Institutional Erosion and Economic Growth

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Abstract. The paper investigates the phenomenon of institutional erosion, which is understood as a decrease in the effectiveness of institutions due to the complication (or, conversely, simplification) of the economic system. Thus, the article substantiates and verifies a hypothesis regarding the impact of economic growth on the quality of institutions. We dwell upon the idea that the possibilities of preventing institutional erosion through timely reforms are limited. This is due to the emergence of institutional friction caused by resistance to reforms on the part of certain social groups and due to the rule of increasing damage. In addition, we consider the process of erosion of human capital under the influence of reforms in the context of cognitive and psychophysiological mechanisms. We put forward a basic and an extended version of the economic growth model that includes the effect of institutional erosion. We conduct computational experiments for the basic model, which made it possible to reveal the effect of economic overheating: a less intensive mode of investment in the long term turns out preferable compared to a more stressful mode of capital accumulation due to the gradual zeroing of the results of explosive growth. We describe the mechanism of degeneration of institutions (i.e., loss of the quality of institutions and the inversion of goals) caused by their internal dialectic. We discuss the significance of a new model of economic growth with institutional erosion for explaining the processes of both ascending and descending branches of social dynamics. We also give an interpretation of some important events of our time in the terms of the new theory.

Key words: institutions, economic growth, reforms, crisis, capital.

Acknowledgment

Introduction

In 2022, Russia launched a special military operation in Ukraine, which became a catalyst for the deglobalization of the world economy. These events have made many previously hidden processes more explicit and almost visually observable. This new round of geopolitical confrontation exposed the fact that the model of Western institutions was not as effective as it had been commonly believed. At the same time, it turned out that alternative institutional models, for example, in China, Iran and Russia, turned out to be quite workable and competitive compared to their Western counterparts. These new events and phenomena have raised at least three important and theoretically significant questions, to which no exhaustive answers have been given so far.

The first – geopolitical – aspect is connected with a need for a comprehensive explanation of the periodical change of the world capital accumulation center (WCAC). So far, the institutional foundations of capital accumulation cycles have not found adequate consideration in the literature. At the same time, it is clear that the very change of one leading state to another is associated with a drop in institutional effectiveness in the former to a certain critical level, when the former leader can no longer maintain its privileged position. Elaborating on the subject, we can say that we need to understand why the world economic superiority of the Netherlands in the 18th century was replaced by the imperial rule of Great Britain at the end of the 19th century, and this, in turn, was succeeded by the quasi-imperial hegemony of the USA in the 20th century; similarly, we need to understand why today, at the beginning of the 21st century, the old the leader – the United States – is losing its geopolitical positions and ceding them to China.

The second – macroeconomic – aspect requires an understanding of the periodic decline in the efficiency of state institutions in various countries and regions without reference to capital accumulation cycles. For example, we still do not have clear answers to the question about the nature of the phenomenon of "decline of the West", which is now being fully manifested. We have no theory explaining the reversal in the development of Japan, which, after several decades of economic miracle in the 1990s, witnessed an equally long period with a regime closely resembling depression. The third – microeconomic – aspect covers local phenomena within different countries and is associated with the search for an answer to the question why certain progressive institutions cease to be such over time. Why, for example, has Lomonosov Moscow State University (MSU), working superbly in the Soviet Union, lost its effectiveness in modern Russia? Or, for example, why has the "melting pot" of European culture and the United States ceased to fulfill its role in relation to current migrants? Or, finally, why is the institution of ordinary schools losing its effectiveness everywhere?

The listed issues have quite obvious specifics: they require disclosure of the mechanism of institutional degradation. While earlier the attention of researchers was mainly focused on the ascending line of societal development, then at present we propose to focus on the downward trend, without which a complete picture of social evolution cannot be obtained. The purpose of the article is to find answers to the above three groups of questions. The major idea of the analysis is the premise regarding the presence of an inseparable mutual connection of the processes of institution building and economic growth.

A brief overview of institutional issues

The purpose of this section does not consist in providing an exhaustive overview of institutional topics, but rather to outline those milestones that lead us to the need to take a new step in its development. In this regard, we will indicate only some fundamental ideas to proceed from.

As part of the microeconomic direction we find it necessary to indicate the works devoted to institutional traps – inefficient, but stable institutions. A set of works in this area (Polterovich, 1999; Polterovich, 2001; Polterovich, 2007) has demonstrated that when certain conditions arise in the system, there emerge completely different institutional configurations that lower the level of its institutional effectiveness. Subsequently, these conclusions were extended to the market of production technologies and equivalent properties were established for technological traps – inefficient but stable technological paradigms (Balatsky, 2003; Balatsky, 2012); moreover, it was shown that under unsuccessful initial conditions, even within the framework of mixed institutional and technological strategies, a less effective alternative may prevail (Balatsky, 2005). The research in this direction has produced a simple model explaining the role of intensive economic growth for the destruction of institutional and technological traps. At the same time, the issue concerning the interdependence of economic conditions and institutions at any given time has not been fully resolved.

The macroeconomic direction goes back to the works of D. North, who emphasized the universality of market institutions and the system of impersonal exchange (North, 1997; North, 2010). Subsequently, these ideas were supplemented by considering the phenomenon of alienation and its implications for human mental health (Balatsky, 2011; Fromm, 2005; Jung, 2010). Further development of North's ideas led to the birth of the concepts of institutional trajectory, which is understood as the trajectory of changes in institutions over time, as well as final and intermediate (auxiliary) institutions (Polterovich,

2006a; Polterovich, 2006b). These concepts helped to realize and thoroughly explain the fact that effective institutional trajectories must take into account restrictions of various kinds; otherwise, the goal in the form of a certain final institution will not be achieved – the final institution may be significantly distorted in comparison with its designed standard. These ideas found their refined expression in the principle of consistency, according to which the pace of economic growth depends not only on the effectiveness of technologies, institutions and culture, but also on the degree of consistency of achievements in these areas (Balatsky, 2021b; Balatsky, Yurevich, 2022). Nevertheless, the reverse effect of economic growth on the combination of factors that determine it remained outside the area of the consistency principle.

The deepening of ideas about the nature of institutions allowed us to formulate an important thesis for quantitative research: institutions themselves do not possess any immanent effectiveness, but acquire it only as a result of coupling with specific economic, technological and cultural realities; if institutions are understood as social technologies, then their effectiveness, as well as that of production technologies, depends on who uses them and how, and what kind of material they "process" (Balatsky, Ekimova, 2019). Implicitly following this logic, institutional bestsellers of D. Acemoglu and J. Robinson consider the mechanism of building effective economic and political institutions in the process of competition between the elites (state) and the masses (population) (Acemoglu, Robinson, 2015; Acemoglu, Robinson, 2021); similar conclusions were drawn even earlier by D. North and co-authors in a slightly different terminology and with a different meaningful connotation (North et al., 2011; North et al., 2012). However, Acemoglu and Robinson's focus on the progressive evolution of institutions did not allow them to reveal a reverse process – the involution (degradation) of institutional systems. In this context, D. Zolo's concept of complexity

was an important addition to the above ideas. Zolo, which is based on the dialectical nature of the political process (Zolo, 2010). According to the new interpretation, politics is a delicate balancing of polar values – personal security and freedom, protection of the political regime and maintenance of social diversity, effective governance and respect for human rights. Consequently, democracy consists in ensuring a reasonable balance between these polar values, whereas the narrow interpretation of democracy as a specific form of elections, representative government and the organization of institutions of power no longer reflects the full depth of this concept. Zolo's idea of the dialectical nature of the political process echoes North's idea of the dual nature of institutions (North, 2010). The simplest model of the political process using the curve of freedom and the curve of security gives an equilibrium (intersection of the curves), which is interpreted as a state of democracy; evolutionary shocks of complexity shift the initial security curve to the origin of the coordinates, which means the destruction of democratic institutions and transition to authoritarian regimes (Balatsky, 2013). Thus, the outcome is that the complication of the social world leads to the destruction of original democratic institutions. However, within the framework of this direction, the idea of economic growth was not explicitly reflected and has remained on the sidelines of the main issues.

