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Macroeconomic model of institutional reforms' influence on economic growth of the new EU members and the Republic of Croatia

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ABSTRACT

The aim of this paper is to research, theoretically and empirically, the impact of institutional reforms on economic growth in transition countries (new European Union members) and Croatia, in the period from 1996 to 2012. In order to prove the hypothesis, we will use panel analysis of transition economies and Croatia, namely the Arellano–Bond dynamic panel analysis. The analysis includes two dependent variables (gross domestic product per capita [G.D.P./p.c.]and the share of export in G.D.P.) and five independent variables (total Heritage Index of Economic Freedom, Worldwide Governance Indicators (W.G.I.) government effectiveness indicator, W.G.I. rule of law indicator, corruption perception index and the index of institutional reforms in transition countries). The results show that there is a significant positive impact of institutional reforms on the economic growth of transition countries and Croatia, which creates preconditions that are essential for the future growth rate of the Croatian economy.

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1. Introduction

Institutions and the state in the broadest sense have a strong impact on the economy due to the possibility of creating an enabling environment for economic growth and development. Institutional changes aim at adapting to new challenges.

In the scientific and professional literature, interest in discovering the causes of institutional differences between countries, as well as the ways in which institutions can affect economic performance, has increased. Likewise, the two-way causal link of institutions and development has become a subject of interest, so that the possibility that institutions affect economic development is more emphasised, as well as the idea that economic development leads to qualitative institutional changes. With the development and progress of a country, the needs of existing organisations also develop, and therefore they will try to change the institutional framework to achieve even better performance.

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The lack of implementation of institutional reforms can lead to a lack of positive development effects, which in turn can lead to far-reaching macroeconomic consequences on investment, technological development, employment and overall economic growth and development. Therefore, this paper will present a comprehensive analysis of institutional reforms, define the most important problems and offer appropriate solutions.

Using scientific methods, this paper will prove that there is a significant positive impact of institutional reforms on the economic growth of transition countries (new European Union members) and Croatia, which implies the following: 1. that there is a positive correlation link between institutional development, economic growth and growth in exports. Support of relevant institutions has a positive impact on achieving better economic results. 2. Development of informal institutions is a long process and their change takes years. Countries with similar informal institutions and macroeconomic, demographic and other settings have certain common characteristics. Such an approach does not preclude the view that each country must develop their own ways of implementing institutional changes because, due to the specific characteristics of each country, simply copying and implementing a model might be unsuccessful and inefficient. 3. The institutions that are directly related to transaction costs, such as the efficiency of government, but also institutional segments that directly affect economic activities, such as the level of competitiveness, have influence on the economic performance of transition countries, including Croatia. Improving the performance of such institutions would result in better economic results for Croatia.

Transition countries represent a group of countries with very similar initial conditions, and they represent an extremely important sample for the study of the impact of institutional reforms on development, because their example can show that institutional changes have significant economic impact.

The institutional system that reduces transaction costs provides support for economic growth and development by encouraging innovation, leading to technological progress, which provides an incentive for economic growth and development.

This paper consists of four interrelated parts. The first part, Introduction, defines the basic themes and issues of the research, raises the hypotheses that are later tested and describes the detailed structure of the work. The second part briefly reviews the literature and theoretical features of the impact of institutional reforms on economic growth. The third part contains a description of the data, methodology and empirical results obtained using the Arellano–Bond dynamic panel analysis. In the fourth and last part of the paper, concluding observations are presented.

2. Literature review

Authors who are researching the impact of institutions on economic growth agree that the influence exists and that it can be measured, but there are often differences in the significance of this impact as well as in the causes of the growth of institutions, and consequently economic growth and development. Most authors emphasise the protection of property rights, political freedom, quality and good government, and the level of political instability. Institutions act through invisible channels, and the fact is that the lowering of transaction costs everywhere was a result of good performance of institutions, and that the reduced transaction costs led to economic growth. From a pool of a large number of studies in

recent years that prove the impact of institutions on economic performance, only some of the most important papers will be mentioned.

The first survey of institutional quality was made by Barro (1991), who included the number of revolutions and assassinations as an indicator of institutional quality in long-term growth in the period from 1960 to 1985 in 98 countries. He proved a positive relationship of institutional quality and economic growth. After this research, the indicators that were used for the assessment of institutional quality were improved, but the principle of econometric models remained mostly the same.

Improving the indicators led to the introduction of subjective indicators made by commercial agencies for the needs of international investors. Research by Mauro (1995) and Knack and Keefer (1995) in the evaluation of institutions included for the first time the following indicators: B.E.R.I. – *Business Environment Risk Intelligence*, I.C.R.G. – *International Country Risk Guide*, and B.I. – *Business International*. Mauro found a statistically significant relationship between institutions, investment and economic growth. As independent variables, he used corruption, bureaucracy efficiency index and political stability index. The problem of causality was noticed in his research, meaning that there was the possibility that the observed dependent variables were affecting the independent ones. Once this problem had been solved, it was concluded that a higher index of bureaucracy efficiency led to high rates of growth. Knack and Keefer's research found that the growth and quality of institutions led to higher G.D.P. growth rates.

Causality was noted by Chong and Calderon (2000), finding that it was two-way and that institutions promoted growth, but also that growth itself led to the creation of new, better institutions. This is the principle of backlinks between institutions and economic growth. The authors have shown that the impact of institutions on economic growth was higher in poor countries.

Research by Rodrik, Subramanian, and Trebbi (2004) showed that the importance of quality institutions for economic growth outweighed the importance of geographical location and level of integration. In this research, institutions were measured by the rule of law and protection of property rights. They proved the great importance of institutions for economic growth.

Easterly, Ritzen, and Woolcock (2005) proved that the level of social cohesion was essential to generate trust and patience necessary to conduct reforms. Citizens must trust the government that the short-term losses that inevitably accompany reforms would be generously compensated by long-term gains. Good institutions have a crucial role in that trust. Consequently, good institutions lead to economic growth.

