

Methodology for assessing the impact of institute on sustainable economic growth

Evgenia Zakharova^{1*} and *Elena Zemtsova*¹

¹Chelyabinsk State University, 129, Br.Kashirinykh str., 454001, Chelyabinsk, Russia

Abstract. The paper presents an overview of methodological approaches to the study of the influence of institutions on macroeconomic indicators characterizing long-term economic growth, although other indicators that are influenced by institutions can be identified: economic growth rate, GDP per capita, saving rate, and total factor productivity. The article analyzes the research of leading scientists conducted within the framework of the institutional theory that explains global inequality and some of its features. In addition to the institutional theory, two more theories compete to explain the causes of global inequality: geographical theory and the theory of cultural influence. Both of these theories are unpromising from the point of view of practical applicability, since geographical, climatic factors, cultural characteristics are not subject to the influence of economic policy within reasonable time limits. Institutional theory explains the inequality of countries by differences in their formal legal and informal social norms that govern the behavior of individuals and structure social interactions. The growing volume of empirical work of this kind has shown that institutions should be considered in the context of alternative approaches (culture and social capital, human capital), alternative econometric methods and alternative strategies for identifying the influence of institutions on macroeconomic indicators (long-term economic growth).

1 Introduction

Three theories compete to explain world inequality and some of its features [9]. Geographical theory argues that the inequality of countries is explained by differences in their geographical position [25, 45, 46]. Theories about cultural influence do not rely solely on religion [53] and point to the importance of other values and ethical attitudes in understanding the nature of global inequality [33, 34, 36]. Both these theories are unpromising from the point of view of practical applicability, since geographic, climatic factors, cultural characteristics are not subject to the influence of economic policy within reasonable time limits. Institutional theory explains the inequality of countries by differences in their formal legal and informal social norms that govern the behavior of individuals and structure social interactions [2, 9, 39, 40].

* Corresponding author: jaz@bk.ru

Why do some countries achieve the best economic results? There are two approaches to the answer. The first affirms the primacy of human capital. The second is institutions

The purpose of our work is to review methodological approaches to the study of the influence of institutions on macroeconomic indicators in the economy. In theoretical and empirical works, the rate of economic growth acts as the main macroeconomic indicator influenced by institutional factors, also, there is a work devoted to institutional structure of corporations [41]. However, it is possible to single out other indicators that are influenced by institutions: the rate of economic growth [18], GDP per capita, savings rate [3, 8], total factor productivity [51].

Our review is organized as follows. In section 2, we observe method of our review. discuss. In section 3 we discuss the impact of the impact of human capital, institutions, democracy, on economic growth, also in section 3, we continue our study by pointing out the co-evolution of institutions and culture as another alternative approach. In section 4 we conclude our study by summarize the information.

2 Method

In our review, the bibliographic method is used, which allowed us to identify the degree of knowledge of the direction of scientific research.

3 Results

3.1 Human capital

Human capital is often identified as one of the main determinants of economic growth.

The study [52] tests the hypothesis that a country with a higher level of human capital will grow faster than the higher the level of specialization in high-tech and knowledge-intensive industries in which skilled labor plays an important role. Human capital and structural change can stimulate economic growth, and economic growth, in turn, affects human capital and structural change. This means that the three variables can have a two-way causal relationship, so the problem of endogeneity in the empirical model is inevitable. The study [52] uses the generalized method of moments for a dynamic panel data model (GMM). The GMM system is capable of correcting for unobserved problems of country heterogeneity, missing variables, measurement errors, and potential endogeneity problems that often affect growth patterns when using combined least squares (GLS). The dynamic panel for assessing GMM in [52] is divided into one-step and two-step assessments: for a model with fewer countries and a longer time interval (21 countries and 52 years - model I), a one-step GMM system is used, and for a model with a large number of countries and a shorter time frame (30 countries and 22 years - model II) uses the two-step GMM system. Thus, the study [52] shows that human capital and the dynamics of the production specialization of countries are the key factors of economic growth. In addition, the interaction between human capital and structural change in high-tech knowledge-intensive industries has a significant impact on economic growth.

