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## **Impact of Institutional Factors on Economic Growth in the United States in the Years 1979–2007**

**JEL Classification:** *B15; B16*

**Keywords:** *economic growth; new institutional economics; regression function*

**Abstract:** *The purpose of this article is to isolate and determine the importance of institutional arrangements in shaping the dynamics of the U.S. GDP in the years 1979–2007. The research hypothesis which has been verified here can be summarized as follows: institutions in the U.S. economy have a positive influence on economic growth through a significant impact on improving the business environment.*

*Having regard to the division of the economy into institutional areas: economic system, labor market, financial market, education and R&D, the author selected these institutional factors which indicated that the operation could be important for the process of economic growth in the United States, and then measured the impact in the years 1979–2007. To verify the thesis about the impact of institutions on economic growth the author used one of the most popular tools in this kind of econometric research – the multiple regression analysis.*

*The analysis revealed that during the period of all the analyzed institutional factors it was the proportion of the working population and the degree of unioniza-*

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*tion that most strongly influenced the economic growth of the United States – an increase in one of these factors was associated with a much more than proportional increase in the rate of the economic growth.*

## Introduction

The development of new institutional economy proves that economists more and more frequently direct their attention to institutional solutions of a given economy as an important factor of economic growth. Aspects of economy such as: legal order, system of regulations and influencing economy, liberalization of cross-border exchange, have an impact on stimulating a higher supply of work, contribute to innovativeness and its dissemination, which translates into faster and more efficient economic growth.

The main purpose of this work is to isolate and determine the significance of institutional solutions to the shaping of the United States GDP dynamics in the years 1997–2001<sup>1</sup>. The research should not only answer the question whether institutional factors have an impact on the level and dynamics of GDP in the United States, but also establish which institutions are responsible for this and to what degree. The research purpose of this work is to verify the research hypothesis referring to the impact of institutional conditions on present day processes of economic growth, and in turn the research hypothesis which has undergone verification may be phrased as follows: institutions in the United States economy exert a positive influence on the pace of economic growth by a significant impact on the improvement of the business environment.

Taking into account the division of economy into institutional areas (Amable, 2003, pp. 104–106): economic system, labor market, financial market, education and R&D, one indicated these institutional factors which might exert an influence on the processes of the economic growth in the United States, and then their influence in the years 1979–2007 was measured. It should, however, be noted that institutional solutions to economy usually influence economic results directly by creating appropriate conditions for the growth of capital and labor productivity and by stimulating technical progress (on the demand side they mainly influence investments).

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<sup>1</sup> The research period covers 29 years, while the number of analyzed observations includes 28 elements (due to the differentiation of variables in order to obtain their stationarity). While choosing the period one took into consideration the change in the character of the conducted economic policy in the US economy in 1979 (most importantly within monetary policy, but also the neoliberal processes which were initiated at that time). 2007 is the last analyzed year, which was done in order to avoid the impact of the deep recession from 2008–2009 on the results of the conducted analysis.

To verify the thesis on the impact of institutions on economic growth one of the main tools in econometric research – the multiple regression analysis- was used.

### **Influence of Institutions on Economic Growth**

The pace of the economic growth may be influenced by all kinds of conditions in which business activities are conducted. Some factors enhance fast growth, whereas others may slow it down.

In the research on economic growth mainstream economists, who focus on the short and medium-term perspective, introduced the assumption of exogenic character of institutions – in the conducted analyses institutions did not change but constituted the framework for the institutional-legal order of the economy. In the 80s of the 20<sup>th</sup> century an emphasis on the long-term approach in analyses of the growth led to the recognition of the achievements of non-orthodox streams, including institutional economics.

Comparative international studies indicate that there exists a correlation interdependence between the achieved level of economic growth and the quality and efficiency of management (Zienkowski, 2008). Economic policy usually is a result of choices made within this institutional order, hence the efficiency of a given economy may largely depend on the quality of existing institutions – on their durability and stability. The economic order is determined by fundamental political, social and legal principles which create the basis for production, trade and distribution (Ząbkowicz, 1998). A growing number of empirical studies demonstrate that institutions have a strong determining impact on aggregate income (Rodrik, 2004).

D.C. North claims in the essay *Institutions and economic growth: An historical introduction* (1989) that the interdependence of political and economic institutions is analyzed against the assumption accepted by the neoclassical economic theory, which says that population and savings constitute the main determinants of economic growth. The fact that institutions have an impact on the economic development makes the difference between North's approach and the mainstream economic approach. North was able to analyze and verify the hypotheses that institutional differences generate economic results by observing the institutional frameworks which were followed by the adoption of the most important legal acts in the United States, and subsequently by monitoring the impact of these institutions on the development of common law in England, and later the institutional development in England, and by comparing it to Spanish solutions.

In turn D. Acemoglu,, S. Johnson and J.A. Robinson (2005) in the work *Institutions as a Fundamental Cause of Long-Run Growth* attempt to prove that differences in economic institutions constitute the primary reason for the differences in economic development. According to the authors, as far as new institutional economics is concerned, there are three basic reasons for the differences in national incomes, namely: economic institutions, geographical position and all its cosequences, and the national culture. Cases from history<sup>2</sup> helped to illustrate the thesis that economic institutions stimulate economic growth when political institutions function in the environment of successful protection of property rights, when effective limitations are imposed on entities wielding power and when the circumstances in which people wielding power draw undue benefits occur rarely.