The fact that differences in economic institutions are a fundamental cause of economic development is proven by Acemoglu in his research, where he also distinguishes economic and political institutions. A country's economic institutions determine the initiatives and restrictions for all economic activity and shape economic results. As such, they are also a matter of social choice, because of the consequences they bring. Since various interest groups and individuals have benefited from various economic institutions, there is usually conflict about social choices, which is ultimately resolved in favour of those groups with greater political power. The distribution of political power is determined by the distribution of political institutions and the distribution of resources (Acemoglu, Johnson, Robinson, & Thaicharoen, 2005). Political institutions allocate *de jure* political power, while groups with greater economic power generally have a greater *de facto* political power. Political institutions and the distribution of resources change over time, as

economic institutions influence the redistribution of resources and as the groups that today have *de facto* political power are trying to change political institutions to increase their *de jure* political power in the future. Economic institutions that foster economic growth arise when political institutions allocate power to the groups whose interests are in preserving and protecting the property rights of all who are the owners of goods, when they seek to create effective constraints for the holders of political power, and when there are relatively few rents that might devolve to the holders of political power.

In another study, Acemoglu (2003) answers the question of whether the erroneous and distorted macroeconomic policies of some countries that included high inflation, high budget deficits and unrealistic exchange rates led to macroeconomic instability and slow growth in the aftermath of World War II, or whether there was another cause. According to him, the countries that followed bad and inconsistent macroeconomic policies had weak institutions, including political ones, which did not restrict politicians and political elites, which were inefficient in terms of protection of property rights for investors, and have favoured the spread of corruption and a high degree of political instability. Once control of the effects of institutions is undertaken, macroeconomic policy can only have a minor impact on instability and crisis. According to him, wrong macroeconomic policies are symptoms of existing institutional problems, not the main cause of instability. Existent institutional problems are reflected in the economy through a number of channels, microeconomic as well as macroeconomic. Therefore, the cause of slow growth lies in institutions, and macroeconomic policies that are not conducive to growth are their consequence.

Ulubasoglu and Doucouliagos (2004), exploring the relationship of institutions and economic growth in a model of 119 countries, found that overall there were significant direct and indirect effects of political and economic freedom on economic growth. In this, economic freedom has a positive and significant effect on productivity, capital accumulation and on the growth of the labour force and human resources.

Vijayaraghavan and Ward (2001) examined the relationship of institutional infrastructure and the rate of economic growth among 43 countries between 1975 and 1990, reaching the conclusion that, for economic growth, most important were institutions protecting property rights and the size of government. However, they called for caution in interpreting the results on the size of government by noting that the state should allow economic processes, but should also have an incentive and regulatory role. In this respect they emphasise that it should not be construed that smaller governments are more efficient.

Furthermore, studying the economic growth of The Organisation for Economic Co-operation and Development (O.E.C.D.) countries, based on analysis of time series, Bassanini, Scarpetta, and Hemmings (2001) found that the role of an institution may be positive or negative; positive because innovation, macroeconomic environment, trade openness and development of financial markets influence economic growth, which is a result of good institutions. The negative impact appears in weak institutions, where strict regulations and administrative restrictions on market efficiency result in a negative impact on overall economic growth. The difference in the quality of institutions will influence the difference in economic growth.

Meon and Weill (2003) find that better institutions are associated with greater macroeconomic performance, and that the rule of law and the effectiveness of government have the greatest influence. Instead of *institutions* they use the term *governance*. The term governance does not stand for any rule of political type or for management, but the term itself is wider and includes the rule of law, corruption and other categories which in this paper

are considered as institutions. Control of corruption and regulatory framework also play a role, but according to them, this role is less significantly associated with efficiency. The rule of law is an institution that will, in each country, have an important influence on economic performance, and therefore it should be encouraged, but each country should develop its legislative and institutional framework adapted to the specific situation, the achieved level of development and the informal institutions that rule in the country.

Such thinking is confirmed by the research of David and Mach (2006) that proves two things in the Swiss example: first, that in Switzerland's rapid growth and successful international integration during the second half of the nineteenth and the first half of the twentieth century a crucial role was played by political and economic institutions, and second, that the fact that Switzerland did not have institutions like patent law and an independent central bank was also important, although these institutions were largely considered as a prerequisite of development. Therefore, through the development of its own path, instead of copying someone else's way of institutional changes, Switzerland has achieved economic success. This is particularly important in the context of seeking out particular ways of institutional change.

Also, Roy and Tisdell (1998) agree that good institutions are necessary for sustainable development, and that their implementation and incorporation into society is essential. They do not put much emphasis on the choice of institutions. According to them, the ways of implementation should not be adopted and copied by others because something that was successful in one society or period will not necessarily be equally successful in different circumstances.

Very extensive research by Kaufmann, Kraay, and Zoido-Lobaton (1999) was conducted in over 150 countries and provided empirical evidence of a strong causal relationship between institutions and better economic results. By observing more than 300 individual indicators of institutions sublimated into six main groups, they concluded that better institutions led to better economic results. Their research is very often used and cited in scientific research, and is one of the most important contributions to the issue of the impact of institutions on economic growth. Their database of indicators of institutional development, which is regularly updated, is very often used in recent research. In this paper, in estimating the impact of institutions on economic performance in transition countries, two of the six indicators that the above-mentioned authors developed will be used.

Studies on the impact of institutions on economic growth are numerous, and only some are given here. It is possible that some studies that would show that impact even more vividly have been omitted, as well as some that might be for some reason even more important. Authors generally agree that the impact of institutions on growth exists, differing in whether they used the indicators of commercial institutions, data from available databases or created their own indicators. Research results vary in the degree of impact on growth as well as in the degree of influence of each institution. While some authors emphasise the institution of property rights, others are more inclined to the institution of the rule of law, and still others prefer the absence of corruption and reducing bureaucracy. But in spite of criticism and taking into account the constraints, most of them ultimately agree on one thing: good institutions have a positive effect on economic performance. However, there is no consensus on how good institutions can be reached. How do they occur? How to encourage their growth? How to encourage institutional change to make it have a positive effect on growth? There is no simple and unequivocal answer to these questions, and there can be none, since

each country has to find its own path of institutional changes. It is very difficult to look to a developed country and its institutional framework and to try to replicate it in one's own terms and conditions. Even if the adoption of laws and regulations can formally succeed, the effects would not be the same as in the original country. What probably applies for all countries is the need to protect property rights and the need to implement the rule of law. It is probably useful for all countries to prevent corruption as much as possible, and to ensure contract implementation. These are the good institutions that each country needs to develop and continuously improve. These are the institutions that reduce transaction costs, and whose level can be identified relatively quickly. Regardless of the level of economic development of the country, it has been proven that these institutions act in a positive direction.