Endogenous growth theory views R&D as a source of economic growth, arguing that for a higher level of per capita income it is necessary to invest in R&D [44]. International trade promotes the redistribution of benefits from foreign R&D through their copying by domestic firms, a greater variety of intermediate resources for internal production processes, as well as the transfer of technical knowledge [32]. In the scientific literature, institutions have also been associated with innovation and research activities. For example, in [26], the model predicts that improving the quality of institutions contributes to the

accumulation of human capital, reducing income inequality and changing the historical path of development. The paper concludes that historically entrenched institutions influence long-term economic performance. Empirical estimates show that the growth of physical and human capital determines long-term economic growth.

Structural equation modeling (SEM) with latent construction in [20] allows us to investigate the role of institutions and human capital in the development process. SEM allows you to take into account the errors of observable variables, represent ambiguous structures in the form of latent variables using several observable variables, as well as evaluate the causal relationships between latent and observable variables. In the study [20], based on data from 143 countries with 14 indicators, two models were built. In Model A, the relationship between the quality of institutions and economic development is defined and significant. However, the direct link between the quality of institutions and economic development becomes insignificant when human capital is included in Model B. Thus, human capital establishes a direct link between the quality of institutions and economic development. In addition, in countries with a high level of quality of institutions, human capital plays a more important role in the process of their economic development [20].

J. Diaz and E. Tebaldi [26] developed a micro-fund model linking institutions with human capital. In the model, the function of human capital accumulation is derived from an endogenous process, which does not occur automatically, but is derived from decisions weighing the intertemporal benefits from capital accumulation against its costs. Institutions in the process of capital accumulation determine the level of return on education, that is, the amount of human capital depends on the quality of institutions. Since the productivity of the economy depends on the accumulation of human capital, in so far as economic development is associated with the quality of institutions. In [26], to study the model, system estimates of the generalized method of moment (GMM) are used, which show that institutions have a positive effect on economic growth. Empirical estimates show that the growth of physical and human capital determines long-term economic growth. Therefore, the accumulation of human capital and institutions together determine long-term economic growth, thereby creating a historical path of development. Thus, the main political conclusion in the work of J. Diaz and E. Tebaldi is that the path of growth is associated with structural institutions.

3.2 Institutions

In the empirical works of D. Acemoglu et al. [3, 4, 5], data were obtained on whether institutions influence economic development and in what way, as well as theoretical ideas about why institutions differ in different countries and how they develop. Institutions are endogenous and develop in concert with other determinants of long-term economic performance. Therefore, research focuses on strategies for isolating differences in institutions across countries. D. Acemoglu et al. [7] argue that Europeans used different colonization policies, which created different sets of institutions. On the one hand, Europeans created extractive institutions, which led to the creation of economic institutions that support slavery and monopoly. On the other hand, Europeans settled down and tried to replicate European institutions, which led to the creation of inclusive institutions. The colonization strategy was influenced by the feasibility of settlements, that is, the rate of death from disease. The work [7] estimates two-stage least squares regression (2SLS) with logarithmic GDP per capita as the dependent variable and the measure of economic institutions as the key explanatory variable. This variable was measured using the logarithm of the potential mortality of the settlers. Using an alternative formulation of the instrument, D. Acemoglu et al. In another study [7] limited the potential mortality of settlers to estimates of 250 per 1000 people. D. Acemoglu et al. [6] show that the density of the

indigenous population in regions that were previously richer (densely populated) turned out to be poorer today. Responding to E. Glezer et al. [29], D. Acemoglu et al. [1] show, by controlling the historical determinants of institutions and human capital, or simultaneously considering both variables as endogenous, that estimates of the impact of human capital on long-term development are significantly reduced and are often in the 6-10% range. In contrast, the influence of institutions on long-term development remains robust depending on whether human capital is included in the regression (and viewed endogenously) or the historical determinants of education are directly controlled. Thus, these data support the view that institutions are the fundamental cause of long-term development, operating not only at the expense of physical capital and total factor productivity (TFP), but also at the expense of human capital.

In [13], the methodology of group cointegration was used to analyze the impact of the quality of institutions of 27 post-socialist countries on economic growth in the period from 1996 to 2016, because the estimates of the auto-regression model of distributed lags (ARDL) are free from the problem of endogeneity. K. Aleksiu and coauthors find that in the long term, economic growth is positively associated with the rule of law, voice and accountability [13].

