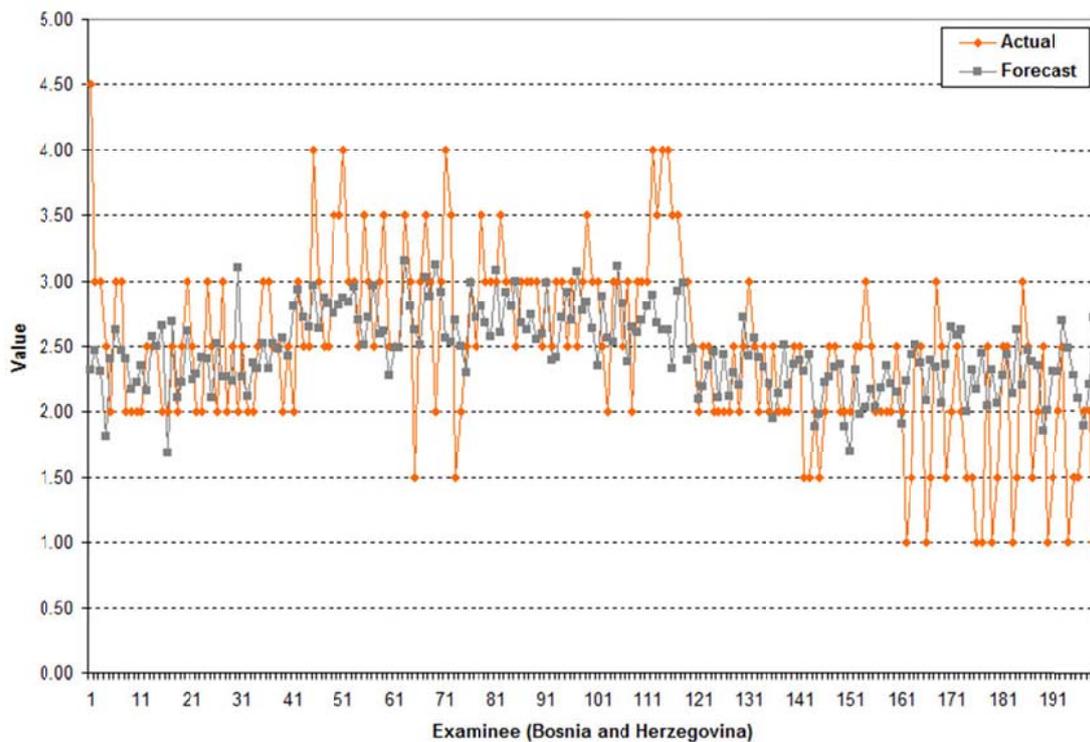


Figure 3. The values of the dependent variables, estimated by respondents and those determined by the model, in the case of Bosnia and Herzegovina
Source: own.

By analogy, it is possible to perform calculations for each of the categories of respondents: experts (university professors and assistants), entrepreneurs, employees in state bodies, retirees, and the unemployed (with university and higher education) from Montenegro, Serbia, and Bosnia and Herzegovina. The results of these analyses are shown in *Table 3*.

Table 3. Mean values of the dependent variable \bar{Y}_s in the case of Montenegro, Serbia, and Bosnia and Herzegovina, according to different categories of respondents

<i>Experts (university professors and assistants)</i>												
	Montenegro (MNE)				Serbia (SRB)				Bosnia and Herzegovina (BaH)			
	F1	F2	F3	F4	F1	F2	F3	F4	F1	F2	F3	F4
	3.64	3.81	3.81	4.05	3.52	3.70	3.81	4.03	3.61	4.04	4.09	4.21
<i>I</i>	2				3				4			
b_0	1.150				1.957				3.389			
b_1	0.388				0.363				0.101			
b_2	-0.128				-0.231				-0.106			
b_3	0.107				-0.142				-0.233			
b_4	-0.072				0.100				0.021			
\bar{Y}_s	2.189				2.247				2.461			
MAD	0.355				0.371				0.391			
MSE	0.219				0.320				0.234			
MAPE	18%				18%				16%			
SE	0.500				0.480				0.517			
r	0.438				0.436				0.284			
r^2	0.192				0.190				0.081			
<i>Entrepreneurs</i>												
	Montenegro (MNE)				Serbia (SRB)				Bosnia and Herzegovina (BaH)			
	F1	F2	F3	F4	F1	F2	F3	F4	F1	F2	F3	F4
	2.94	3.20	2.99	3.84	2.95	3.60	2.68	3.94	3.04	3.45	2.85	3.80
b_0	2.748				-0.338				3.476			
b_1	0.423				0.008				-0.089			
b_2	0.228				0.436				-0.121			
b_3	-0.338				0.139				0.204			
b_4	-0.153				0.328				-0.127			
\bar{Y}_s	3.125				2.919				2.887			
MAD	0.416				0.424				0.456			
MSE	0.253				0.250				0.347			
MAPE	14%				16%				17%			
SE	0.543				0.534				0.630			
r	0.553				0.516				0.243			
r^2	0.306				0.267				0.059			
<i>Employees in state bodies</i>												
	Montenegro (MNE)				Serbia (SRB)				Bosnia and Herzegovina (BaH)			
	F1	F2	F3	F4	F1	F2	F3	F4	F1	F2	F3	F4
	2.85	3.28	3.01	3.51	3.04	3.18	2.78	3.83	3.38	3.24	2.98	3.85
b_0	3.956				4.288				2.881			
b_1	0.137				-0.268				0.056			