Another line in the macroeconomic direction is connected with an idea concerning the destructive impact of institutional reforms on human capital; the idea immediately received a symmetrical formulation for the technology factor (Balatsky, 2021a). In this case, progress in the efficiency of institutions and technologies leads to the destruction of the workforce efficiency, which can turn into a paradox of reforms, when visible improvements in two groups of factors can provoke an economic downturn. However, the mutual influence in this scheme is limited only by the factors of economic growth, while growth itself does not affect them.

In the framework of the geopolitical direction, attention should be paid to G. Arrighi's theory of cycles of capital accumulation (Arrighi, 2006), which reveals the logic of the WCAC moving in time and space. The theory of Arrighi's cycles was empirically developed in the recent work by R. Dalio on the cycles of the world order (Dalio, 2023), which considers generalized indices of wealth and power for different countries; as it turned out, Dalio's cycles of the world order for the Netherlands, Great Britain and the USA correspond to Arrighi's cycles of capital accumulation and can be used to clarify their chronology. In the Russian tradition, there are substantial works on modeling the security function of different countries, which made it possible to carry out a historical reconstruction of the security dynamics of the Roman Empire, including the Roman Republic, the Russian Empire, including the USSR and the Russian Federation, as well as such imperial entities as Great Britain, the United States, China (Shumov, 2015; Shumov, 2016). However, in all these works, civilizational cycles were stated and empirically confirmed, but they were not given a systematic explanation, including why at a certain point in time some economic variables of the WCAC begin to deteriorate.

Thus, today an almost complete picture of the mechanism of economic growth is observed; moreover, these new ideas are very far apart from classical theories. Further, we will supplement the picture with missing elements to ensure final clarity of the phenomenon under consideration.

General hypothesis

The main point, which we will continue to proceed from, is that *any institutional system is created either for an existing social system or for a one that is planned to be built*. In this sense, any institutions are a secondary phenomenon, which is a kind of ritual and legal *form*, which is then filled with a certain social *content*. The social entity (system) is constantly evolving, while its institutional shell is more inert and stable. Moreover, the institutions themselves are introduced for the purpose of

ensuring the stability of society by setting the rules of conduct for each of its members and functional subsystems; otherwise, the order is violated and a war of all against all begins. For this reason alone, changes in society and institutions cannot be *fully synchronized*, which gives rise to constant efforts by politicians and the state bureaucracy to bring them into mutual compliance. The degree of *conformity or nonconformity* of the content (social structure, material base and worldview) of society to its form (institutions) determines the level of *effectiveness* of the institutions themselves.

Let us make a reservation right away that by the content of the social system we mean the totality of its elements, system connections, culture and technology, with the exception of institutions — formal and informal[1].

What has been said entails an extremely important conclusion: institutions themselves cannot be good or bad, effective or ineffective; they become so depending on the level of development of society, development of its institutional support, their correspondence to each other and the adequacy of the method of their mutual coupling. This understanding of the process is shared by D. Acemoglu and J. Robinson, who claim that "without society's vigilance, constitutions and guarantees are not worth much more than the parchment they are written on". (Acemoglu, Robinson, 2021, p. 12). We agree with their ideas regarding the values of society: "Liberty cannot be engineered and its fate cannot be ensured by a clever system of checks and balances. It takes society's mobilization, vigilance, and assertiveness to make it work. We need all that running!" (Acemoglu, Robinson, 2021, p. 109). Thus, in order to build an effective state system, it is necessary to properly combine institutions and culture.

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[1] Informal institutions and culture overlap in many ways and it is difficult to separate them from each other, but in this case traditions (informal institutions) can be excluded from culture to ensure the convenience of analytical constructions (Barsukova, 2021).

The following theoretical premise, necessary for further analytical constructions, can be formulated as follows: the level of *social development is proportional to the scale of national production*. In other words, the volume of GDP acts as the main evolutionary feature. Granted, the development of society is not limited to the growth of production and is not equivalent to it; however, it does not exist outside of its scrupulous accounting. All modern practice of macroeconomic research and measurements shows that no historical comparisons are possible without taking into account GDP, its dynamics and structure. Thus, the stage of development of society can somehow be approximated by the value of GDP.

Combining the two formulated provisions allows us to take the next logical step: *the construction of institutions always reflects the needs corresponding to either the current or designed (future) level of development of society and national production*. In this case, it is assumed that institution building is a creative act compressed in time, after which the institutions created remain stable for a long time, while national production and economy continue their evolution. Such an "escape" of the economy from the original institutions leads to an increase in mismatch between them and generates a natural decrease in the quality (efficiency) of institutions. In the case of sustained economic growth, such a process becomes system-wide and causes institutional erosion. Here and further, institutional erosion will be understood as a historically conditioned decrease in the effectiveness of institutions due to the growing gap in the scale of the current and initial (projected) scale of national production.

The above allows us to formulate the general hypothesis of our research: *institutional erosion manifested in a decline in the quality (efficiency) of institutions is predetermined by the phenomenon of economic growth, due to which the social system is constantly growing and becoming more complex, requiring institutional support of a different kind*. This

premise postulates the direct impact of economic growth on the quality of institutions. As far as we know, this idea has never been put forward explicitly before. This provision will be considered in more detail below.

We cannot but mention the ideas of K. Marx in the context of his law of correspondence of productive forces to the relations of production (Marx, Engels, 1960). In fact, Marx, using a slightly different terminology and expressing a slightly different connotation, asserts a thesis that coincides with our hypothesis. In his interpretation, productive forces, whose proxy variable can be economic growth, are constantly developing and eventually outgrow the original production relations, which are, essentially, institutions. If there is too much discrepancy between one and the other, a revolutionary replacement of outdated relations (institutions) should take place. However, Marx does not consider the evolutionary process of gradual erosion of institutions due to the "dispersal" of productive forces and production relations as such; he speaks mainly about the final stage of accumulated structural inconsistency. We can say that Marx focused on rare and discrete updates of the institutional system, whereas the general hypothesis focused on permanent and continuous ones. Nevertheless, taking into account these reservations, the general hypothesis formulated above appeared almost explicitly in Marx' works.