There is debate about the relationship between a country's natural resource abundance and economic growth. Case study [14] looks at the impact of resource surpluses in Kuwait using data from 1984 to 2014. Resource exports are relatively important in resource-rich countries, as they can be a major source of economic growth and development. Kuwait has the largest share of oil revenues. Oil accounts for almost 50% of the country's GDP, 92% of export earnings and about 90% of government revenues. R. Aljaralla and E. Angus analyze the impact of resource rent on GDP, labor productivity, human capital and the quality of institutions. Their research shows that using the Distributed Lag Autoregressive Model (ADL) and Error Correction Model (ECM), resource rent increases GDP per capita only in the short term; however, resource rent degrades productivity, human capital, and the quality of institutions both in the short and long term [14]. See [21, 43, 47].

Study [48] examined the contribution of institutional failures to long-term development, drawing on the history of Argentina. Since the adoption of the Constitution of 1853, Argentina has experienced rapid economic growth and institutional modernization, which by 1913 brought it to the top 10 richest countries in the world. After the war, Argentina's per capita income fell from a level close to that of Switzerland to its current status as a middle-income country. The institutional development of Argentina differs in comparative perspective from that of the United States of America, Canada or Australia. Argentina has not completed the transition to an open democracy supported by the rule of law. The institutional structure dooms it to decades of weak economic growth. The empirical strategy in the work of R. Spruk [48] is based on the construction of a counterfactual scenario for studying the path of Argentina's long-term development in the absence of disruptions, assuming that it will follow institutional trends in countries at parallel stages of development. Synthetic control and estimates of the difference in differences show that the creation of *de jure* and *de facto* political institutions more inclusive for non-elites is associated with an increase in per capita income between 1.8 and 2.6%, all other things being equal. Political institutions account for up to 73% of intercountry and intrastate differences in per capita income. Estimates of synthetic control and difference in differences indicate an increase in per capita income in the absence of the key institutional failures, without which Argentina would be among the rich countries today. Argentina's per capita income in 2012 was about 34% of US income, and without the 1930 military coup, Argentina's long-term per capita income would be 59% of the US level, which is equivalent to New Zealand's income level [48].

Results [54] show that maximizing the return on infrastructure capital requires improving the quality of institutions. The paper examined the combined effects of infrastructure capital and institution quality on economic growth using a panel dataset from 99 countries from 1980 to 2015. The empirical strategy in the work involves evaluating a simple growth model and solving endogeneity using the generalized method of moments (GMM).

In work [35], cross-country data indicate that generalized trust is one of the key factors of long-term economic growth, with the influence being stronger in countries with weak formal institutions. The game-theoretic model in [10] shows that the impact of social capital on long-term economic growth depends on the quality of institutions. Thus, the effect of social capital is reduced with well-functioning formal institutions. Generalized trust contributes to the accumulation of human capital [24] and the development of trade [31]. Based on more than 40 regressors for almost 50 countries of the world, R. Horvath shows that generalized trust is a reliable determinant of long-term economic growth [35]. For this, Bayesian Model Averaging (BMA) is used to cope with model uncertainty and estimation bias. The BMA score shows that trust is characterized by a high posterior probability of inclusion (PIP) in the economic growth model. R. Horvat uses BMA joint with two-step least squares method (2SLS-BMA) and instrumental variables (IV-BMA) to solve the problem of endogeneity of trust. According to the results of 2SLS-BMA and IV-BMA, generalized trust is a reliable determinant of long-term economic growth [35].

Cross-country studies using panel data from 60 countries in [27] showed that the size of the informal economy is negatively related to the productivity of entrepreneurial activity, that is, in the presence of a large informal economy, government efforts to improve the quality of governance can be counterproductive due to inconsistencies between formal and informal the rules of the game. A. Fredström et al, using fixed effects and the differential generalized method of moments (GMM), prove that in countries with a large informal economy, lower productivity of entrepreneurship, the quality of management softens the negative relationship between the size of the informal economy and the productivity of entrepreneurship (than the higher the quality of management, the stronger the negative relationship between the size of the informal economy and the productivity of entrepreneurship).