The colonial past is a subject of numerous research works, mainly by D. Acemoglu, S. Johnson and J.A. Robinson. Moreover, in cooperation with Y. Thaicharoen economists again dealt with this issue by analyzing countries which implemented the macroeconomic policy in the situation of high inflation, high budget deficits and unadjusted currency exchange rates (2003). They noticed that such countries experienced a higher level of volatility on the path of economic growth, and their economies rose slowly in the post-war period. Considering this issue economists decided to check whether developing countries implementing such a deformed macroeconomic policy also have weak institutions (including political institutions). The researchers understood the term 'weak institutions' as the principles of governance which do not impose any limitations on politicians and political elites, which do not successfully protect investors' property rights, or which function in the presence of corruption on a large scale and of a high degree of political instability. The analysis confirmed that the countries which inherited more 'imposed'<sup>3</sup> institutions from industrialized countries in connection with their colonial past were more exposed to high instability and economic crises in the post-war period.

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<sup>2</sup> Two 'quasi-natural historical experiments' were used in the analysis – the example of Korea divided into two parts with very different economic institutions, and the example of colonization of the majority of the world by European powers, starting from the 15<sup>th</sup> century.

<sup>3</sup> In the sense of not finding an appropriate cultural basis for their application; which are unsuitable in the system of already existing social and cultural institutions.

It appears that the distorted macroeconomic policy is a result of basic institutional problems rather than the main reason for economic instability. Additionally, the influence of institutional differences on the volatility of economic growth does not necessarily take place with the help of any classical factors of growth. Instead, it seems that rather poor institutions contribute to economic instability by a number of microeconomic as well as macroeconomic channels.

In all the three above-mentioned works, the authors took advantage of economic history in order to prove their theses. Similarly, S. Ogilvie and A. W. Carus (2014) also applied experiences from the economic past to support the analysis of the influence which institutions exert on economic growth. This time, however, the authors count the weaknesses of many historical facts referred to in the source literature on economic growth. For example, private law enforcement institutions are not able to substitute for public law enforcement institutions in order to make it possible for markets to function; parliaments with a strong representation of the rich did not always act in favor of stimulating economic growth; the Glorious Revolution of 1688 in England did not mean that suddenly the protection of property rights and economic growth would be guaranteed. According to the authors, economic history may be applied both to emphasize the crucial meaning of the protection of property rights in order to achieve economic growth and to demonstrate lack of such a connection.

In another work closely related to the subject of this paper, P.B. Doeringer and P.P. Streeten (1990) claim that although whole generations of growth models stress the significance of technical progress and accumulation of factors of production as sources of economic growth, such research works often proved to be insufficient for the explanation of the real pace of growth registered in a given economy. The dynamics of the growth often exceeded or was lower than the projections delivered by neoclassical models. This is confirmed by the phenomenon of the decline of the global production in England in the end of the 19<sup>th</sup> century and by the stagnation in the area of the industrial production in the United States in the end of the 70s and in the 80s of the 20<sup>th</sup> century. Economists traditionally explained those experiments by determining the size of the 'residual' in growth models, even after the analysis of the influences exerted by such factors as R&D, technological changes, economies of scale, and improvement of work quality. The authors note that obviously some important variables which determine the development directly or by their impact on traditional growth factors are not taken into account by these models. Economic institutions may provide here the ideal explanation.

The subject of the research work by F. Carmignani (2009) is the redistribution related to weak institutions and growing inequalities in income. The analyses of this thesis demonstrated that: weak institutions increase inequalities in income while a higher level of redistribution decreases inequalities in income; larger inequalities increase the probability of early parliamentary elections; a higher probability of government dissolution before its term expires increases the redistribution range.

M.K. Nabli, while appreciating extraordinary achievements in the field of social science which became known as the new institutional economics, decided to apply them in the analysis of the conditions and results of institutional changes in the context of development. His work (1989) identifies two important elements of the new institutional economics and presents potential complementarities between them as well as their application in different problems and policy in the long-term development of developing countries.

Other examples of works dealing with the impact of institutional solutions on economic growth<sup>4</sup> are papers by D. Acemoglu, S. Johnson and J.A. Robinson (2001)<sup>5</sup>, W. Easterly and R. Levine (2003), R.E. Hall and C.I. Jones (1999), D. Rodrik, A. Subramanian and F. Trebbi (2002) .

### **Basic Problems in Research on Impact of Institutions Upon Economic Growth**

The process of including institutions and institutional changes into the area of economic theory has been underway relatively short. For this reason the literature related to the subject of economic growth does not provide a single definition for the interpretation of the impact of economic, political and social institutions, the process of their changes and the possible channels of influencing economic results. A similar opinion is shared by J. Aron (2000), who claims that although economists agree that weaknesses of political and economic institutions are reflected in economic performance of a particular country, the interpretation of the results of the research on economic growth with the use of institutional measures still generates many problems.

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<sup>4</sup> One of the works addressing this issue is (Kuder, 2008).

<sup>5</sup> These research works were partly referred to in the papers (Acemoglu, Johnson & Robinson, 2000) as well as (Acemoglu, Johnson & Robinson, 2005).

Both terms ‘policy’ and ‘institutions’ are reflected in a wide base of economic indicators, including indicators of institutional quality (exercising property rights), indicators of political instability (riots, coup d’etats, civil wars), indicators of political system (elections, constitution, executive power), indicators of social capital (level of activity among citizens and organizations), and social characteristics (differentiated levels of income, differentiated ethnic, religious and historical background). Economists select a number of criteria out of this wide range and on this basis define the features of an institution, but frequently forget that each of the indicators may influence growth in a potentially different manner, or that these indicators may be correlated.

The source literature dealing with the question of economic growth is loaded with serious problems related to data accessibility and quality, as well as methodological and identification problems. The most serious mistakes that appear while measuring the impact of institutions on economic results are: choice of the model and variables, evaluation of the direction of dependencies between institutions and growth and data quality.