Criticism of the studies on the impact of the quality of institutions and economic growth is mainly related to the quality of the data, because there are no direct measurements of the quality of institutions (Bađun, 2005); instead, they are indirect and derivative. The data used are subjective and therefore are susceptible to a dose of inaccuracy. Data mainly comprise perceptions, which is the main objection about their use. However, data on institutional development obtained in this way are still very useful in practice because they provide sufficient information. In fact, for domestic and foreign investors, perceptions are important because the perception of security can be more important than the formal existence of some law. Subjective indicators often show the degree of implementation of formal institutions, and according to that they may to some extent be regarded as relevant. Also, the collection and analysis of data is constantly improving and developing (EBRD. 2006). A particular problem is the circular causality and feedback effect of economic growth on the growth of institutions. It is possible that variables that would at the same time explain both the economic growth and the institution, which would in such case result in apparent regression, are excluded from the survey. It is also noted that when short periods of time are used, cyclical movements of G.D.P. are ignored. Without doubt there are more criticisms and limitations related to the research of the impact of institutions on economic growth which should be considered. There needs to be an awareness of all of these limitations when interpreting the results of research on the impact of institutions on economic growth. Research should be used in order to determine the direction, and to find out how to enable more effective impact on economic growth. International studies find a positive link between institutional development and economic growth, as in Ogilvie and Carus (2014) or Góes (2016) using panel SVAR analysis. Bi-directional Granger causality between institutional development and economic growth is found in Law, Lim, and Ismail (2013).

3. Data and research methodology

3.1. Data

In the empirical part of the study longitudinal data with spatial and temporal dimensions are used. The ways in which institutions affect economic growth are numerous and ambiguous, and they act through various and numerous channels. For the purposes of this model it is important to show that institutions have an important role in the economic growth of Croatia and transition countries, and that their increase may contribute to increased economic growth. In this regard, the impact of institutions on the gross domestic product per capita (G.D.P./p.c.) for the observed countries will be examined. In studies of this kind

the question whether it is better to use the average rate of growth of real G.D.P. (average growth rates used are for example, Barro, 1991; Vijayaraghavan & Ward, 2001) or the level of G.D.P./p.c. often arises. Due to the short time of observation and because of the large and dynamic changes in the economy that transition countries have passed, it is more appropriate to use the level of G.D.P./p.c. (Acemoglu, Johnson, & Robinson, 2004; Pritchett, 1998). Because of the need for comparability arising from the same data collection methodology for all countries observed[1], for the data on G.D.P./p.c. the World Bank database was used, and for the purpose of comparability the data have been presented at constant prices from the year 2010 over the period 1996–2012.

The next dependent variable that is observed is the share of exports in G.D.P. Croatia has so far attracted significant amounts of foreign direct investments, but these investments were in the so-called nontradable sector and have not produced positive spillover effects (Bilas & Franc, 2006; Babić, Pufnik, & Stučka, 2001; Lovrinčević, Marić, & Mikulić, 2005), nor contributed to the remarkable increase in production and exports, as opposed to institutionally more advanced transition countries for which this was the case. Therefore, this paper does not study the influence of institutions on attracting investment but on the share of exports in G.D.P. Numerous authors have proved that institutions influence the attraction of investment and investment activity in the country in general (Alfaro, 2003; Botrić & Škuflić, 2006; Kumar, 2007; Zakharov & Kušić, 2003). Investments that contribute to technological progress, production and exports contribute directly to the function of economic growth. For this reason, this paper explores the connection between institutions and exports in the observed transition countries.

The achieved institutional development is taken as the independent variable in the panel analysis. In this sense, a composite index Heritage overall index of economic freedom is used in the model. It represents an unweighted average value of 10 separate freedom indexes, namely: business freedom, trade freedom, monetary freedom, fiscal freedom, property rights, freedom from government influence, investment freedom, financial freedom, freedom from corruption and freedom of the labour force. The professional authority of the Heritage Foundation has a major impact on the formation of attitudes of Western investors about economic policies, political stability and institutional development of the surveyed countries (Baletić & Budak, 2007). Furthermore, the Heritage Index of Economic Freedom is extensively quoted and it stands for a popular measure of assessing progress in market reforms. It is very useful for testing and comparing institutional development, as the set of indicators used is based on a methodologically consistent, internationally comparable database.

In the model, the European Bank for Reconstruction and Development (E.B.R.D.) index of institutional reforms in transition countries is also used. Since special attention in this paper is paid to this index, it is useful to decompose the index in order to allow more detailed analysis of individual impact of certain indexes on economic growth.

The index of institutional reforms in transition countries presents evaluations by the E.B.R.D.'s Office of the Chief Economist of the progress of the countries in transition. Determining the value of the index is based on a classification system that was developed in 1994. Indexes assume values from 1 to 4+, where 1 represents a slight change from the status of a rigid planned economy to 4+ which indicates the level of standards of developed market economies. Estimates are made in six areas:

1. Privatisation of large systems
2. Privatisation of small and medium-sized enterprises
3. Quality of government and enterprise restructuring
4. Price liberalisation
5. Trade and foreign trade
6. Competitiveness

The next indicator used to evaluate the impact of the rule of law on the dependent variable is Worldwide Governance Indicators (W.G.I.) – Rule of Law indicator. It is an indicator which is published by the World Bank, reflecting the extent to which there is a confidence that the rules will be respected, and in particular to which the contracts will be enforced and property rights protected. It reflects the level of confidence in the police, judiciary and the possibility for the occurrence of crime and violence.

In addition to the above, this paper also used the indicator of the effectiveness of the government (Government Effectiveness), which reflects the perception of the quality of public services, civil society and the degree of its independence from political pressures, the quality of the formulation of policies and their implementation, and the credibility of the government's commitment in the framework of the implementation of such policies. It should be noted that W.G.I. consist of six separate indicators that reflect institutional development. In addition to these indicators, there are also voice and accountability – freedom of opinion and responsibility of governance – political stability and regulatory quality, the quality of legislation and control of corruption (Kaufmann, Kraay, & Mastruzzi, 2010; Kaufmann et al., 1999). Although there are numerous studies in which these indicators are weighted and added together to obtain a single indicator, the authors of W.G.I. indicators insist on the separation of each parameter, emphasising that they are not intended to form a composite index and that a thus calculated composite index gives a distorted picture of institutional development (Arndt & Oman, 2006). Databases supporting each of these indicators include more than 300 individual consistent indicators, so the use of W.G.I. indicators is considered justified. Based on these data Kaufmann et al. (1999) have provided evidence that the institutions have a strong and important role in economic growth. The two mentioned indicators are particularly singled out because of the assumption of the importance of their impact on economic growth and growth in exports.