The phenomenon of complexity of the system: economic growth and the principle of consistency

To restore the entire chain of cause-and-effect relationships arising from the general hypothesis, let us first consider the relationship between the scale of production and the level of complexity of the social system. To do this, we will assume that each current value of GDP (Y) corresponds to a certain level of complexity (Ψ) of the social system: $\Psi = \Psi(Y)$. Then the initial (projected) level of development of the social system, when the existing institutions in the country were being

formed, corresponds to the level Ψ^*. In the process of social development and economic growth, an institutional error accumulates in the form of accumulated risks (Ω) caused by the inconsistency of the institutional needs and capabilities of the state ($\Delta\Psi$): $\Omega = \Omega[\Delta\Psi(Y,Y^*)]$, where

$$\Delta\Psi = |\Psi - \Psi^*| . \qquad (1)$$

In this case, we follow North's ideas that the world is developing by shifting risks from the physical world to the social world (North, 2010). The knowledge accumulated by humankind leads to the emergence of new technology and the growth of power over the physical world, thereby reducing the uncertainty of the physical environment, but such shifts cause the complication of the social environment, which becomes a source of completely new, social uncertainty (North, 2010, p. 38). These challenges require the introduction of institutions that should be increasingly effective. Moreover, this happens by occasionally "shaking up" old institutions and replacing them with new ones (Balatsky, 2011). Thus, we are talking about the fact that institutions have remained stable for a long time, but after the accumulated problems have been acknowledged, the institutions are discretely and significantly adjusted through large-scale reforms.

When introducing the risk function $\Omega = \Omega(\Delta\Psi)$ into consideration, we follow the tradition of Zolo, who argued that time leads to the complication of the social system, which automatically increases a variety of social risks (Zolo, 2010). At this point, the viewpoints of North and Zolo are organically combined, creating the basis for further theoretical constructions. Thus, a final cycle at the level of content is as follows: economic development (Y↑) leads to the increasing complexity of the social system (Ψ↑), which in turn gives rise to additional risks in institutional subsystem (Ω↑) and eventually causes institutional erosion (I↓):

$$\Delta I \sim -\Omega[\Delta\Psi(Y,Y^*)] , \qquad (2)$$

where I — institutional effectiveness (quality).

In this case, dependence (2) is a formalization of the general hypothesis about institutional erosion. At the same time, it expands the scope of the consistency principle: if, in the traditional interpretation, inconsistency in the level of development of macrofactors constrains economic growth (Balatsky, Yurevich, 2022), then in case (2) inconsistency in the needs and availability of certain institutions leads to a deterioration in the efficiency of existing institutions. Such an extension of the basic methodological principle is not only quite natural, but also quite fruitful, allowing the direct and reverse negative connections to be combined in the social system, thereby ensuring the completeness of the picture of historical dynamics.

Approximation (2) requires at least two explanations. First, in formula (1), the discrepancy in complexity is taken modulo, which can be expressed in other ways. For example, we can use the quadratic dependence: $\Delta\Psi = (Y-Y^*)^2$. It does not matter; the main thing is that the potential for institutional tension arises both with the complication and simplification of the social system relative to existing institutions. In this case, formula (1) reflects the *principle of symmetry* of institutional problems, which are the same both in the progress and degradation of the economy. This is extremely important for further constructions, because it takes into account the return movements of the system in historical segments. Second, the approximation of the level of complexity of the system is monoparametric, and this parameter is GDP: $\Psi = \Psi(Y)$. Of course, in reality, complexity is a multiparametric phenomenon, but we use only one value so as to simplify the constructions. Theoretically, the complexity of the system could be described by the size of the country's population, but this variable, as a rule, is closely correlated with the GDP indicator, which makes it possible to replace one with another for the same purpose — to simplify the analytical scheme.

The equation of institutional erosion

The concepts and assumptions introduced allow us to write down an equation for the dynamics of institutional effectiveness, which will contain the effect of institutional erosion. To do this, it is necessary to take into account three driving forces of institutional dynamics. The first one is self-improvement of institutions. As a rule, current legal norms are being continuously improved either by accumulating adequate law enforcement practice, or by adopting complementary institutional norms — additions and clarifications to existing norms. Thus, over time, a kind of "polishing" of existing institutions takes place. The second factor is reforms of existing institutions. As mentioned earlier, reforms are carried out when the accumulated institutional inconsistencies become obvious and unbearable. In essence, reforms are aimed at "adjusting" existing institutions by abolishing old and introducing new rules. The third driving force is erosion of institutions due to the accumulated discrepancy between the institutional needs of the social system and the capabilities of the regulator (state). The old "rules of the game" no longer cope with the situation and do not allow achieving the goals for which they were created.

Then the final balance, which in the future we will call the equation of institutional erosion, can be as follows::

$$\dot{I} = -\Omega + (R + \nu I), \qquad (3)$$

where ν — coefficient of institutional "polishing", reflecting adaptive self-improvement of the legal system; R — effect of the ongoing institutional reform.

In the right part of differential equation (3), positive contribution to the quality of institutions appears in parentheses in the form of "polishing effect" (νI) and "correcting effect" (R); negative contribution is represented by "erosion effect" (Ω). Even in this generalized representation, formula (3) shows that the growth of institutional effectiveness

is not guaranteed, but requires the fulfillment of the condition: $\Omega < R + \nu I$. If we take into account that the effect of reforms occurs only periodically, then for most of the institutional dynamics $R = 0$, and the recorded condition becomes even more stringent: $\Omega < \nu I$. In other words, the erosion effect should not exceed the polishing effect.

Let us elaborate on the complexity function $\Psi = \Psi(Y)$ and the risk function $\Omega = \Omega(\Delta\Psi)$ in the simplest way. Let us assume that the complexity of the economic system is approximated directly by the value of GDP $\Psi = Y$, and the system risks depend linearly on the excess of complexity $\Omega = \alpha\Delta\Psi$, where α — parameter reflecting the sensitivity of the system to the excess/shortage of complexity. Then the equation of institutional erosion is as follows:

$$\dot{I} = R + \nu I - \alpha|Y - Y^*| \,. \qquad (4)$$

In this form, it is clearly visible that institutional dynamics are losing their former triviality, becoming dependent on the stage of economic growth and the amount of excess (deficit) of systemic (economic) complexity typical for it. It is the equation of institutional erosion that is a turning point in our theoretical constructions. Let us focus on this in more detail.

The point is that North proceeded from the idea that economic growth is not a function of knowledge and technology, as it is traditionally postulated in classical theory. In his opinion, this function should have another factor — institutions that "collect" and arrange knowledge and technology; institutions, in turn, are closely related to culture (North, 2010, p. 223). At this point, there emerges a theoretical bifurcation: if we use a simplified two-factor model, then the future of humanity seems bright, because the growth of useful knowledge and technology continues; the three-factor growth model contains a situation where the lack of culture and the lack of effective institutions can neutralize the positive impact of knowledge and technology (Balatsky, 2011). The equation of institutional erosion substantiates and visualizes this hypothetical possibility. We can say that thanks to this equation, the model of economic growth becomes complete and allows us to explore the endogenous trajectories of societal development.

Basic model of economic growth

Continuing North's ideas, let us consider a three-factor production function (Balatsky, 2021a); for simplicity, we will use the Cobb − Douglas function:

$$Y = AI^a K^b L^c \,, \qquad (5)$$

where I, K and L denote the availability of three factors in the economy: institutions, capital and labor; a, b and c — parameters that take into account the contribution of institutions, capital and labor to the creation of new value; A — scale parameter.

Here and elsewhere, let us assume that the provision of these resources involves taking into account two components − quantitative and qualitative. For example, the institutions factor is the product of their quantitative (index Q) and qualitative (index E) features: $I = I_Q I_E$. In this case, it is assumed that the number of institutional norms (I_Q) is multiplied by their average effectiveness (I_E). Similarly, capital and labor are taken into account: $K = K_Q K_E$ and $L = L_Q L_E$. Then production function (5) is as follows:

$$Y = A(I_Q I_E)^a (K_Q K_E)^b (L_Q L_E)^c. \qquad (6)$$

To simplify the analysis, we will consider the aggregated values of three resources without allocating quantitative and qualitative components. However, if necessary, all constructions can be generalized accordingly.