R. Levine and D. Renelt (1992) as well as L. Moers (1999) draw attention to the fact that in empirical research where one implements economic growth models which include institutional variables, the selection of explanatory variables becomes a frequent mistake. However, J. Aron (2000) emphasizes the differences resulting from the application of structural models and reduced forms of growth models, which describe the impact of institutional variables on economic growth in a completely different manner. The introduction of institutional variables into structural growth models provides an explanation of their direct impact on economic growth by increasing the effectiveness of investment. It should, however, be noted that in such models it will be impossible to determine their indirect impact on economic growth by increasing the level of investment because the level of investment is already included in the equation in the form of the determinant of economic growth. Both direct and indirect impact of institutional variables on economic growth may be estimated while using the reduced form of growth models in which instead of the variable describing the level of investment there appears a set of variables determining this level (Aron 2000).

J.E. Stiglitz (2000) points to the problem of defining ‘good’ institutions and their evaluation with the help of the results which they do lead to. This economist claims that ‘if institutions are assessed on the basis of the results, such claims as “good institutions lead to better results” become something more than tautologies (Stiglitz 2000). Therefore, economists are left with the task of defining these features of organizations (institutions), which are

systematically related to better economic performance. However, it should be noted that measuring the quality of institutions is very often related to the application of approximate measures, frequently related to the feelings of a given economic subject or a group of subjects, of subjective nature – many features of institutions simply are extremely difficult to quantify. Sometimes they may reflect the real situation in a better way, but they are not distortion-free.

Therefore, it may be concluded that indicators of institution quality measure how one estimates the function of the rules of the game, and not what these rules are in reality (Brzozowski, *et al.*, 2006, p. 32).

At present economists are also confronted with the problem of the endogenous nature of institutional variables within research works on dependencies between institutions and economic growth – the institutional structure of a given country rarely remains unchanged in time, hence institutional variables rarely are exogenous with reference to growth. J. Aron points out that the quality of institutions may worsen in times of low economic growth as a result of political instability, changes in the conducted policy or external shocks. D. Rodrik (2004) similarly argues that with a high degree of probability it may be concluded that high quality institutions are both the final product of economic growth and the reason for it. According to him, poor countries most likely will experience long-term growth by improving the rules of the game towards strengthening of entrepreneurs' and investors' property rights.

### **Selection of Institution Measures**

Numerous economists are of the opinion that traditional growth factors do not fully explain the processes of economic growth. It is for this very reason that this part of the work will contain further analyses which aim to verify the research hypothesis on the impact of institutional solutions on the United States economic growth. These solutions do not directly influence economic performance, but are a basis for economic growth by creating appropriate conditions for the changes of work productivity, capital and stimulation of technical progress.

Therefore, a review of databases of quantitative character was carried out. Due to the fact that one economy, namely the United States, is the subject of the analysis, there are no reasons for the analysis of data of qualitative character. The rankings (positioning of economies) which are prepared by well-known research centers would be sensibly applicable in the model only in the situation with the comparative analysis (a lot of data for many



countries). Data of quantitative character may be used in the research on the impact of institutions on economic growth with regard to only one economy. This also solves the problem of limited accessibility of data – data of qualitative character most frequently are annual data beginning in the middle of the 90s of the 20<sup>th</sup> century, which provides the time series of maximum 17 elements. This is in contradiction to the research period of this work.

The analyzed data were divided in accordance with the B. Amable (2003) methodology into measures describing particular institutional areas. They originate from the following sources: *Economic Report of the President* (2010; 2009), *Bureau of Economic Analysis: U.S. Department of Commerce “National Economic Accounts”* (2010) and *U.S. Bureau of Labor Statistics: United States of Labor Statistics* (2010).

The selected measures describing institutions of an economic system are:

- openness of an economy measured as the ratio of the value of exports to the value of GDP expressed as a percentage;
- openness of an economy measured as the ratio of the value of imports to the value of GDP expressed as a percentage;
- mobility of the American society represented as the number of relocations per 1,000 residents;
- index of the value of the dollar measured against a basket of basic currencies (March 1973=100);
- net value of international investments (in billions of USD);
- proportion of people living below the poverty line expressed as a percentage;

The labor market in turn is described by the following variables:

- index of employment costs in the private sector (2005=100);
- index of hourly wage (1996=100);
- proportion of people in the working population expressed as a percentage;
- federal minimum hourly wage (in USD);
- ratio of labor union salaries to salaries in general expressed as a percentage.

The following institutional measures were applied to evaluate the financial sector:

- share of the financial sector in generating GDP expressed as a percentage;
- market interest rate;
- federal debt expressed as a percentage of GDP;

- ratio of household debt to personal income expressed as a percentage;
- income from financial assets of households expressed as a percentage of GDP.

The last of the analyzed institutional areas, i.e. education and R&D, was characterized by the following variables assumed for the analysis:

- proportion of people holding college degrees expressed as a percentage;
- expenditure on R&D expressed as a percentage of GDP;
- share of the private sector in financing R&D expressed as a percentage;
- number of submitted patent applications per 1,000 American citizens;
- expenses on educational institutions expressed as a percentage of GDP.

Due to the high probability that autocorrelation will occur, the measures which were expressed as a percentage of GDP were eliminated from the analysis of the impact of institutional variables on economic growth in the United States.

In order to verify the thesis of the impact of institutions on economic growth one of the most popular econometric tools was implemented – the multiple regression analysis. It describes and assesses the dependence between the selected variable (dependent or explained variable) and a larger number of other variables (independent or explanatory variables). Similarly to the prior assumptions, the explained variable was marked as  $y$ , whereas explanatory variables as  $x_1, x_2, \dots, x_k$ .

The differentiation of variables and the selection of data for the period 1980–2007 cause the stationarity of the applied time series.