The last single indicator used in this model is the Transparency International Corruption Perceptions Index. This index represents perception, which means that it reflects subjective views about the level of corruption, and this is one of the biggest constraints. In fact, there is currently no way in which the corruption in any country can be measured or calculated, so it can only be based on an assessment of perception. Corruption perception indicators reflect the quality of institutions, the effectiveness of the judiciary and obstacles to investment. The most widely used indicator is the Transparency International Corruption Perception Index (Arndt & Oman, 2006). Since the Transparency International Corruption Perceptions Index is the indicator of development of institutions that attracts the greatest media attention, and because it is largely used by investors, donors, business institutions and scientists, its use in this model is justified. The index consists of the results of research on the perception of corruption carried out by domestic and foreign business people in every country. This research is carried out by over 10 independent organisations according to a methodology that is the same for all countries, and therefore the data, with the restriction

Table 1. Variables included in the analysis.

DEPENDENT VARIABLES		
Variable name and label	Variable definition	Data source
G.D.P./p.c. (gdppc)	Gross domestic product per capita.	World Bank database
Exports/G.D.P. (udiz,gdp)	Share of exports in percentage of G.D.P.	World Bank database
INDEPENDENT VARIABLES		
Variable name and label	Variable definition	Data source
Heritage overall index of economic freedom (heritage) (+)	Composite index consisting of 10 individual indexes measuring the level of institutional development across countries.	Heritage Overall Index of Economic Freedom Heritage Foundation
W.G.I. government effectiveness indicator(W.G.I.uv) (+)	Reflects the perceptions of the quality of public services, the quality of civil society and the degree of its independence from political pressures, the quality of policy formulation and its implementation, and the credibility of the government in the implementation of such policies.	World Bank database
W.G.I. rule of law indicator (W.G.I.prav) (+)	Shows confidence in the police, compliance with the rules, contract enforcement, protection of property. Its values are from −2.5 to +2.5.	World Bank database
Corruption perception index (tpI.P.K.) (+)	Perception of the level of corruption in the country. Index can have values from 0.0 to 10.0. Higher value means less corruption in the country.	Transparency International Corruption Perception Index
Index of institutional reforms in transition countries (iT.R.)(+)	Composite index consisting of an average of six individual indexes with the values from 1 to 4+.	E.B.R.D.

Source: Coruption perception index 2013, EBRD. (2012), Transition Report 1999-2011 (2012), Heritage Country Rankings (2012), The world Bank (2009), The World Bank (2012), World Governace Indicators (2012), processed and elaborated by authors

Table 2. Summary of selected data.

Variable	Number of observations	Average	Standard deviation	Minimum	Maximum
G.D.P./p.c. (log)	187	9.05	0.63	7.31	10.27
Exports/G.D.P.	182	54.13	16.93	21.00	93.00
(heritage) (+)	187	62.48	7.44	45.70	78.00
(W.G.I.prav) (+)	187	0.48	0.43	−0.52	1.22
(W.G.I.uv) (+)	187	0.54	0.42	−0.62	1.22
(tpI.P.K.) (+)	169	4.57	0.98	2.60	6.70
(iT.R.)(+)	177	3.68	0.26	2.61	4.06

Source: Authors' calculation.

that it is a perception after all, can be considered comparable. Sources and descriptions of the dependent and independent variables are presented in Table 1.

Table 2 shows a summary of selected data. Considerable heterogeneity can be noticed with respect to the average and to the standard deviation. However, it cannot be concluded from the data whether those are deviations within countries with regard to timing, or whether it is the case of discrepancies between countries. In any case, the existence of such a variation is a good prerequisite for econometric analysis. This is because, especially in the context of the analysis of temporal dimensions, greater variations also allow greater accuracy in assessing the impact of the independent variables.

3.2. Methodology and empirical results

In this part of the paper, the testing of the impact of institutions on economic growth and on increase of share of exports in G.D.P. in transition countries is carried out. After that, attention is paid to reflections on the research on the institutional system in the Republic of Croatia.

3.2.1. Correlation analysis

Given the characteristics of the selected variables that are made by the two composite indexes, before the panel regression analysis it is useful to show the results of correlation analysis. In fact, with these sample data, there is a very high probability of correlation of regressors in the model, which undermines the basic assumptions of regression models on the independence of regressors.

Within the correlation analysis, it can be seen that all of the variables used in the model are correlated with each other, and have a positive sign, which is certainly an expected result considering the theoretical and empirical assumptions. However, correlation analysis is useful for two reasons.

First of all, the relationship between dependent variables shows that they are interconnected, but the size of the correlation coefficient differs significantly from the value of 1, which indicates *de facto* identical variables. This value of coefficient suggests a pool of countries that are characterised by a heterogeneous structure of economic growth. In this sense, it is reasonable to separately observe a variable G.D.P. per capita, which shows the level of development, and a variable share of exports in G.D.P., which refers to the competitiveness of a country with respect to export power as the most important indicator of competitiveness. It is particularly important to separate these variables due to the fact that many countries in transition in the initial period, due to low development, as well as substantial inflow of capital, had a phase of rapid economic growth. The problem is that economic growth was not based on growth of manufacturing capabilities and on the increase of competitiveness, but was based on portfolio investment and borrowing money which, at a later stage, presented obstacles to growth and led to capital outflows. Such a situation precisely characterises the Republic of Croatia.

The second segment of the correlation analysis refers to the independent variables used in the model. Since there are two composite indicators and three variables that are indirectly included in the composite indexes, but also probably correlated with each other, it is important to determine the extent of such a correlation because of the previously mentioned assumptions of regression analysis, which can lead to incorrect conclusions. For example, we can see a very high correlation coefficient value of the rule of law and government efficiency index, which is 0.88. Very similar is the connection of the rule of law and corruption perception index. On the other hand, it is interesting that the composite indexes Heritage Institute and the E.B.R.D. do not show such a high dependency, which means that their structure covers somewhat different segments.

Correlation analysis showed positive dependence of variables of institutional environment with the relevant dependent variables. The panel regression analysis of the same variables is conducted below.

Table 3. Correlation matrix.