RECENT ISSUES IN ECONOMIC DEVELOPMENT

<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
b_2	0.111	-0.128	0.001
b_3	-0.561	0.081	-0.027
b_4	0.002	-0.027	-0.001
\bar{Y}_s	3.027	3.186	2.988
MAD	0.408	0.293	0.303
MSE	0.231	0.140	0.205
MAPE	14%	9%	11%
SE	0.513	0.400	0.484
r	0.537	0.425	0.074
r^2	0.289	0.180	0.006

Retirees

	Montenegro (MNE)				Serbia (SRB)				Bosnia and Herzegovina (BaH)			
	F1	F2	F3	F4	F1	F2	F3	F4	F1	F2	F3	F4
	4.16	4.05	3.24	4.31	4.25	4.14	3.28	4.28	4.04	4.20	3.44	4.34
b_0	2.586				3.803				2.478			
b_1	0.004				-0.307				-0.234			
b_2	0.171				-0.103				0.009			
b_3	-0.073				0.194				0.249			
b_4	-0.202				-0.165				-0.052			
\bar{Y}_s	2.188				2.000				2.200			
MAD	0.294				0.266				0.262			
MSE	0.122				0.105				0.097			
MAPE	14%				14%				12%			
SE	0.374				0.347				0.333			
r	0.404				0.483				0.456			
r^2	0.163				0.232				0.208			

Unemployed

	Montenegro (MNE)				Serbia (SRB)				Bosnia and Herzegovina (BaH)			
	F1	F2	F3	F4	F1	F2	F3	F4	F1	F2	F3	F4
	3.94	4.06	4.13	4.26	4.03	3.99	3.81	4.36	4.00	4.03	3.08	4.16
b_0	4.060				2.569				1.894			
b_1	-0.021				-0.377				0.038			
b_2	0.217				0.178				-0.172			
b_3	-0.317				0.021				0.251			
b_4	-0.408				-0.015				-0.104			
\bar{Y}_s	1.811				1.773				1.688			
MAD	0.354				0.480				0.513			
MSE	0.202				0.312				0.348			
MAPE	22%				31%				33%			
SE	0.481				0.597				0.630			
r	0.536				0.328				0.262			
r^2	0.287				0.108				0.063			

Source: own.

Comments in relation to the numerical values in *Tab. 3*, can be derived by analogy from the explanations afore given in *Table 1* and *Table 2*.

Conclusions

Exploring the conditional concept of institutional rationality as a specific form of limited economic rationality, through the perception of 600 respondents of expert type in Montenegro, Serbia, and Bosnia and Herzegovina, we came to the conclusion that the level is relatively low, i.e. below average.

The study verified the basic hypothesis concerning the negative impact on four groups of hindering (scarce) factors in the observed countries (the rule of law, institutions, civil society and opportunistic behavior). Their underdevelopment in the long period of transition has not favored the formation and development institutions, and consequently the development of institutional rationality. A logical conclusion is that the increase of institutional rationality level, and consequently economic development, requires overcoming the deficits of those hindering factors.

The results obtained by the mathematical model, which is based on multiple linear regression analysis, confirm the validity of the basic hypothesis. The estimated mean value of institutional rationality levels is relatively low, while the values of the factors affecting those levels are relatively high, subjectively estimated by respondents in all analyzed variations.

Statistical analysis of the results has proven that complex and multi-dimensional socio-economic impacts on the institutional rationality can not be limited only to the factors discussed herein (relatively low value of coefficient of determination). Also, it has been shown that the linear relationship is not the best form of functional dependence, which would describe the phenomenon considered (relatively low value of the correlation coefficient).

Identified deficiencies should serve a future research as an incentive for the inclusion of a large number of variables, and possibly experimenting (Polterovich, 2012) with other forms of the prediction models.

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