### **Statistical Estimation of Model Parameters and Economic Interpretation of Parameters**

The estimated model assumed the shape:

$$\hat{y}_t = 0.006 - 1.010 x_{t1} + 0.019 x_{t2} - 0.017 x_{t3} - 0.003 x_{t4}$$

(0.021)      (0.456)      (0.003)      (0.006)      (0.0016)

where:

$y_t$  –  $\ln(\text{PKB}_t/\text{PKB}_{t-1})$ ,

$x_{t1}$  –  $\ln$  of ratio of employment costs index (period  $t$  to  $t-1$ ),

$x_{t2}$  – difference in proportion of working population (between periods  $t$  and  $t-1$ ),

$x_{t3}$  – difference in ratios between labor union salaries and salaries in general (between periods  $t$  and  $t-1$ ),

$x_{t4}$  – percentage of people living below poverty line,

while average errors of estimation are presented under equation in brackets.

In the course of the conducted analysis the obtained value of the coefficient of determination is:  $R^2=0.805$ .

The coefficient of determination is a descriptive measure of the strength of the linear relationship between variables. The obtained result means that 80.5% of changes in economic growth in the United States may be explained with the help of the above variables ( $x_{t1}$ ,  $x_{t2}$ ,  $x_{t3}$ ,  $x_{t4}$ ). On the other side, it may be concluded that 19.5% of changes in economic growth cannot be explained with the help of the applied explanatory variables.

The analysis of the time series autocorrelation conducted on the basis of the Durbin-Watson test yielded the following result:  $DW=1.978$ .

The result is satisfactory due to the fact that in the null hypothesis lack of correlation was assumed. Knowing that the number of observations amounted to  $n = 28$ , the tables for the Durbin-Watson statistic give the bottom limit of the significance range for  $d$  on the level  $d_L = 1.104$ , and the top limit on the level  $d_U = 1.747$ . In the situation when the obtained statistic  $d > d_U$  it should be concluded that there is no ground to reject the null hypothesis, and so the residuals autocorrelation is not present.

The interpretation of the obtained parameters is as follows:

1. An increase in the pace of employment costs increase of 1 % (with constant  $x_{t2}$ ,  $x_{t3}$ ,  $x_{t4}$ ) results in a fall in the pace of GDP growth of approximately 1.01 %.
2. An increase in the proportion of working population of 1 percentage point (with constant  $x_{t1}$ ,  $x_{t2}$ ,  $x_{t4}$ ) leads to an increase in the pace of GDP growth of approximately 1.9%.
3. An increase in the increments of the pay ratio labor union salaries to salaries in general of 1 percentage point (with constant  $x_{t1}$ ,  $x_{t3}$ ,  $x_{t4}$ ) causes a drop in the GDP growth of around 1.7%.
4. An increase in the proportion of people living below the poverty line of 1 percentage point (with constant  $x_{t1}$ ,  $x_{t2}$ ,  $x_{t3}$ ) results in a decrease in GDP growth of approximately 0.3%.

It is worth noting that three out of the four obtained parameters are variables referring to institutions in the American labor market. The obtained results may result from the specific nature of this market. This requires an explanation.

In the United States economy the labor market is characterized by an exceptionally low level of employment protection (anti-discrimination measures may be the only exception). Comparing this economy with the developed European countries, the United States labor market is characterized by the lowest indicator of employment protection. The index of employment protection developed by OECD permits to make an evaluation of

the labor market with the help of the scale from 0 to 6, where 0 stands for the lowest level of restrictive regulations in the area of employment protection, whereas 6 informs about their highest degree of restrictiveness. Thus generated indexes express the general degree of employment protection with the help of a weighted average. In 2008 the value for the United States amounted to 0.21; in the case of Great Britain 0.45; for Italy 1.89; for Germany 2.12; for France 3.05 (OECD, 2012).

Such a low degree of employment protection is mainly related to a low level of unionization in the American economy. This is mainly due to historical reasons – the character of this labor market may be described by the term ‘employer’s market’. There are many anti-union legal regulations and an unfavorable attitude to labor unions which is present in the media weakens the position of labor activists there. The indicator of labor unions presence in the United States in 2011 was at 11.3% among all the employed, and in France it was even lower and amounted to 7.7% in 2009, in Germany it reached the level of 18.5% in 2010, and in Great Britain it was 25.8% in 2011, and in Italy 35.1% in 2010 (OECD, 2012).

The low level of employment protection and the low degree of unionization make it possible to make the labor market in the United States more flexible. A relatively high level of mobility to casual jobs (temporary), freedom to employ and to dismiss, and a high mobility of demand for work are all present there. All this contributes to the fact that the United States may be described as a country of very high indicators of labor market elasticity<sup>6</sup>. It is above all the elasticity of remuneration and demand for work which, due to a negligible employment protection, are worth noting as they provide employers with the opportunity to adequately adapt employment and remuneration in accordance with the phase of the economic cycle. This in turn makes it possible to reduce recession costs, at least in the employment categories. Another advantage of this labor market is a high mobility of labor force, well developed systems of vocational training aiming at a quick requalification and staff training in accordance with the needs.

The latest studies on elasticity of the number of created work places with reference to remuneration in the United States economy demonstrated that these indicators worsened (Beaudry, Green & Sand, 2010). The authors explain a relatively low elasticity of the number of newly created work places with reference to remuneration by the fact that the American society shows less and less willingness to create new work places and to demonstrate entrepreneurial skills in a situation when labor costs decrease and changeable profits get bigger and bigger. Of course, a periodical dete-

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<sup>6</sup> See studies: OECD (2010); Blanchard and Portugal (2001); Botero *et al.*, (2004).

rioration of indicators may result from attempts to stabilize prices which negatively influenced an effective adjustment of real wages.

This economy also achieves exceptional results when it comes to the level of working activity among Americans – in the last two decades the index amounted to an average of 62–64% of the population in the working age (U.S Department of Labor, 2010), while it was at 56–58% in Great Britain, 51–52% in Germany and France, and 43–44% in Italy (U.S. Census Bureau, 2012).

The above labor market characteristics are confirmed by relatively low levels of the unemployment rate. In the United States it has usually achieved a lower level than in the European Union in the last three decades (U.S. Census Bureau, 2012).