	Exports/ G.D.P.	G.D.P./p.c. (log)	(heritage) (+)	(W.G.I.uv) (+)	(W.G.I.prav) (+)	(tpI.P.K.) (+)	(iT.R.) (+)
Exports/G.D.P.	1						
G.D.P./p.c. (log)	0.4253	1					
(heritage) (+)	0.5476	0.4943	1				
(W.G.I.uv) (+)	0.4845	0.7698	0.5711	1			
(W.G.I.prav) (+)	0.4705	0.6694	0.6275	0.8818	1		
(tpI.P.K.) (+)	0.5082	0.6295	0.5689	0.7205	0.8087	1	
(iT.R.)(+)	0.5216	0.6227	0.7388	0.641	0.5524	0.4827	1

Source: Authors' calculation.

3.2.2. The panel analysis of transition economies and Croatia

Panel analysis is a method recommended for economic research in which a long temporal or spatial dimension cannot be provided, as is the case with the transition countries. Panel analysis takes more observations of time section of different units of observation, which enables the analysis even with a smaller range of time series data, and is therefore suitable for setting up this model.

The most commonly used methods of panel regression analysis, when it comes to data samples with small temporal and spatial dimension, are the methods of fixed and random effects.

The general shape of the panel regression model used in this paper is:

$$y_{it} = x_{it}\beta + \alpha_i + u_{it} \quad t = 1, \ldots, T \quad i = 1, \ldots, N \tag{1}$$

where y_{it} is the dependent variable (G.D.P. per capita or the share of exports in G.D.P.) in the country i and time t, x_{it} is the matrix of independent variables, α_i signifies specific factors for each country, and u_{it} is residual value.

In the case where α_i is correlated with regressors, a model of fixed effects is more appropriate, and if the distribution of α_i is corresponding to the normal distribution, the better evaluator is the method of random effects. The usual method for checking the suitability of the fixed and random-effects models is the Hausman test, which is applied in this paper.

The results of the model are shown in Table 4. When it comes to the impact of independent variables on the growth of G.D.P. per capita, we can see a positive value of coefficient of Heritage index, of corruption perception index and of the index of institutional reforms in transition countries. Similar values are obtained using both fixed and random-effects methods. Also in both cases, the percentage of explanation of the dependent variable is at a high level. It is important to notice that, for the movement of dependent variables, the E.B.R.D. composite index is particularly important.

Figure 1 shows the relationship between the composite index and G.D.P. per capita (in the context of the time dimension data). The time component of panel data was evaluated with square regression equation, and it is evident that the countries which have been improving the index of institutional reforms through the years recorded higher growth rates of G.D.P. per capita.

As already mentioned, correlation analysis showed that one should not expect analogous influence of independent variables on the movements of two selected dependent variables. Thus, for the growth of ratio of exports and G.D.P., only the index of institutional reforms in transition countries is significant. It is interesting that a positive impact on economic growth has the variable perception of corruption and the composite index of the Heritage Institute (however, to a lesser degree). This is surprising; however, it should be noted that the Heritage composite index is still at much higher general level, both in terms of structure and geographical scope. The E.B.R.D. index applies only to transition countries, which certainly reflects the common initial setting of transitional societies.

The Hausman test favours the fixed-effects model; however, there is no significant difference in values of the coefficients of variables and in their statistical significance in both models.

Table 4. Panel regression analysis – fixed and random effects.

	Dependent variable		Dependent variable	
	ln(G.D.P. per capita)		Share of exports in G.D.P.	
	(159 observations)		(159 observations)	
Independent variables	Fixed effects	Random effects	Fixed effects	Random effects
Constant	0.56	1.60***	−44.97**	−40.94**
	(1.04)	(2.71)	(-2.17)	(-2.00)
(heritage) (+)	0.02***	0.01*	0.18	0.21
	(2.86)	(1.78)	(0.79)	(0.93)
(W.G.I.uv) (+)	−0.27	0.00	−7.91	−5.49
	(-1.61)	(0.01)	(-1.26)	(-0.91)
(W.G.I.prav) (+)	0.49	0.29	−5.84	−3.55
	(2.67)	(1.49)	(-0.85)	(-0.53)
(tpI.P.K.) (+)	0.14***	0.15***	1.91	1.97
	(3.06)	(2.93)	(1.07)	(1.12)
(iT.R.)(+)	1.81***	1.59***	23.25***	21.14***
	(9.14)	(7.60)	(3.11)	(2.91)
R^2	0.78	0.49	0.17	0.31
F-test/ Wald chi2	98.84***	349.04***	5.56***	30.34***
Hausman test	The model does not meet asymptotic assumptions of Hausman test		10.41*	

Source: Authors' calculation, at 1% significance level.
***at 1% significance level.
**at 5% significance level.
*at 10% significance level.

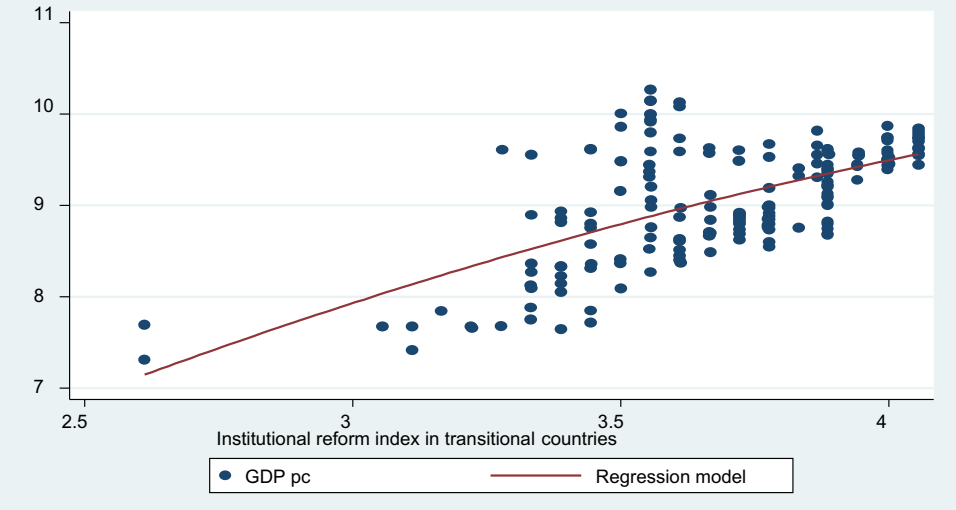

Figure 1. Square regression equation. Source: Authors' calculation.