For capital (technology), we will use the traditional accumulation equation:

$$\dot{K} = -\sigma K + sY \,, \qquad (7)$$

where σ − fixed assets retirement rate; s − accumulation rate (share of investments in GDP).

For the dynamics of institutions, we will use the erosion equation without taking into account the reform factor (R=0):

$$\dot{I} = \nu I - \alpha |Y - Y^*|. \qquad (8)$$

For the basic model, we can use the simplest option, when the labor factor is stable and is not exposed to any impacts. Then the production function will become two-factor and be as follows:

$$Y = A^* I^a K^b, \qquad (9)$$

where $A^* = AL^c$ is an aggregated parameter, L=const.

Thus, the adoption of the above simplifications allows us to build a basic dynamic model consisting of equations (7), (8) and (9).

We cannot ignore the issue of measuring all the variables contained in the model. Obviously, the volume of fixed capital and the volume of GDP are estimated in monetary terms, while labor is approximated by the number of employees, and institutions by some conventional units. Today there are many alternative (expert, survey and statistical) and integrative (mixed) methods for assessing the quality of institutions; while the methods themselves can be a subject of various discussions, it is universally acknowledged that the phenomenon under consideration can be measured with varying degrees of accuracy. Labor can also be calibrated depending on the accounting of human capital, just as fixed capital can contain a parameter such as the quality of technologies and the rate of their actual utilization. However, these questions are of a technical nature and do not affect the logic of the model and all related theoretical constructions.

The peculiarity of model (7)−(9) consists in the fact that it has no institutional reforms in it. This model considers, in the most simplified form, the natural "devaluation" of institutions without their occasional repair by the authorities. Thus, many small but important aspects such as the culture of the elites and the masses, managerial skills of reform designers, etc., remain outside the scope of

the study. Of course, these nuances can be taken into account, but in more general varieties of the model proposed (see the following sections). However, we should note that as the model becomes more complex, the results of experimenting with it become less informative. The main objective of model (7)−(9) is to find out the reverse effect of economic growth on institutions as one of its driving forces.

Model experiments and the phenomenon of economic overheating

Despite its simplicity, growth model (7)−(9) is a nonlinear construction in which nonobvious effects occur. To clarify the most general points of the new model, we will use it to conduct simple numerical experiments[2]. We will use conditional data that are close to actual data and also consider two scenarios that differ in the accumulation rate; the initial data for calculations are given in *Tables 1−3* (Tab. 1 shows that the volume of accumulated fixed capital is twice the value of GDP; in Tab. 3 it is assumed that the share of accumulation (the volume of annual production investments to GDP) for two scenarios is at the level of 30 and 60%).

The calculation results are shown in Figures 1−3; the solid line corresponds to scenario 1, and the dotted one to scenario 2. The presented trajectories allow us to draw the following conclusions.

First, the presence of the mechanism of institutional erosion leads to the formation of an economic cycle when intensive growth is replaced by recession and prolonged depression *(Fig. 1)*. Thus, the assumption that institutional erosion can act as a source of inhibition of economic growth can be considered proven.

Second, excessive investment increases the unevenness of development and causes the emergence of a pronounced phenomenon of economic overheating. From this viewpoint, the regime of

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[2] When performing applied calculations, model (7)−(9) with differential equations was approximated by a model from difference equations, for example, $dI/dt \approx \Delta I = I_{t+1} - I_t$.

Table 1. Initial values of variables in function (9)

Variables in model (9)		
Institutions I(0)	Capital K(0)	Output Y(0)
30.0	300.0	150.0

Table 2. Values of parameters in function (9)

Parameters of model (9)			
σ	ν	α	A*
0.13	0.01	0.05	4.9

Table 3. Calculation scenarios for model (7)–(9)

Scenarios of model calculations	
Scenario 1	Scenario 2
$s_1 = 0.3$	$s_2 = 0.6$

Figure 1. Model GDP trajectories in scenarios 1 and 2
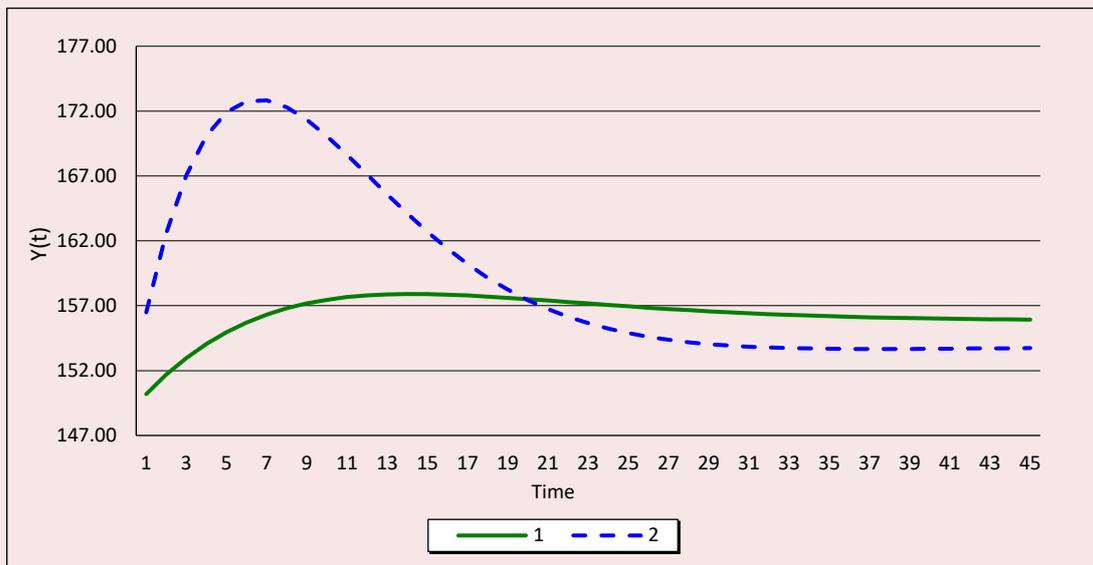
moderate capital accumulation is more preferable than the regime of accelerated investment. Thus, Figure 1 shows that under scenario 2, rapid growth is replaced by equally rapid decline in GDP, and the fall is below the initial value, which devalues the previous growth. The situation is different under scenario 1: growth is replaced by a small adjustment of GDP, but its volume remains noticeably higher than the initial value. Thus, economic overheating cancels all previous gains, while slower growth allows them to be preserved. This conclusion is very meaningful and even unexpected for such a simple model. Even more interesting is the fact that the trajectories of the two scenarios overlap, which shows that after about 20 model cycles (years), the country's economic situation under scenario 1 is more preferable than that under scenario 2. This proves once again that a smoother development can be much more preferable than explosive growth.