A high elasticity of the market translates into a better use of the available factor, which is additionally strengthened by one of the highest ratios of the level of working activity. This in turn is reflected in the performance results of the whole economy, and hence it seems justified to claim that labor market institutions exert a positive impact on economic growth in this country.

The United States does not belong to social security countries if compared to international labor markets background. Unlike the social systems typical of European countries, the American ones not only have a considerably shorter history, but are also not so universal as they cover only a small percentage of the poorest families. This makes it possible to ‘save’ the part of the budget expenditure which is usually redistributed in the form of government transfers. Bearing in mind that this money does not affect GDP growth, one may understand why in the model there appeared the fourth of the obtained in the model parameters – the proportion of people living below the poverty line.

## **Conclusions**

The purpose of this work was to verify the research hypothesis on the impact of institutions on economic growth dynamics in the United States in the years 1979–2007. On the basis of the analysis of the econometric model it may be concluded among others that:

- institutional factors influence the level and dynamics of the United States GDP;
- although neither the economic system nor financial and monetary market nor the area of education nor spending on R&D seem to strongly

contribute to the stimulation of GDP dynamics in the United States, labor market institutions affect American economic growth;

- market institutions expressed as employment costs, proportion of working population, low level of unionization, and proportion of people living below the poverty line are strongly correlated with the dynamics of the US economic growth: of the listed factors the factor of the proportion of working population and the factor of unionization level most strongly influenced the United States economic growth – an increase of one of these factors of 1% corresponds to an increase in the pace of economic growth of more than 1%.

The basic message of the new institutional economics is the belief that institutions are important for economic development<sup>7</sup>. Today, however, the question is not "whether institutions matter?" but "which institutions are most important and how to build them?" (Rodrik, 2000). The study showed that in the case of the US economy probably the most important factor of economic growth is the nature of the labor market and human capital itself.

## References

- Acemoglu, D., Johnson, S., & Robinson, J. A. (2000). *The Colonial Origins of Comparative Development: An Empirical Investigation*. NBER Working Paper, No. 7771.
- Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). *Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution*. NBER Working Paper, No. 8460.
- Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a Fundamental Cause of Long-Run Growth. In: P. Aghion and S. N. Durlauf (Ed.), *Handbook of Economic Growth*, Vol. 1, Part A, Elsevier.
- Acemoglu, D., Johnson, S., Robinson, J. A., & Thaicharoen, Y. (2003). Institutional Causes, Macroeconomic Symptoms: Volatility, Crises and Growth. *Journal of Monetary Economics*, 50(1).
- Amable, B. (2003). *The Diversity of Modern Capitalism*. Oxford–New York: Oxford University Press.
- Aron, J. (2000). Growth and Institutions: A Review of the Evidence. *The World Bank Research Observer*, 15(1).
- Beaudry, P., Green, D. A., & Sand, B. M. (2010). *How Much Is Employment Increased by Cutting Labor Costs? Estimating the Elasticity of Job Creation*. NBER Working Paper, No. 15790, February.

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<sup>7</sup> "Institutions matter" - famous statement used by Douglass C. North (1990).

- Blanchard, O., & Portugal, P. (2001). What Hides behind an Unemployment Rate: Comparing Portuguese and US Labor Market. *American Economic Review*, 91(1).
- Botero, J., Djankov, S., Porta, R.L., Silanes F. L., & Shleifer, A. (2004). The Regulation of Labor. *Quarterly Journal of Economics*, 119( 4).
- Brzozowski, M., Gierlatowski, P., Milczarek, D., & Siwnińska-Gorzela, J. (2006). *Institucje a polityka makroekonomiczna i wzrost gospodarczy*. Warszawa: Wydawnictwo Uniwersytetu Warszawskiego.
- Carmignani, F. (2009). The Distributive Effects of Institutional Quality When Government Stability is Endogenous. *European Journal of Political Economy*, 25(4).
- Doeringer, P. B., & Streeten, P. P. (1990). How Economic Institutions Affect Economic Performance in Industrialized Countries: Lessons for Development. *World Development*, 18(9).
- Easterly, W., & Levine, R. (2003). Tropics, Germs, and Crops: How Endowments Influence Economic Development. *Journal of Monetary Economics*, 50.
- Economic Report of the President* (2010). Council of Advisers. Washington D.C: United States Government Printing Office, Retrieved from <http://www.gpoaccess.gov/eop/> (1.012014).
- Hall, R. E., & Jones, C. I. (1999). Why Do Some Countries Produce So Much More Output per Worker than Others?. *Quarterly Journal of Economics*, 114(1).
- Kuder, D. (2008). Institucje wspierające wzrost gospodarczy w wymiarze teoretycznym. In: D. Kopycińska (Ed.). *Polityka ekonomiczna państwa we współczesnych systemach gospodarczych*. Szczecin: Wydawnictwo Uniwersytetu Szczecińskiego.
- Levine, R., & Renelt, D. (1992). A Sensitivity Analysis of Cross-Country Growth Regressions. *American Economic Review*, 82(4).
- Moers, L. (1999). *How Important are Institutions for Growth in Transition Countries?* Tinbergen Institute Discussion Papers No. 99-004/2, Tinbergen Institute, Amsterdam.
- Nabli, M. K. (1989). The New Institutional Economics and its applicability to development. *World Development*, 17(9).
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. New York: CambridgeUniversity Press.
- North, D. C. (1989). Institutions and economic growth: An historical introduction. *World Development*, 17(9).
- OECD (2010). *Employment Outlook 2010*.
- OECD (2012). *Employment Outlook 2012*.
- Ogilvie, S., & Carus A. W. (2014). Institutions and Economic Growth in Historical Perspective. In: P. Aghion, S. N. (Eds.). *Durlauf Handbook of Economic Growth*, Vol. 2. Elsevier.
- Rodrik, D. (2004). *Getting Institutions Right*. Retrieved from: <http://www.sss.ias.edu/faculty/rodrik/papers> (1.012014).