Although the results of the empirical analysis indicate a positive interdependence of institutional variables on the growth of G.D.P. per capita and the share of exports in G.D.P., the characteristics of the datasets suggest caution. First of all, it is a relatively short panel. Furthermore, the results of the Hausman test warn that the fixed-effects model is more appropriate, but in the first case the test results are not valid, and in the second case the level of significance is relatively low. Preference for fixed-effects models in this set of data should

be taken with caution, since the fixed-effects model is focused on the time dimension data. If the variation data in time is small, as is the case with variables of institutional environment, the fixed-effects model is not precise enough, because it only uses time dimension data. On the other hand, it is unlikely that distribution α_i is not correlated with the independent variables, especially when it comes to the transition countries that have relatively similar history of development of the institutional environment. Finally, an additional problem is the possibility of autocorrelation, especially with the dependent variable, which leads to the problem that in both fixed-effects and random-effects models, the influence of independent variables on the dependent variable was assessed imprecisely. Such an endogeneity of dependent variable is very likely in this case.

3.2.3. Arellano–Bond dynamic panel analysis

In this paper the Arellano–Bond dynamic analysis based on lagging of the dependent variable to eliminate autocorrelation out of the model and on use of instrumental variables (lagged independent variables) as regressors of independent variables was also conducted. Since the application of Arrelano–Bond analysis is questionable in cases of significant auto-regression in variables, the Arellano and Bover (1995), Blundell and Bond (1998) method was also applied as more consistent and a method which assumes the absence of auto-regression.

There are several reasons why the above method is suitable for such a set of data and assumptions of economic theory built into the empirical model (Arellano & Bond, 1991, 277–297):

- Within the established model of empirical research, there is a high likelihood of endogeneity of dependent and independent variables. Namely, the growth of G.D.P. and the share of exports in G.D.P. could lead to greater institutional change through greater financial investment in institutions or through greater openness in economic systems. Therefore, the causality can have effects in both directions; within the two-stage regression procedure the potential correlation between the dependent and independent variables is lost;
- Characteristics of individual countries that are not related to the impact of institutional reforms in time but are related to geographic, demographic and other characteristics can be correlated with the independent variables and affect the validity and accuracy of econometric research; this problem within the framework of this method is solved by differencing variables of model which eliminates the features that are not related to the time component of the panel data; therefore it also removes the risk of correlation between the independent variables;
- There is a big possibility of autoregression behaviour of the dependent variable, namely G.D.P. per capita and the share of exports in G.D.P.; for example, G.D.P. growth for the year also affects the growth of G.D.P. the following year; if it does not grant such a feature of the dependent variable by defining lagged values of the dependent variable as regressor, evaluation of independent variables will not be accurate (the effect of regressors will be overemphasised because it will contain the effect of G.D.P. last year, which undermines the fundamental assumptions of the least squares method);
- It is a panel with a short time series; in this case, the data-set that includes 17 years (T=17). This is why the lagging of dependent variable is recommended because the autoregressive effect in the panel with a short time series is significant. Where the

temporal dimension is longer, autoregressive effect of the dependent variable with time is lost and the use lagging is not so important.

Given the relatively short temporal dimension, too big a lagging of variables is not recommended because a large number of datasets is lost. In this case, the dependent and independent variables are differentiated by 1 year. The lagging of dependent variable for 2 years was also tested, but the resulting value of the coefficient and level of significance indicate that autocorrelation was already lost with the first differencing.

The general model of such autoregressive model ρ in y_{it} with $y_{i,t-1} + ... + y_{i,t-\rho}$ as regressors, as well as regressors x_{it} is represented by the following equation:

$$y_{it} = \gamma_1 y_{i,t-1} + ... + \gamma_\rho y_{i,t-\rho} + x_{it}'\beta + \alpha_i + \varepsilon_{it}, t = \rho + 1, ..., T \quad (2)$$

Table 5 shows the results of the application of the said empirical method.

First of all, it can be seen that in both tested empirical models the auto-regression of dependent variables is presented, which certainly indicates the need for the application of this method and its advantage over the previously presented results of panel model of fixed and random effects. It can also be noted that there are no significant differences in the application of Arellano–Bond and Arellano–Bover / Blundell–Bond system dynamic analysis. In both cases, the high and significant value of coefficient of variables of indexes of institutional reforms in transition countries is confirmed. In the first model, the variable efficiency of government was shown as substantial and significant; however, what surprises is a high and a significant negative impact of the rule of law. However, careful examination of the correlation matrix in Table 3 shows a very large coincidence of variables of government

Table 5. Panel regression analysis – Arellano–Bond, Arellano–Bover / Blundell–Bond dynamic panel analysis.

	Dependent variable		Dependent variable	
	ln(G.D.P. per capita)		Share of exports in G.D.P.	
	(146 observations, 113 instruments)		(141 observations, 108 instruments)	
	Arrelano–Bond	Arrelano–Bover/ Blundell–Bond	Arrelano–Bond	Arrelano–Bover/ Blundell–Bond
Constant	−0.03	0.09	−37.86*	−36.80
	(-0.08)	(0.32)	(-2.02)	(-2.46)
Lagged D.V.	0.81***	0.79***	0.65***	0.81***
	(20.15)	(25.26)	(8.11)	(12.95)
(heritage) (+)	0.01	0.01***	−0.39	−0.31
	(1.48)	(4.08)	(-1.92)	(-1.60)
(W.G.I.uv) (+)	0.27***	0.34***	−6.87	−5.46
	(2.92)	(4.64)	(-1.30)	(-1.18)
(W.G.I.prav) (+)	−0.30***	−0.38***	2.97	5.63
	(-2.60)	(-3.79)	(0.47)	(0.99)
(tpI.P.K.) (+)	−0.01	−0.01	1.08	0.08
	(-0.15)	(-0.11)	(0.66)	(0.05)
(iT.R.)(+)	0.39***	0.29***	21.60***	18.26***
	(3.09)	(2.63)	(3.12)	(3.43)
Wald chi2	2425.61***	4405.33***	110.65***	321.18***
Hausman test	The model does not meet asymptotic assumptions of Hausman test		The model does not meet asymptotic assumptions of Hausman test	

Note: D. V. - dependent variable.
Source: Authors' calculation.
***at 1% significance level.

effectiveness and rule of law, and therefore it can be assumed that the cause of this unusual movement of coefficient though is multicollinearity. These developments are not surprising given the nature and characteristics of the indexes of institutional environment, which are most often correlated indirectly, and often directly. Additional justification for such index movement can be in changing the perception towards the rule of law that a more developed society has, a society which is potentially more sensitive on the content of indicator of the rule of law and is biased in the evaluation (more likely to give a negative assessment). On the other hand, it is possible that the perception of the effectiveness of government is related to the improvement of economic conditions and growth in exports, so the causality here has a positive direction.