Third, from the standpoint of the dynamics of macroeconomic resources, scenario 1 turns out to be much more rational than scenario 2. For

example, institutional effectiveness in scenario 2 shows a landslide fall and is restored at the level of 2/3 of the starting value only after 36 cycles; in scenario 1, on the contrary, it increases slightly during 7 cycles, and then imperceptibly decreases without apparent catastrophes *(Fig. 2)*. As for the dynamics of capital, in scenario 1, it tends to increase for 34 cycles, and then imperceptibly decreases and stabilizes; in scenario 2, the capital is growing rapidly for 19 years, after which it imperceptibly decreases and stabilizes *(Fig. 3)*. As a result, by the end of the modeling period, institutional effectiveness in scenario 2 is at the level of 63.2% of the initial value, and in scenario 1 − 97.7%; similar final values for the volume of capital in scenario 2 and scenario 1 are 202.4% and 117.7%, respectively. Thus, a less stressful scenario of economic growth makes it possible to maintain

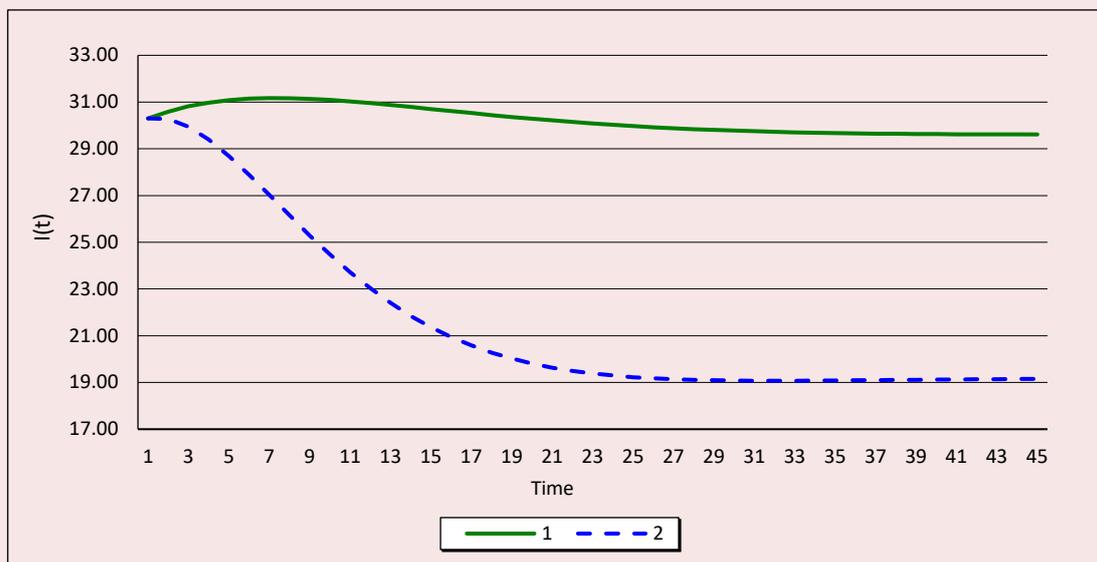Figure 2. Model trajectories of institutional quality under scenario 1 and 2
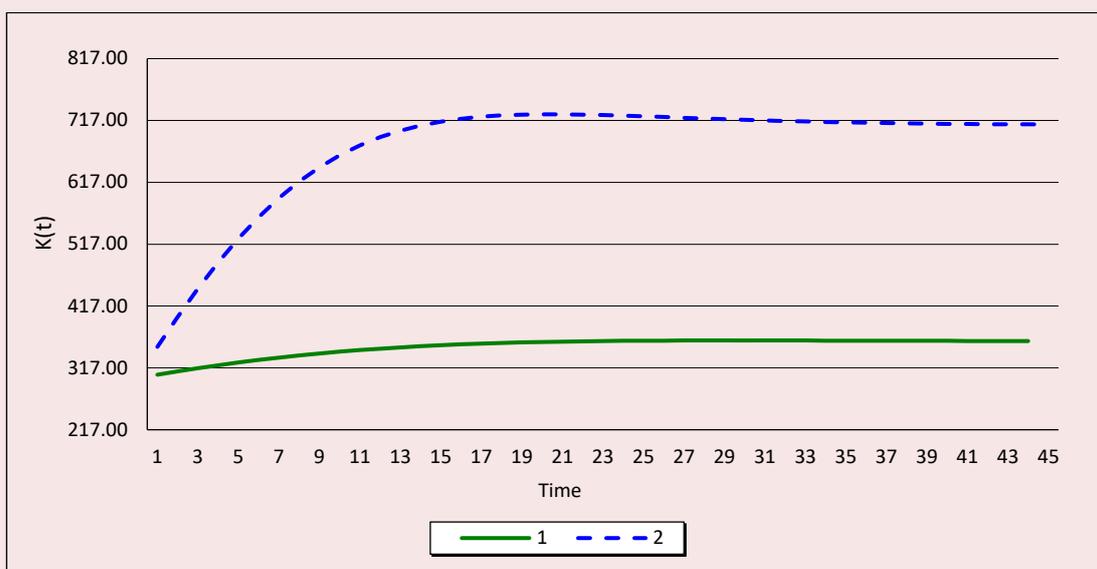

Figure 3. Model trajectories of capital under scenario 1 and 2

institutional effectiveness against the background of moderate capital accumulation, whereas an intensive scenario is characterized by a noticeable destruction of the institutional environment against the background of gigantic over-accumulation of production technologies. Therefore, scenario 1 can be qualified as a gentle development regime, and scenario 2 as an economic overheating regime.

Thus, the modeling using the basic model of economic growth allows us to obtain fundamentally new conclusions regarding classical and traditional models. In the new theory, unlimited capital growth leads to economic overheating, subsequent depression and the destruction of the institutional basis of society.

Resistance to reforms and the rule of increasing damage

Understanding the fact that the phenomenon of institutional erosion in the long term is capable of generating the cooling of the economy urges us to analyze equation (4) more closely. The fact is that it includes the effect of reforms, which can potentially compensate for any effects of erosion by institutional restructuring. However, this is not quite true. To understand the possible problems on the path of institutional restructuring, let us take a closer look at the reform process itself.

Let us define reform R* as the cumulative change in the quality of institutions over the period of reform T, i.e. R* = I(T) − I(0) (Balatsky, 2021a):

$$R^* = \int_0^T dI(t), \qquad (10)$$

where t − current time (year); T − duration of the period when the reform project is being implemented. It is assumed that the value of R* is set (constant) and the larger it is, the larger the reform being carried out. In this case, the reform involves a project with a specific action plan (regulatory and organizational), which must be implemented within the established (planned) deadlines.

It is quite logical to assume that R* > 0, i.e. reform is always aimed at improving institutions and improving their quality. Although there are a huge number of examples of erroneous reforms when R* < 0, we will not address such degenerate cases further. If we assume that the reform is implemented evenly over the years, then its annual effect can be described by the following ratio:

$$R = R^*/T - \gamma(R^*/T)^{1+\theta}, \qquad (11)$$

where γ and θ are parameters that take into account the resistance to reforms with sides of different social groups; θ > 0 and 0 < γ < 1.

If the first term in the right part (11) reflects the normative impact of reforms on the quality of institutions, then the second term is the *effect of resistance to reforms* on the part of those social groups for whom the ongoing reforms are undesirable or even dangerous. The role of this effect has been raised repeatedly in the literature (Polterovich, 2001; Polterovich, 2006b; Polterovich, 2007). In this case, we proceed from the thesis that reforms are not a socially neutral phenomenon − they do not just affect all people, but some of them to a greater or lesser extent. It is not surprising that groups of people who lose from the reforms step up their actions against the introduced changes, which not only reduces the effectiveness of the regulator's actions, but in some cases can lead to completely unpredictable results (Polterovich, 2001). For example, an increase in the retirement age does not affect people who have already retired, is almost not perceived by young people and, conversely, causes a painful reaction from people of pre-retirement age.