- Rodrik, D., Subramanian, A., & Trebbi, F. (2002). *Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development*, NBER Working Paper, No. 9305.
- Rodrik, D. (2000). *Institutions for High Quality Growth: What They Are and How to Acquire Them?* NBER Working Paper No. 7540.
- Stiglitz, J. E. (2000). *Challenges in the Analysis of the Role of Institutions in Economic Development*, Villa Bording Workshop Series „The Institutional Foundations of a Market Economy”.
- U. S. Bureau of Labor Statistics (2010). *U.S. Bureau of Labor Statistics*. Reterived from: <http://www.bls.gov/> (1.01.2014).
- U.S. Census Bureau. *The 2012 Statistical Abstract of the United States of America*, Retrived from: <http://www.census.gov/compendia/statab/> (1.01.2014).
- U.S. Department of Commerce (2010). *Bureau of Economic Analysis*. Retrived from: <http://bea.gov/> (1.01.2014).
- U.S Department of Labor (2010). *Labor Force Statistics from the Current Population Survey*. Retrived form: <http://www.bls.gov/> (1.10.2010).
- Ząbkowicz, A. (1998). Państwo a źródła niepewności instytucjonalnej. *Ekonomista*, 5–6.
- Zienkowski, L. (2008). Determinanty i perspektywy wzrostu gospodarczego w nadchodzących latach – próba syntezy. In: *Polska transformacja i jej przyszłość*. Warszawa: PWE.

### Statistical annex

Calculations for econometric model – calculations were conducted with the application of programme “gretl” and “Excel”

#### The GDP data

Year	real GDP (bln USD)	real GDP growth expressed as a percentage	real GDP per capita (USD)	fixed capital formation at constant prices (bln USD)	employment (thousand)
1978	5,677.60	5.6	25,507.56	18,091.83	96,048.00
1979	5,855.00	3.1	26,015.86	19,253.22	98,824.00
1980	5,839.00	-0.3	25,640.46	20,112.04	99,303.00
1981	5,987.20	2.5	26,035.15	20,302.73	100,397.00
1982	5,870.90	-1.9	25,285.11	20,221.43	99,526.00
1983	6,136.20	4.5	26,188.72	20,090.62	100,834.00
1984	6,577.10	7.2	27,828.03	20,406.75	105,005.00
1985	6,849.30	4.1	28,722.33	20,851.96	107,150.00
1986	7,086.50	3.5	29,447.21	21,681.21	109,597.00
1987	7,313.30	3.2	30,120.18	22,289.08	112,440.00
1988	7,613.90	4.1	31,074.48	22,862.45	114,968.00
1989	7,885.90	3.6	31,882.58	23,290.51	117,342.00
1990	8,033.90	1.9	32,118.64	23,489.70	118,793.00
1991	8,015.10	-0.2	31,618.62	23,249.60	117,718.00



1992	8,287.10	3.4	32,258.83	23,669.40	118,492.00
1993	8,523.40	2.9	32,750.19	24,347.26	120,2590.00
1994	8,870.70	4.1	33,673.07	25,282.83	123,060.00
1995	9,093.70	2.5	34,115.40	25,981.90	124,900.00
1996	9,433.90	3.7	34,983.52	26,740.68	126,708.00
1997	9,854.30	4.5	36,107.98	27,686.36	129,558.00
1998	10,283.50	4.4	37,243.54	28,936.39	131,463.00
1999	10,779.80	4.8	38,596.47	30,377.21	133,488.00
2000	11,226.00	4.1	39,754.24	31,738.81	136,891.00
2001	11,347.20	1.1	39,771.62	32,885.49	136,933.00
2002	11,553.00	1.8	40,099.96	33,973.92	136,485.00
2003	11,840.70	2.5	40,714.88	35,106.91	137,736.00
2004	12,263.80	3.6	41,789.94	37,649.17	139,252.00
2005	12,638.40	3.1	42,670.48	40,066.80	141,730.00
2006	12,976.20	2.7	43,399.24	41,930.04	144,427.00
2007	13,254.10	2.1	43,887.17	42,582.52	146,047.00

The labor market data

Year	index of employment costs in the private sector (2005=100)	index of hourly wage (1996=100)	proportion of people in the working population expressed as a percentage	federal minimum hourly wage (in US dollars)	ratio of labor union salaries to salaries in general expressed as a percentage
1979	36.1	45.7	59.9	2.90	22.40
1980	39.4	51.2	59.2	3.10	22.10
1981	42.8	56.3	59.0	3.35	21.00
1982	45.5	61.5	57.8	3.35	20.50
1983	47.8	63.3	57.9	3.35	19.50
1984	49.8	65.5	59.5	3.35	18.20
1985	51.8	68.8	60.1	3.35	17.40
1986	53.5	72.1	60.7	3.35	17.00
1987	55.2	74.4	61.5	3.35	16.50
1988	57.5	76.9	62.3	3.35	16.20
1989	59.9	79.2	63.0	3.35	15.90
1990	62.3	82.7	62.8	3.35	15.50
1991	64.6	87.4	61.7	3.80	15.50
1992	66.3	91.5	61.5	4.25	15.10
1993	68.3	93.3	61.7	4.25	15.10
1994	70.2	96.3	62.5	4.25	14.90
1995	72.2	98.1	62.9	4.25	14.30
1996	74.7	100.0	63.2	4.25	14.00
1997	77.6	102.6	63.8	4.75	13.60
1998	80.6	108.6	64.1	5.15	13.40
1999	83.5	112.9	64.3	5.15	13.40
2000	86.7	123.2	64.4	5.15	12.80
2001	90.0	126.1	63.7	5.15	12.80
2002	92.4	135.2	62.7	5.15	12.60
2003	95.2	144.7	62.3	5.15	12.40
2004	97.5	147.7	62.3	5.15	12.00
2005	100.0	150.5	62.7	5.15	12.00
2006	103.2	156.7	63.1	5.15	11.50
2007	106.6	162.2	63.0	5.85	11.60