Within the analysis of the share of exports in G.D.P., as in the case of analysis within the model of fixed and random samples, a positive and statistically significant value of coefficient of the E.B.R.D.'s composite index is shown.

Considering that the previously conducted analysis highlighted differences in the importance of institutional variables on economic growth and on the share of exports in growth, and in particular stressed the importance of the E.B.R.D.'s composite index, it is important to determine which are those institutional factors within the same composite index that are especially important for the assessment of the importance of institutional environment. The government effectiveness (W.G.I.uv) variable is statistically significant, showing positive impact on the G.D.P. per capital level (0.27). However, the impact of rule of law indicator (W.G.I.prav) is negative while it was expected to be positive. The reason for this is that in all sample countries the privatisation process suffered from consistent institutional deterioration. This was particularly visible during the large state firm privatisation, where the legal institutional framework failed to sanction suspicious privatisation processes that resulted in large national output drops. This is the reason why the rule of law indicator register negatively impacts on national output, especially since in the sample countries the biggest state firms are still undergoing privatisation.

3.2.4. Analysis of institutional factors

Table 6 shows the correlation matrix of decomposed index of institutional reforms in transition countries. While one can see the positive interplay between all indexes, the height of the correlation coefficient is significantly lower than the correlation matrix of the general indexes shown in Table 3. These values show the heterogeneity of the above categories, which provides the quality of the dataset and allows a better empirical analysis.

Since the previous empirical analysis indicated the advantage of using the dynamic panel regression analysis, largely because of the presence of the first order auto-regression in the context of the dependent variables, the regression model panel of fixed and random effects was not specifically examined. Table 7 shows the results of empirical analysis.

Apart from the autocorrelation of the dependent variables, it can be seen that for the growth of G.D.P. per capita the index of the privatisation of large systems, quality of government, corporate restructuring, and price liberalisation are important. On the other hand, for the growth of exports in G.D.P., privatisation of small and medium-sized enterprises and the level of competitiveness are significant.

In any case, it appears that only the coefficient of index of trade and foreign trade has no positive effect. On the contrary, its value is negative, but not statistically significant. It can also be noted that there are no significant differences in the application of Arellano–Bond

Table 6. Correlation matrix.

	Exports/G.D.P.	G.D.P./p.c. (log)	Privatisation of big enterprise	Privatisation of S.M.E.s	Government quality and enterprise restructure	Price liberalisation	Trade and intern.exch.	Competitiveness
Exports/G.D.P.	1							
G.D.P./p.c. (log)	0.43	1						
Privatisation of big enterprises	0.55	0.28	1					
Privatisation of S.M.E.s	0.33	0.69	0.30	1				
Government quality and enterprise restructure	0.53	0.69	0.53	0.68	1			
Price liberalisation	0.12	0.07	0.65	0.15	0.35	1		
Trade and intern. exchange	0.13	0.42	0.34	0.36	0.32	0.28	1	
Competitiveness	0.46	0.61	0.63	0.46	0.75	0.45	0.52	1

Note: S. M. E. - Small and medium enterprises.
Source: Authors' calculation.

Table 7. Panel regression analysis – Arellano–Bond dynamic panel analysis.

	Dependent variable		Dependent variable	
	ln(G.D.P. per capita)		Share of exports in G.D.P.	
	(154 observations, 112 instruments)		(149 observations, 107 instruments)	
	Arrelano–Bond		Arrelano–Bond	
	Arrelano–Bond	(sys)	Arrelano–Bond	(sys)
Constant	0.21		−6.04	7.61
	(0.35)		(-0.19)	(0.23)
Lagged D.V.	0.72***	0.78***	0.56***	0.71***
	(16.78)	(22.61)	(6.40)	(11.03)
Privatisation of big enterprises	0.25***	0.30***	0.15	2.28
	(3.69)	(5.10)	(0.05)	(0.81)
Privatisation of S.M.E.s	−0.13	−0.04	11.54*	15.91***
	(-1.28)	(-0.47)	(1.88)	(3.44)
Government quality and enterprise restructure	0.27***	0.25***	−1.17	−0.91
	(3.84)	(4.11)	(-0.34)	(-0.29)
Price liberalisation	0.35***	0.09	−3.09	−8.92
	(2.34)	(0.77)	(-0.37)	(-1.10)
Trade and international exchange	−0.07	0.05	−4.43	−9.41
	(-0.51)	(0.45)	(-0.64)	(-1.41)
competitiveness	−0.01	−0.08	6.10***	5.169342**
	(-0.01)	(-1.88)	(2.64)	(2.59)
Wald chi2	3202.39***	5005.76***	129.11***	382.80***
Hausman test	The model does not meet asymptotic assumptions of Hausman test		6.97	

Source: Authors' calculation, at 1% significance level.
***at 1% significance level.
**at 5% significance level.
*at 10% significance level.

and Arrelano–Bover / Blundell–Bond system dynamic analysis, except with the impact of price liberalisation on the growth of G.D.P., where the coefficient in the system approach is not significant and is remarkably lower.

Since the previously performed econometric analysis showed the importance of institutional variables on economic growth and export growth, it is important to compare the movements of these variables in Croatia and neighbouring countries (Table 8). It may be noted that Croatia in 1996 was on the average of countries, while in 2012 the majority of indexes that appear to be important for economic growth and exports fell below the average. These trends are troubling, and point to possible institutional factors that determine the long-term recession of the Croatian economy. We can certainly conclude that the transition economies, compared with Croatia, in the context of the quality of the institutional framework, on average have advanced significantly more than Croatia.

It is also evident that precisely in the segment of privatisation of large systems, in quality of government and enterprise restructuring, as well as price liberalisation as variables in context of panel regression method (Table 7), which showed a positive and statistically significant impact on economic growth, Croatia recorded a lag compared with transition countries. An identical situation can be observed in the analysis of the impacts of these E.B.R.D. indicators of the movement of the share of exports in G.D.P. Specifically, in Table 7 we can see a positive and statistically significant impact of variable of privatisation of small and medium-sized businesses and variable of competitiveness. In these indicators

Table 8. Value comparison of institutional reforms index in transition countries.