Thus, in addition to the direct effect of reforms, formula (11) takes into account the peculiar *effect of social friction* that occurs during the revision of old institutions and introduces system-wide distortions in economic dynamics. This effect is described in (11) by the power function of damage $C = \gamma(R^*/T)^{1+\theta}$. However, in addition to this, the so-called rule of increasing damage is also important, which postulates the nonlinearity of the damage

function. The successful formulation and disclosure of the content of this effect was given by N. Taleb: The damage caused to fragile objects by any shocks increases nonlinearly as their intensity increases (Taleb, 2014, p. 403). Taleb illustrates this rule by a simple example: if small pebbles are thrown at a person 1,000 times, the harm from this will not be comparable to that which will occur if one large stone is thrown at them, equal in weight to the previous thousand small ones (Taleb, 2014, p. 402). If in the first case the harm inflicted on an individual is likely to be limited to prolonged irritation with concomitant slight pain, then in the second case the experiment is likely to end in death or severe injury. In other words, it is better to have many small institutional changes that occur sequentially over a long period of time than one large and one-time change that has a shock character.

In our case, the rule of increasing damage from reforms reduces to two inequalities: $dC/dR > 0$; $d^2C/dR^2 > 0$. In other words, we are talking about an accelerated increase in social damage as the scale of the reform increases. If we continue the example of pension reform, the picture looks like this: with an increase in the retirement age by one year, social friction will be insignificant and will not cause a noticeable distortion of the reform project itself; if the retirement age is increased by five years, it will cause mass discontent on the part of the population, and if the retirement age is increased by 15 years, then we can get a revolutionary movement that will question the necessity and reasonableness of the planned reform. Thus, the rule of increasing damage conceals a hidden possibility of complete or partial disavowal of the results of reforms. From a formal point of view, a limitation on the scale of the projected reform follows from (11): if $R^* > R^{**}$, then the reform leads to the opposite result, namely, it does not improve, but worsens the current quality of institutions ($R<0$). The critical magnitude of the scale of reforms is as follows:

$$R^{**} = T^{\theta}\sqrt{1/\gamma} \,. \qquad (12)$$

It clearly follows from ratio (12) that a large-scale reform should stretch over time rather than take the form of shock therapy. However, as has been repeatedly stated, the reform is basically a temporary phenomenon and should not turn into permanent pressure on the population. Consequently, the duration of T cannot take on too large values; otherwise, the stability of public order is disrupted and a reform fatigue syndrome occurs, which will be discussed in more detail below.

The phenomenon of institutional friction, coupled with the rule of increasing damage, leads to an understanding of the differences in two reform regimes — shock, which involves the "rapid" implementation of all planned innovations, and adaptive, based on the "stretching" of the transformation program for a longer period (Balatsky, 2021a). In turn, the adaptive mode is organically connected with the process of building an institutional trajectory due to the "fragmentation" of the desired institution into intermediate (auxiliary) ones (Polterovich, 2006a; Polterovich, 2006b). We emphasize that the process of carrying out reforms in small "portions" of institutional innovations can be conducted both through a simple prolongation of the planned measures, and through the special construction of simpler intermediate institutions; the nature of these measures is the same.

A comparison of the shock and adaptive modes of reform is shown in *Figure 4*. The logic of the above illustration is as follows. The initial institution at the initial moment of time (the left shaded circle) is supposed to be changed by carrying out a sufficiently large-scale reform to build a new final institution (the left white circle). If the reform is carried out in a shock mode in a compressed time (t), then the resistance to reforms may be so significant that the goal will not be achieved, and the final institution (the circle with double hatching) will not only not coincide with the designed one, but will also be less effective than the original one. If the reform is carried out in an adaptive mode for a time

Figure 4. Comparison of the shock mode and adaptive mode of reform
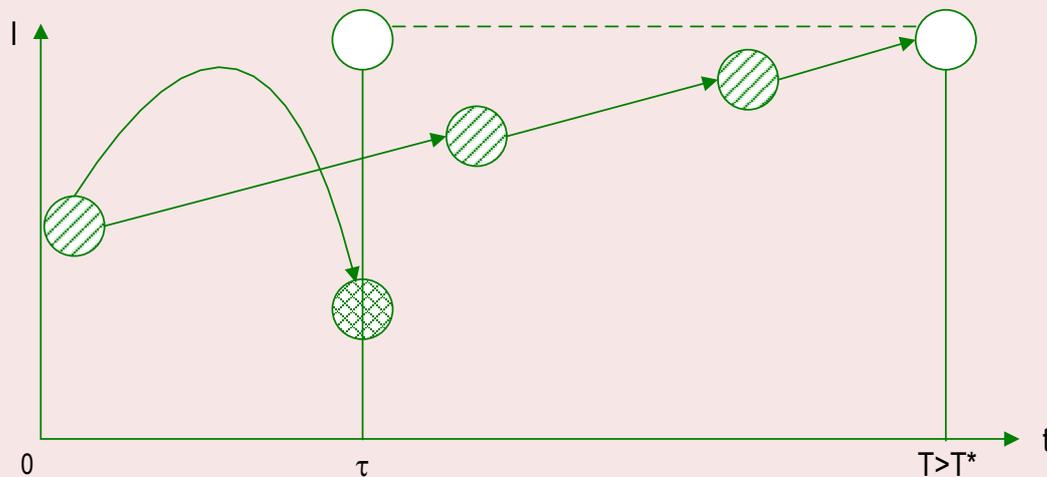
T, greater than a certain minimum safe T*, and by a stepwise transition to intermediate institutions (two right shaded circles), then it is possible to reduce the social damage from the transformations and reach the designed institution (the right white circle).

Thus, taking into account the phenomenon of resistance to reforms and the rule of increasing damage makes the process of reform itself nontrivial and raises the question of its proper design[3].

Reforms and the erosion of human capital

In addition to all the above, reforms also have a negative effect on human capital, which in itself can lead to the paradox of reforms, when the growth of the institutional quality provokes an economic downturn; this aspect was discussed in detail in (Balatsky, 2021a). Elaborating on this provision, we will consider two channels of the impact of reforms on human capital — cognitive and physiological.

The first, *cognitive*, channel is connected with the fact that reforms lead to the write-off of part of human capital due to the devaluation of certain knowledge, experience and skills. The second, *psychophysiological*, channel involves physiological fatigue and psychological discomfort from externally imposed reforms, to which people have to adapt; sometimes this is also associated with the loss of professional and social positions. The negative impact on both channels leads to a deterioration in health and psychological well-being, an increase in the cognitive and psychological burden. With some degree of conditionality, we can say that the cognitive channel is responsible for reducing the quality of labor (L_E), and the psychophysiological channel is responsible for its quantity (L_Q); of course, in reality, the influence coming through two channels affects both features of labor, and therefore we will not take these differences into account in detail in model constructions. Then the dynamics of labor will be described by the equation:

$$\dot{L} = \omega L - \mu H^{1+\rho} - \zeta (R^*/T)^{1+\beta}, \quad (13)$$

where ω — natural growth rate of the quantity and quality of labor; H — time period after the start of the reform (H=0,,,T); ζ and β — parameters that take into account the impact of the scale of the reform on the process of writing off human capital; μ and ρ — parameters that take into account the

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[3] We consider it relevant to point out that in all constructions we deliberately do not take into account the cost factor of reforms. This is due to the fact that the costs of ensuring reforms fall on the country's budget and are reflected in the overall macroeconomic characteristics. However, this aspect of the problem is not of great importance for the issues under consideration.

impact of the duration of the reform on the process of psychological fatigue of the population; all parameters μ, ζ, ρ and β are positive.