## The R&amp;D area data

Year	proportion of people holding college degrees expressed as a percentage	expenditure on R&D expressed as a percentage of GDP	share of the private sector in financing R&D expressed as a percentage	number of submitted patent applications per 1,000 American citizens	expenses on educational institutions expressed as a percentage of GDP
1979	0.767	2.24	0.508397	0.0222042	4.0
1980	0.760	2.31	0.525726	0.0281628	4.0
1981	0.762	2.34	0.533302	0.0322619	3.9
1982	0.770	2.51	0.540137	0.0385862	4.0
1983	0.775	2.58	0.539177	0.0429735	3.9
1984	0.769	2.64	0.545495	0.0455773	3.8
1985	0.766	2.75	0.540939	0.0488105	3.8
1986	0.760	2.72	0.545755	0.0502125	3.9
1987	0.751	2.69	0.536178	0.0551949	4.0
1988	0.749	2.65	0.550866	0.0614333	4.1
1989	0.757	2.61	0.573864	0.0668002	4.2
1990	0.775	2.65	0.594664	0.0699657	4.3
1991	0.799	2.71	0.622184	0.0690908	4.4
1992	0.821	2.64	0.631611	0.0696258	4.3
1993	0.833	2.52	0.634797	0.0706806	4.3
1994	0.837	2.42	0.640826	0.0741800	4.3
1995	0.832	2.51	0.657096	0.0817430	4.3
1996	0.833	2.55	0.678783	0.0859396	4.3
1997	0.838	2.58	0.695641	0.0953671	4.3
1998	0.832	2.61	0.706894	0.1026369	4.4
1999	0.832	2.66	0.726389	0.1093771	4.4
2000	0.844	2.75	0.751811	0.1107015	4.5
2001	0.847	2.76	0.737796	0.1066262	4.6
2002	0.866	2.66	0.719095	0.1095921	4.6
2003	0.901	2.66	0.710745	0.1103481	4.6
2004	0.939	2.59	0.704076	0.1132497	4.6
2005	0.962	2.62	0.709806	0.1155849	4.5
2006	0.982	2.66	0.719147	0.1075739	4.5
2007	0.996	2.68	0.732867	0.1074239	4.6

## The financial sector data

Year	share of the financial sector in generating GDP expressed as a percentage	market interest rate	federal debt expressed as a percentage of GDP	ratio of household debt to personal income expressed as a percentage	income from financial assets of households expressed as a percentage of GDP
1979	15.2	9.44	33.2	16.925910	4.69172
1980	15.9	11.46	33.4	15.290899	5.80065
1981	15.9	13.91	32.5	14.378710	7.04670
1982	16.6	13.00	35.3	14.090239	8.31900
1983	17.1	11.11	39.9	14.804853	8.63075
1984	17.0	12.44	40.7	15.824252	9.24268
1985	17.3	10.62	43.8	17.150777	9.53674

1986	17.8	7.68	48.2	17.715104	9.80032
1987	17.7	8.38	50.4	17.488502	9.78765
1988	17.8	8.85	51.9	17.298113	10.07368
1989	17.8	8.50	53.1	17.435265	11.09322
1990	18.0	8.55	55.9	16.675894	11.46143
1991	18.4	7.86	60.7	15.860657	11.58563
1992	18.6	7.01	64.1	15.075247	10.97730
1993	18.6	5.87	66.1	15.546606	10.56503
1994	18.4	7.08	66.6	16.975927	10.68349
1995	18.7	6.58	67	18.396432	11.05601
1996	18.8	6.44	67.1	19.015673	11.45550
1997	19.2	6.35	65.4	18.923212	11.82732
1998	19.3	5.26	63.2	18.882670	12.34210
1999	19.4	5.64	60.9	19.354629	11.56608
2000	19.7	6.03	57.3	20.054062	12.12097
2001	20.3	5.02	56.4	21.007843	11.86196
2002	20.5	4.61	58.8	21.752137	11.33558
2003	20.5	4.02	61.6	22.137867	11.08803
2004	20.4	4.27	62.9	22.053553	11.48502
2005	20.4	4.29	63.5	21.848153	12.20091
2006	20.4	4.79	63.9	21.164278	14.10043
2007	20.4	4.63	64.4	21.182769	15.32733

The economic system data

Year	openness of an economy measured as the ratio of the value of exports to the value of GDP expressed as a percentage	openness of an economy measured as the ratio of the value of imports to the value of GDP expressed as a percentage	mobility of the American society represented as the number of relocations per 1,000 residents	index of the value of the dollar measured against a basket of basic currencies (March 1973=100)	net value of international investments (in billions of USD)
1979	3,92997	4,3159693	0,984607	88,00	315663
1980	4,80904	5,0316835	0,982404	90,90	360347
1981	5,09754	5,3079904	0,982027	100,00	340385
1982	4,82379	5,1644552	0,982835	108,40	331373
1983	4,51419	5,3551058	0,982930	109,90	302404
1984	4,59777	6,1592495	0,985634	117,20	166747
1985	4,40921	6,0911334	0,985673	122,05	61739
1986	4,51986	6,3910252	0,986488	99,71	-27759
1987	4,97450	6,9558202	0,987440	89,21	-70919
1988	5,83013	7,2761660	0,988358	84,19	-167458
1989	6,37974	7,4943887	0,989882	88,52	-246232
1990	6,87213	7,8380363	0,988804	85,15	-230375
1991	7,44345	7,7790670	0,986905	83,48	-291754
1992	7,66251	8,0583075	0,983952	82,35	-411021
1993	7,69177	8,4473332	0,982680	85,59	-284460
1994	8,12450	9,1695131	0,980236	85,24	-298458
1995	8,92816	9,9255529	0,976811	81,37	-430194
1996	9,19768	10,2184674	0,975018	86,28	-463338
1997	9,68511	10,7141045	0,971611	93,56	-786174
1998	9,27602	10,8494190	0,970230	98,64	-858363