3.3 Democracy

The paper [1] provides evidence that democracy has a positive impact on GDP per capita. Assessing the impact of democratization on GDP faces challenges. First, existing democracy indices are subject to measurement bias. This problem is solved by the dichotomous indicator of democracy, which combines several indices to eliminate false changes in each of them. Second, democracy differs from undemocracy in unobservable characteristics that affect their GDP. R. Barro's cross-country regressions [16, 17] do not allow us to identify the causal influence of democracy on economic growth. Recent studies have addressed this issue with differences in differences (DID) or panel data with fixed effects (PDFE) across countries. Third, democratization is preceded by a temporary drop in GDP. Finally, changes in democracy can be caused by unobservable factors related to future economic conditions. D. Acemoglu et al. [1] proposed research strategies. The first approach uses a dynamic (linear) panel model of GDP that includes country fixed effects and autoregressive dynamics. The second approach uses a semi-parametric system of treatment effects, in which democratization affects the distribution of potential GDP in all subsequent years. And the third approach uses the spread of political regimes between the countries of the region and with a common political history (IV). The approaches lead to estimates that show that within 25 years after permanent democratization, GDP per capita is

about 20 percent higher than it would otherwise be. Therefore, the effect of democracy does not depend on the initial level of economic development, although D. Acemoglu et al. [1] find evidence that democracy is more conducive to growth in countries with higher secondary education.

In the work of K. Gervasoni [28] shows that citizens of democratic countries enjoy rights and freedoms, varies not only depending on social differences, but also on subnational borders (see [23]). Differences in subnational regimes are explained by the size and origin of fiscal resources: a low level of democracy where subnational governments receive significant subsidies from the central government and have a weak tax relationship with local citizens and businesses. Economically autonomous citizens are more likely to engage in politics and challenge the authorities, thereby creating an enabling environment for democracy.

The influence of democracy on economic growth is studied in the work of M. Colagrossi et al. [22], a meta-analysis of 2047 models is applied. Early empirical studies of the institutional determinants of economic growth [15, 19] have shown mixed results. Which is explained by several reasons. First, democracy is a multidimensional concept. Second, studies that test the impact of democracy on economic growth are based on a large set of model specifications and assessment methods that can influence the results of the analysis. The solution to the endogeneity of institutions is associated with identification strategies [1, 4, 7]. M. Colagrossi et al. [22] find that democracy has a positive and direct impact on economic growth, but weaker than the impact of human capital. The heterogeneity of the results is due to spatial and temporal differences in the samples, which indicates that the relationship between democracy and growth is not uniform across regions of the world and over decades.

3.4 Culture

A growing body of empirical work has shown that culture matters for economic results.

R. Putnam's research [42] is devoted to the description of a natural experiment - institutional reform in Italy in the early 1970s, when the central government created new governments in the regions. Each of the 15 newly created governments was expected to achieve the same results, but their functioning ran into problems and the results varied significantly. R. Putnam suggested that this difference is due to regional differences in social capital (the level of cooperation, participation, social interaction and trust was considered). Studies have shown that since the 12th century, residents of free cities in Europe developed a sense of civic responsibility and cooperative behavior. Passing down from generation to generation, this cultural peculiarity has caused regional differences.

A study of the preferences and beliefs of citizens of East Germany, formed under the influence of communist ideas over five decades, carried out by A. Alesina et al. [12], revealed that after the unification of the country, it was East Germans who more supported state intervention than Western Germans. Moreover, the authors predict that the rapprochement of the positions of the West and East Germans is accelerating and can be completed in two generations. A. Alesina et al. [11] show that different initial conditions of capitalism, conditioned by different pre-industrial institutions, have led to long-term cultural differences that influence the choice of policy today.

U. Gnizi et al [30] describe experiments carried out in the communities of Brazilian fishermen (sea fishermen work in groups and are more inclined to cooperate, lake fishermen are individualists and do not trust each other). The authors emphasize that it is trust that sustains the group action of marine fishermen.

To explain the differences in development throughout Europe, G. Tabellini [49, 50] explored the relationship between institutions and generalized morality. G. Tabellini in his

study proved that the modern culture of generalized morality is based on the past institutions of European countries, which allowed the accumulation of human capital from the 18th century, which contributed to the development, in turn, of well-functioning modern institutions favorable for sustainable economic growth.