The second term of the right part of (13) reflects the psychophysiological effect of the reforms, and the third – cognitive. In equation (13), as in equation (11), the rule of increasing damage appears explicitly. In this regard, there is a potential opportunity when the erosion of human capital blocks its natural reproduction. For example, even a sluggish but long-lasting reform intensified at a certain moment by a new large-scale and short reform can create such a destructive potential for the human capital of a nation that will provoke its depopulation with the accompanying economic downturn. It is where another danger of reforms can be found.

In general, the refined model of economic growth consists of equations (5), (7), (8), (11) and (13). The dynamics of institutions and labor are presented in a somewhat unconventional form; equations (8), (11) and (13) clarify various provisions of economic theory that were previously ignored. Numerical experiments with the model are a separate topic, but all the qualitative aspects are well understood from the very configuration of the equations considered.

Dialectics and the rebirth of institutions

The equation of institutional erosion reproduces a purely quantitative evolutionary change in the effectiveness of institutions as the economic system grows. However, no less important is the qualitative aspect of the problem associated with institutional failures and radical degeneration of institutions. This question is important in itself; it is also important because it allows us to understand the direction of the deformation of institutions under the influence of external circumstances. To clarify the issue raised, we should determine two aspects. Let us look at them in more detail.

The first aspect is connected with the formation of domestic and foreign policy in the state; these types of policy are sometimes supported by institutions that are completely different in their goals and ideas. For example, a hegemon state represented by the United States has traditionally supported economic and political competition within the country, whereas in the world economic system it has done everything to ensure its economic and political monopoly. This situation, when the builder and custodian of institutions for the internal and external environment uses completely different institutional models, is typical.

The second aspect is associated with the direction of the rebirth of institutions. Dialectical logic is fully involved here. Thus, modern dialectics has three fundamental laws – the unity and struggle of opposites, the transition of quantity into quality, and the negation of negation. Combining these three logical postulates allows us to formulate the *main theorem of dialectics*: any phenomenon in the process of its development passes into its own opposite (Hegel, 2023). This fact is directly related to institutional dynamics, namely: any serious failure in the work of institutions leads to its dysfunction and inability to achieve the goal for which it was created; the gradual accumulation of such dysfunction sooner or later leads to the fact that the institution begins to work to achieve the goal directly opposite to the original one. This inversion is related to the purpose of the institution, which is either provided or not. In the first case, the institution is effective, in the second – ineffective; bringing distortions in the work of the institution to a certain critical level leads to its restructuring in the opposite direction. The considered dualism in the dynamics of institutions is determined by their original functional dualism – they either perform their generic function or not; therefore, they perform the opposite function. Such inversions are also the norm of institutional dynamics.

Reforms and the institutional paradigm

The work (Balatsky, 2021a) substantiates the thesis that all reforms should be strictly metered, whereas the theoretical constructions of the previous sections allow us to add something else

to this: all reforms have their limits in the "repair" of institutions and cannot compensate for their historically conditioned erosion. This issue is extremely important because of the often false impression that reforms can correct any norms of public life.

To understand the limited possibilities of reforms, it is advisable to introduce the concept of *institutional paradigm*, which we will understand as the initial basic principles of the institutional model of the state. As a rule, reforms are aimed at "repairing" institutions, but do not affect the institutional foundations, which in turn are permeated by some kind of institutional paradigm. That is why sometimes, instead of reforms, revolutions occur designed to change the original social paradigm of the outdated legal system.

To understand the introduced concept, one can refer to the studies of institutional systems based on different philosophies. For example, today it is customary to distinguish between competitive and collaborative institutions. The former are based on the primacy of mechanisms and principles of competition, the latter − on the primacy of mechanisms and principles of cooperation (Polterovich, 2022a; Polterovich, 2022b). Thus, we can talk about competitive and collaborative institutional paradigms, which form a kind of dialectical opposition and which cannot be reduced to each other. Experience shows that one or another institutional paradigm has deep historical roots and an economic basis. The demand for a radical change in the economic model of the state also leads to the demand for a change in the institutional paradigm, on the basis of which a new institutional system is being built. It is this logic that underlies the replacement of the old WCAC with a new one.

Concretizing what has been said, let us turn to the colonial paradigm of Great Britain, which in the second half of the 20th century has already become ineffective, as well as the entire institutional management system of the world economic system. This contradiction is due to the fact that the very

core of the British colonial system represented by a small island state − Great Britain − turned out to be insufficiently large and powerful for the expanded and complicated geopolitical space. That is why this core was replaced by a more adequate state formation in the face of the United States with a different institutional paradigm and a different institutional model. Some fundamental differences between the British and American systems of domination are considered in (Arrighi, 2006).

Similar processes took place with the Russian Empire in the period from 1917 to 1924, when the old social system in the new conditions could no longer keep the gigantic territory of the country from disintegration; the change of the institutional paradigm led to the reconstruction of the Russian Empire into the Soviet Union. The same situation was repeated in 1991, when the Cold War exhausted the USSR and under the conditions of the old institutional paradigm there were no longer enough resources to preserve the country; another change in the way of life led to the rebirth of the Soviet Union in the format of the current Russian Federation. In both cases, the breakdown of the country's institutional framework occurred because of the overdue mismatch of economic problems and economic opportunities of the state; bringing supply and demand in the economic sphere into line required a fundamental change in the rules of the game.

An interesting illustration of the phenomenon of "obsolescence" of the institutional paradigm is provided by basic model (7)−(9) proposed above. Thus, the scenario of economic overheating clearly shows that excessive erosion of institutions makes it pointless even to accumulate fixed capital, which, within the framework of the old institutional structure, cannot reverse the negative situation and restart economic growth. This is the universal mechanism of economic degradation: old institutions "bind" the country's economic resources and do not allow them to function with due efficiency.

Discussion of the results and historical interpretations

The introduced concept of institutional erosion made it possible to construct a model of economic growth that best meets the above requirements mentioned by North. This model demonstrates the complex interdependence of not only the three groups of macrofactors, but also the volume of production. Back in 2002, V.M. Polterovich made a shrewd remark that, paradoxically, the most important factor in economic growth is growth itself (Polterovich, 2002). In the light of the completed constructions, Polterovich's thesis can be paraphrased: paradoxical as it may be, but the limitation of economic growth is growth itself. This is the effect generated by the proposed model. However, in addition to this general conclusion, the new theory allows us to answer a number of questions posed in the introduction. Let us dwell on these meaningful interpretations in more detail.

Before moving on to concrete examples, let us consider a kind of institutional metaphor. A balloon or a football bladder can be considered as institutions, and the gas filling them can be considered as an economic system. If the balloon is filled with light gas, it will fly up, and if it is filled with heavy gas, it will lie on the ground; if the balloon is inflated too much, it may burst, and if not strong enough, it will be like an ordinary rag, not suitable for use. It is this analogy that will become a guide to all subsequent examples.

Example 1: Why have modern secondary schools ceased to provide good education? To answer this question, one should proceed from the fact that schools were established quite a long time ago as small institutions, where teachers and schoolchildren were few and knew each other well. At the same time, the teachers themselves were in short supply and the school management treated them with care. Today, the school education system has undergone a total *massification*, when the number of students and teachers has become huge on the scale of both one school

and the whole country. Secondary education has become a conveyor belt and has lost its former value, as well as the personalities of teacher and student. The individual contact between teacher and student has been replaced by a bureaucratic system of formal evaluation of both, which is based on primitive templates. In such conditions, the traditional institution of school is degenerating and losing its former effectiveness; modern large-scale economic realities cannot be squeezed into the old institutional framework.