1999	9,17735	11,6087497	0,967390	98,40	-731068
2000	9,73811	13,1418136	0,975897	105,04	-1337014
2001	9,05686	12,3263889	0,974854	112,50	-1875032
2002	8,68173	12,3794685	0,980644	110,88	-2044631
2003	8,79171	13,0490596	0,977727	97,81	-2093794
2004	9,62344	14,6683736	0,978351	90,82	-2253026
2005	10,32647	16,0447525	0,978233	90,63	-1932149
2006	11,33614	17,2646846	0,978923	90,55	-2191653
2007	12,49349	17,8789959	0,976247	86,40	-1915685

**Model 1: Least squares method estimation with implementation of 28 observations 1980–2007**

Dependent variable: real\_GDP\_per

	factor	Standard error	t-Student	p-value
const	0.0688422	0.0343178	2.006	0.0646 *
LM_employment_costs	-0.865321	1.22221	-0.7080	0.4906
LM_hourly_wage	0.204718	0.670593	0.3053	0.7646
LM_proport_of_working	0.0219732	0.00599333	3.666	0.0025 ***
LM_labor_union_salar	-0.0166676	0.0108708	-1.533	0.1475
RD_college_degrees	0.235681	0.255925	0.9209	0.3727
RD_private	-0.0995977	0.188204	-0.5292	0.6050
RD_patents	0.552607	0.627555	0.8806	0.3934
F_market_rate	-0.00157755	0.00225171	-0.7006	0.4950
F_debt_to	0.00144147	0.00390572	0.3691	0.7176
ES_mobility	-0.337136	0.960393	-0.3510	0.7308
ES_value_of_the_dollar	0.174849	0.165486	1.057	0.3086
ES_international	7.03021e-09	1.39603e-08	0.5036	0.6224
ES_poverty	-0.00422034	0.00254425	-1.659	0.1194

Mean of dependent variable	0.018676	Standard deviation of dependent variable	0.017903
Residual sum of squares	0.001350	Standard error of residuals	0.009820
Coefficient of determ. R-squared	0.843978	Adjusted R-squared	0.699100
F(13, 14)	5.825457	p-value for F- test	0.001190
Log likelihood	99.42619	Akaike information criterion	-170.8524
Schwarz's Bayesian criterion	-152.2015	Hannan-Quinn criterion	-165.1506
Autocorrel. of residuals - rho1	-0.147669	Durbin-Watson statistic	2.295056

Excluding the constant, the highest p-value is for the variable 3 (LM\_hourly\_wage)

The test for normality of distribution of residuals –

The null hypothesis: random variable has a normal distribution

Test statistic: Chi-square(2) = 1.75759

with the p-value = 0.415283

Test for omitted variables –

The null hypothesis: regression parameters for the indicated variables are equal to zero

LM\_hourly\_wage

RD\_college\_degrees

RD\_private

RD\_patents

F\_market\_rate

F\_debt\_to

ES\_mobility

ES\_value\_of\_the\_dollar

ES\_international

Test statistic:  $F(9, 14) = 0.386314$

with the p-value =  $P(F(9, 14) > 0.386314) = 0.922469$

Sequential elimination of negligible variables in presence of two-tailed critical region,  $\alpha = 0,10$

Negligible variable: LM\_hourly\_wage (p-value = 0.765) was eliminated

Negligible variable: ES\_mobility (p-value = 0.799) was eliminated

Negligible variable: RD\_patents (p-value = 0.325) was eliminated

Negligible variable: ES\_international (p-value = 0.579) was eliminated

Negligible variable: RD\_private (p-value = 0.456) was eliminated

Negligible variable: F\_market\_rate (p-value = 0.433) was eliminated

Negligible variable: RD\_college\_degrees (p-value = 0.417) was eliminated

Negligible variable: ES\_value\_of\_the\_dollar (p-value = 0.371) was eliminated

Negligible variable: RD\_patents (p-value = 0.325) was eliminated

Model 2: Least squares method estimation with implementation of 28 observations 1980–2007

Dependent variable: real\_GDP\_per

	factor	standard error	t-Student	p-value
const	0.0576700	0.0212128	2.719	0.0122 **
LM_employment_costs	-1.00987	0.456494	-2.212	0.0372 **
LM_people_in_the_worki	0.0190034	0.00308950	6.151	2.83e-06 ***
LM_labor_union_salar	-0.0165101	0.00649152	-2.543	0.0182 **
ES_poverty	-0.00287137	0.00164773	-1.743	0.0948 *

Mean of dependent variable 0.018676 Standard deviation of dependent variable 0.017903

Residual sum of squares 0.001685 Standard error of residuals 0.008560

Coefficient of determination R-squared 0.805231 Adjusted R-squared 0.771358

F(4, 23) 23.77212 p-value for F- test 6.93e-08

Log likelihood 96.32073 Akaike information criterion -182.6415

Schwarz's Bayesian criterion -175.9804 Hannan-Quinn criterion -180.6051

Autocorrelation of residuals - rho1 0.008954 Durbin-Watson statistic 1.977922

Comparison of Model 1 and Model 2:

The null hypothesis: regression parameters for the indicated variables are equal to zero

LM\_hourly\_wage

RD\_college\_degrees

RD\_private

RD\_patents

F\_market\_rate

F\_debt\_to

ES\_mobility

ES\_value\_of\_the\_dollar

ES\_international

Test statistic:  $F(9, 14) = 0.386314$ , with the p-value = 0.922469

For 3 information criteria (AIC, BIC, HQC), 3 criteria are better.