S. Michalopoulos and E. Papaioannou [38] investigated the role of rooted pre-colonial ethnic institutions in the development of African countries. The authors combined information on the spatial distribution of ethnic groups before colonization with modern economic indicators, using satellite images of light density at night as a proxy. As a result, a close connection is recorded between pre-colonial ethnic political centralization and regional development. This pattern is free from geographic features and other observable cultural and economic variables. Using both the method of comparison and the method of discontinuity of spatial regression, S. Michalopoulos and E. Papaioannou [37] conclude that divided ethnic groups, forming their own national institutions, come to approximately the same economic results. However, national institutions stimulate subnational development near capitals. A brief summary of our review is shown in Table 1.

Table 1. Basic research within the institutional framework.

Researchers	Key ideas
1. Human capital	
A. A. C.Teixeira	Human capital and the dynamics of production specialization of countries are key factors of economic growth, and the interaction of these factors in high-tech knowledge-intensive industries leads to further economic growth
P. M . Romer, G. M. Grossman, J. Dias, E. Tebaldi, F. Baser, S. Gokten и др.	Investment in R&D is seen as a source of economic growth
2. Institutions	
D. Acemoglu, S. Johnson, J. A. Robinson, P. Yared, S. Naidu, P. Restrepo	Institutions are fundamental to long-term development, operating not only with physical capital and total factor productivity (TFP), but also with human capital
C. Alexiou, S. Vogiazas, N. Solovev	In the long term, economic growth is positively associated with the rule of law, voice and accountability
R. A. Aljarallah, A. Angus, E. Bulte, R. Damania, R. Deacon, . Robinson, R. Torvik, T. Verdier, X. Sala-i-Martin, A. Subramanian	Resource rent increases GDP per capita only in the short term; however, resource rent degrades productivity, human capital and the quality of institutions in both the short and long term
R. Spruk	Comparing the path of institutional development in Argentina and in other developed Western countries, the author concludes that Argentina would be among the rich countries today if it completed the transition to an open democracy supported by the rule of law
Y. Z. Zergawu, Y. M. Walle, J. M. Giménez-Gómez	The authors examined the combined impact of infrastructure capital and institutional quality on economic growth
R. Horváth, P. Ahlerup, O. Olsson, D. Yanagizawa, J. Dearmon, R. Grier, A. Greif	Social capital, generalized trust, is a reliable determinant of long-term economic growth
A. Fredström, J. Peltonen, J. Wincent	Lower entrepreneurial productivity, quality of governance mitigates the negative relationship between the size of the informal economy and the productivity of entrepreneurship in countries with large informal economies
3. Democracy	
D. Acemoglu, S. Naidu, P.	Democracy has a positive effect on GDP per capita

Restrepo, J. A. Robinson, R. J. Barro,	
M. Colagrossi, D. Rossignoli, M. A. Maggioni, J. Barro, X. Sala-i-Martin,	Democracy has a positive and direct impact on economic growth, but weaker than the impact of human capital
R. Dahl, C. Gervasoni	Citizens of democracies enjoy rights and freedoms, which varies not only according to social differences, but also on subnational borders
4. Culture	
R. D. Putnam, R. Leonardi, R.Y. Nanetti	Since the 12th century, a sense of civic responsibility and cooperative behavior has developed among the inhabitants of the free cities of Europe. Passing down from generation to generation, this cultural feature has determined regional differences.
A. Alesina, G. Cozzi, N. Mantovan, A. Alberto, N. Fuchs-Schündeln	The different initial conditions of capitalism, conditioned by different pre-industrial institutions, have led to long-term cultural differences that affect political choices today
G. Tabellini	The modern culture of generalized morality is based on the past institutions of European countries, which allowed from the 18th century to accumulate human capital, which contributed to the development, in turn, of well-functioning modern institutions favorable for sustainable economic growth
S. Michalopoulos, E. Papaioannou	There is a close connection between pre-colonial ethnic political centralization and regional development. This pattern is free of current geographic features and other observable cultural and economic variables

4 Conclusions

All of the above works advance the idea that culture and institutions complement each other. The joint development of culture and institutions creates a variety of possible combinations of formal institutions and cultural imperatives that support multiple stable equilibria.

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