Example 2: Why did Lomonosov Moscow State University lose its position as a world-class university after the collapse of the USSR? The organizational model of Moscow State University, formed in the Soviet Union, was designed to solve large scientific, technical and economic problems, but after 1991, the GDP of the Russian Federation for eight years decreased by half compared to the Soviet period alongside the closure of many high-tech economic sectors. Thus, for MSU, the goals and objectives for which it was designed have physically disappeared. The primitive economy of the post-Soviet period no longer required the university to solve complex problems, and therefore its organizational model turned out to be unclaimed and inefficient. There was nothing to fill the old institutional model with, and therefore it first began to work idle, and then simplified, formalized and degraded. Of course, this model of erosion was typical for many universities in Russia. We should note that in recent years, MSU has begun to "come to life" a little; this is due to the fact that the economic growth of the last two decades has started to generate pinpoint scientific problems addressed to researchers, which were chronically lacking in the first 10 years after the collapse of the USSR.

Example 3: Why have the "melting pots" of the United States and European countries stopped coping with their tasks of Americanization and Europeanization of immigrants? The answer to this question is also rooted in the phenomenon of migration outgrowing its original borders. For

example, if the "melting pot" is set up to "process" a certain proportion of the population in the form of migrants, then it will not necessarily cope with this task when the specified proportion increases tenfold. In addition, the growing European (American) society was increasingly tolerant of the violation of internal cultural norms, which by no means added "fuel" to the "melting pot". Thus, the extinction of the effectiveness of the institute of melting pots in the USA and Europe is also a consequence of the proliferation of the phenomenon of migration itself. No cosmetic reforms will help here — the entire institutional paradigm must change either in the direction of rejection of tolerance and strengthening control over the behavior of migrants, or in the direction of severe restrictions on the flow of visitors.

Example 4: What are the origins of such phenomena as the "decline of the West" and the loss of dynamism of Japan's development? Quite often, these phenomena are explained by a decrease in the passionarity of the respective peoples, a drop in the vitality of their representatives. This explanation can be considered correct, but it is of an intermediate nature, because in this case it is quite legitimate to ask the question of why passionarity suddenly begins to fade. With regard to Japan, the situation is more obvious: the country's catching-up development has been replaced by its economic and technological leadership, which has "crossed out" the very need for institutions of catching-up development; in parallel, Japan has reached its limit in population growth in the existing territory and in the growth of the average level of welfare. Taking into account these new realities, the further efforts of the Japanese in ensuring economic growth have actually become meaningless, which is the direct cause of the decline in passionarity. With regard to Europe, we can talk about two historical phases of its decline — the second decade of the 20th and 21st century, respectively. However, in the 20th century, Germany's imperial ambitions added "fuel" to the civilizational dynamics of the continent,

whereas at the beginning of the 21st century there is no similar incentive yet, and the welfare is at an unprecedentedly high level by historical standards. It is the acquisition of a new quality of life in Europe and Japan that underlies the decline in the productivity of the established development institutions.

Example 5: Why are the established WCACs eventually replaced by new leading states and why is the United States losing its position as a global regulator today? Any WCAC creates its own world order (institutional system), in which it acts as a global regulator of all major processes; this system is based on an international political consensus, when all countries explicitly or implicitly recognize the established order as legitimate. However, over time, the world system grows quantitatively and qualitatively, when the population, production, military power, etc. increases in all countries. Sooner or later, the complexity and scale of the geopolitical space reach such a level that the WCAC no longer has enough resources to ensure effective control of all world-system relations. The old order comes into conflict with the new interests of the countries within the world system, and they begin to struggle with the old institutions, which leads to a natural decline in their effectiveness. At the same time, the WCAC, which is at the peak of economic prosperity, loses incentives for an uncompromising struggle for its dominance, which ultimately ends with the change of the world political hegemon. At the moment, the Chinese economy has already outgrown the American one, which negates the previous consensus on the current world order and provokes geopolitical turbulence. At the same time, it is important to emphasize that the currency hegemony of the United States is not going away because, for example, the U.S. Federal Reserve System (the Fed) has become poorly functioning. On the contrary: the mistakes of the monetary institution represented by the Fed during the Great Depression in the 21st century were taken into account by B. Bernanke, and therefore

for many years the country managed to curb the unfolding crisis phenomena; however, despite this, the countries participating in the world market are beginning to abandon the dollar as a trading currency, which is due to their own geopolitical interests; the Fed can no longer effectively serve the global economy, because it was not intended for such a large-scale economy. In an attempt to maintain its monopoly over the outside world, the United States spontaneously renounces the internal order in the form of maintaining political and economic competition within the country. Because of these processes, a dialectical inversion of the institutions of the world order occurs — the external monopoly is replaced by fierce competition between other countries and the United States, and the internal competitive mechanisms within the American state are replaced by the monopoly of one (democratic) party on all forms of state power.

In a broader context, the general hypothesis is indirectly confirmed by the entire history of capitalism. For example, the phenomenon of economic growth itself arises simultaneously with the formation of the capitalist system, and it is at this time that the colossal dynamism of institutions begins to manifest itself, which in the conditions of the Middle Ages were highly stable and could remain in their original state for hundreds of years. Thus, the fact of synchronization of the high dynamism of institutions and the economy clearly indicates the existence of a connection between the two phenomena; the rapid growth of production led to the rapid erosion of institutions, which were constantly modernized through institutional reforms[4].

We started this section with a certain analogy, but we would like to finish it with another one. The history of states resembles the life of individuals, which consists of qualitatively disparate stages. It is not surprising that different stages are characterized by different life strategies and lifestyle (rules of the game, institutions), which are produced by completely different tasks facing a person. For example, the principles of career and professional growth for an 80-year-old person lose not only their effectiveness, but also any meaning due to the fact that the person has already outgrown the corresponding stage of their life. Conversely, to them, the right diet, work and rest become the determining factors in their existence, whereas at the age of 30 they did not pay any attention to all this. The same thing happens in the life of countries. And no matter how conditional this analogy may be, it highlights the main thing — the erosion of certain institutions at different stages of the life of an individual and society.

Conclusion

The issues discussed in this article are a logical step in integrating the institutional factor into the theory of economic growth. The implicit assumption in many modern studies about the exogenous nature of institutions, which, although they "link" labor and capital for the production of vital goods, but themselves explicitly do not depend on the level of welfare, leads to a loss of the explanatory power of economic theory. In this picture, institutions are connected with culture and live their own life, which is not directly coordinated with the achieved level of production and complexity of the economic system. Removing this unrealistic premise opens up great analytical possibilities in understanding social dynamics. The hypothesis of the influence of the level of welfare on the quality of institutions allows us to explain comprehensively not only the ups, but also the downs of individual countries and entire civilizations.

The proposed model is a deliberate simplification of reality, but even in this form it generates a lot of additional effects that enrich our understanding of the world around us and the person themselves. So far, the potential of computational

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[4] I would like to thank Professor V.V. Volchik for this observation; he was the first to draw attention to the parallel between the dynamics of institutions and economic growth at the stage of capitalism.

experiments based on the full model, and not only with its basic version, has remained unrealized. Progress in this direction can provide additional interesting information about the patterns of self-assembly and self-disintegration of social systems.

In addition, the empirical verification of the thesis about institutional erosion is of independent interest. However, these questions are beyond the scope of this article and can serve as a basis for further research.

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