	Republic of Croatia			Average of chosen countries		
	1996	2012	Difference	1996	2012	Difference
Privatisation of big enterprises	3	3.33	0.33	3.0	3.75	0.71
Privatisation of S.M.E.s	4.33	4.33	0	3.9	4.04	0.17
Government quality and enterprise restructuring	2.67	3.33	0.66	2.7	3.42	0.71
Price liberalisation	4	4	0	3.9	4.29	0.37
Trade and internation-al exchange	4	4.33	0.33	4.0	4.16	0.16
Concurrency	2	3	1	2.1	3.46	1.38

Source: Authors' calculation.

Table 9. Impact of institutional variable on G.D.P./p.c. and share of exports in G.D.P. in Croatia.

	Dependent variable	Dependent variable
	ln(G.D.P. per capita)	Share of exports in G.D.P.
	(17 observ.)	(17 observ.)
(heritage) (+)	0.06***	0.27
	(3.36)	(1.29)
	R^2=0.43	R^2=0.10
(W.G.I.uv) (+)	1.39***	8.72**
	(5.82)	(2.72)
	R^2=0.69	R^2=0.33
(W.G.I.prav) (+)	1.14***	8.17**
	(3.65)	(2.50)
	R^2=0.47	R^2=0.29
(tpl.P.K.) (+)	0.46**	1.33
	(2.75)	(0.86)
	R^2=0.39	R^2=0.06
(iT.R.)(+)	2.55***	9.73
	(8.18)	(1.59)
	R^2=0.82	R^2=0.14

Source: Authors' calculation, at 1% significance level.
***at 1% significance level.
**at 5% significance level.

Croatia recorded a lag in relation to the transition economies in the period from 1996 to 2012 (see Table 8).

To gain further insight into the specifics of the process of institutional development in the Republic of Croatia, on the basis of panel data, a simple regression method of least squares was conducted. The dependent variables (G.D.P. per capita and the share of exports in G.D.P.) were regressed with each independent variable.

It is possible to gain insight into the dynamics of movement of institutional variables in Croatia. Table 9 shows the results of regression equations. Below is a coefficient of direction and coefficient of determination (R^2), which shows the degree of explanation of the dependent variable with regression coefficient.

Based on the results of regression equations (significant R^2), in the framework of Table 9, it can be concluded that the growth of G.D.P. per capita was followed by the improvement of institutional variables, i.e., economic growth dynamics can contribute to institutional development. Such a movement has the highest interdependence within the variable of

E.B.R.D. institutional reforms, the efficiency of government indicator and the rule of law. On the other hand, the share of exports in G.D.P. variable shows a somewhat different interdependence versus institutional variables. Specifically, in relation to the impact on growth of G.D.P. per capita, where all variables showed a positive and statistically significant impact, with variable share of exports in G.D.P. such dependence is confirmed only in the case of indicators of the effectiveness of government and the rule of law.

4. Conclusion

Based on the econometric analysis, the hypothesis that there is a positive correlation link between institutional development and economic growth is confirmed. A higher level of institutional development is associated with higher levels of G.D.P. per capita. These results support the historical evidence of the link between institutions and economic growth, but other issues also have to be taken into the account, as shown in Ogilvie and Carus (2014). Góes (2016) using panel SVAR analysis validates the results of this study.

Due to a lack of relevant data, the analysis for transition countries was conducted for the period from 1996 to 2012, which actually represents a relatively short period of time, and therefore one of the conclusions that arises is that countries can benefit by implementing institutional changes even in the short term. This conclusion has very important implications for Croatia and for determination of the further direction of its development, as the current model of growth appears difficult to sustain. From the experience of the selected transition countries, and based on existing indicators of development of institutions in Croatia, one could guess what the future trends of G.D.P. would be. However, there is the question of the justification of observing all selected transition countries as economic and institutional entities, knowing how much diversity and specificity among the observed countries exists, as well as the question of relevance of the findings obtained by such an analysis. Bi-directional Granger causality found in Law et al. (2013) supports the results of this study, finding a positive link between institutional development and growth in both directions.

Therefore, the second hypothesis, that the development of informal institutions is a long-term process and that their change takes years, was also tested. Transition countries represent a group of countries with very similar initial conditions, and they are an extremely important group for the study of the impact of institutional reforms on development. Their example can show that institutional changes have significant economic impact. However, such a starting point does not preclude the view that each country must develop their own ways of implementing institutional changes because, due to the specificity of each country, simply copying and implementing the model might be unsuccessful and ineffective. Confirmation of this hypothesis has significant importance, because before any attempt to apply another's institutional framework, good care of informal institutions and the conditions prevailing in each country should be taken. Considering institutional changes in Croatia, it is necessary to bear this knowledge in mind. Countries that have a shared common history of socialist countries do not have the same informal institutions as, for instance, countries that share a common European history.

Analysis of the institutional framework in the Republic of Croatia has shown certainly a positive impact of the quality of institutions on G.D.P. growth. Lack of continuous improvement could reduce long-term growth rates. A comparison with the transition economies shows that Croatia potentially belongs to such a group of countries. Specifically, as shown,

Croatia had an average level of institutional quality within a set of transition countries. However, because the process of improving the quality of institutions in Croatia was much slower, in time the difference in the level of institutional quality has increased in favour of the transition countries. Such developments were also recorded with G.D.P. growth in Croatia, which at first was at above-average levels; but in recent years Croatia is at the rear. Therefore, Croatia needs to change the model of economic growth and reorient from consumption-generated growth to growth that will be based on production and export. Croatia had a relatively high G.D.P. per capita in relation to the quality of institutions, and knowledge about this is additionally gaining in importance. The results of the analysis have directly indicated that institutional factors have different effects on the growth of G.D.P. and the share of exports in G.D.P. While for the G.D.P growth almost all institutional factors are significant, for the increase in the share of exports in G.D.P. the general level of competitiveness, efficiency of government and rule of law appear as the most important.

Policy makers in Croatia should develop their own way of institutional change, using the accumulated knowledge and all the possibilities of the existing institutional framework, including both formal and informal institutions. The results presented here show this will significantly affect Croatia's future economic development. The results in this study could be sensitive to the structural data breaks present in the series since the Asian financial crisis of 1998 and World financial crisis of 2008. Further research on the link between institutional development and economic growth should take into the account the problem of these structural breaks in the data and different institutional development paths across the countries.

Note

1. Czech Republic, Slovakia, Hungary, Poland, Estonia, Latvia, Lithuania, Bulgaria, Romania, Slovenia, Croatia.

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