ANTHROPOGENIC CAPITAL AS A PREDICTOR OF ECONOMIC SUSTAINABILITY: GLOBAL DYNAMICS ASSESSING

Daria Ivanova

Rostov State University of Economics (RSUE), Rostov-on-Don, Russia

Being a system focused on long-term external competitiveness ensuring, autonomous from the world economic situation fluctuations, a sustainable economy requires its own objective measurement, primarily in order to determine the stages and intermediate control of the strategy to achieve it. The paper analyzes role of traditional capital as a predictor of economic sustainability, presents the author's methodology for determining the dynamics of the traditional capital stability in 50 countries of the world, offers conclusions regarding the traditional capital sustainability and the directions for modernizing state policy to achieve it in modern conditions.

Keywords: economic sustainability; predictors of economic sustainability; traditional capital

Introduction

The sustainable model of economy implies relations around the goods production and distribution, primarily functioning on the principles of efficiency with traditional market institutions (for example, competition, private property, market pricing) support.

Economic relations are focused on expansion, constant growth, however, do not have the ability to strive for stability and stabilization, are devoid of self-preserving functions, economy’s attempts to independently stabilize its own progress only cause the self-destruction of traditional market system (for example, due to monopolization, shortening the horizon of planning, potential to generate new knowledge that is not capable of rapid commercialization, and so on).

Daria Ivanova

is a candidate of sciences; PhD – candidate lecturer in Rostov State University of Economics, Rostov-on-Don, Russia.

Research interests: sustainable economics, green economy, national competitiveness, globalization

Published more than 25 articles in Russian and International journals, participated in 15 International scientific – practical conferences and workshops.

Email: ivanova753@yandex.ru
ANTHROPOGENIC CAPITAL AS A PREDICTOR OF ECONOMIC

The economy is the sphere of formation and life of capital in various forms of its manifestation - from material to those associated with entrepreneurial initiative, competitiveness of behavior, innovation, and so on.

This capital is inherently private, capable to change its efficiency depending on belonging to different owners, lose or gain value, create more or less added value as a result of involvement in production processes, diversify, crossing the boundaries.

*Purpose of the study* is based on the author's methodology for considering and evaluating anthropogenic capital as a predictor of economic sustainability, to analyze the indicators of its sustainability in geographic regions and in groups of countries by per capita income.

**Literature review**

The multidimensional nature of the sustainable economy parameters (including socio-cultural, geographic and environmental) does not detract from the importance of anthropogenic capital. That is confirmed by the presence of sustainability predictors associated with anthropogenic capital, proposed in a wide range of studies.

Thus, R. Husgafwell et al. (2017) identified and tested nine aspects of economic sustainability directly related to the anthropogenic capital functioning and included financial performance, investment dynamics, raw material and energy flows, risk assessment, supply chains, aspects of economic regulation and administration.

I. Sachs (1999) proposed a toolkit based on economic assessments of environmental management indicators, combining fixed, variable costs and environmental costs.

J. Harris and N. Goodwin (2001) included public debt, external debts and sectoral imbalances in indicators of economic sustainability, generally leaving social and environmental aspects without much attention.

Economic sustainability, proposed by the experts from the University of Mary Washington in 2009, singles out anthropogenic capital as one of its fundamental (along with environmental, cultural and social) principles.

Representatives of the theory of free entrepreneurship in many ways analogous sustainability and economic efficiency, but fundamentally distinguished economic sustainability from economic growth.

L. Rigamonti, I. Sterpi and M. Grosso (2016) considered costs as the main aspect of economic sustainability.

Porokhin A.V. and Urban N.A. (2015) focused on the regional indicators of economic sustainability. Based on the fact that the regions’ activities are mainly related to ensuring the effective functioning of the economic sphere, they identified the following criteria for economic sustainability of the regions assessing: changes in consumption; international integration to accelerate sustainable development; financial mechanisms and resources; transfer of environmental technologies, capacity building and cooperation.

Studies that consider the perspectives of economic sustainability measuring in terms of labor productivity (Pieper, 1999), energy efficiency (Vasiev et al., 2020), marginal revenues (Guth et al., 2020) and costs of life cycle of economic sustainability (Jeswani et al., 2020) deserve attention.

A large number of studies (Hanegraaf & Biewinga, 1998; Kryukov et al., 2017; Koryakov, 2012; Naumenko, 2008; Shilova, 2014; Andreeva, 2018) have been carried out in
the areas of measuring the probability and factors of sustainable growth of individual sectors of the economy or enterprises (Boyd-Barrett & Rantanen, 1998; Unur et al., 2017; Seguin & Germain, 2000; Batov at el., 2011; Kostygova, 2016) especially in energy, tourism and agriculture.

Based on the achievements of the authors in development a system of sustainability indicators, it can be assumed that these indicators should, first of all, reflect the economic system's own potential for sustainable development (reproduction of anthropogenic, human and natural capital) in the long term, as well as to characterize the autonomy of the economic system from the dynamic and often unpredictable factors of the world economic dynamics.

The first group of indicators can be conditionally called as predictors of economic stability, the second - as stabilizers.

**Research methodology**

An integrated assessment of the sustainability of traditional capital was carried out based on the ranking of countries (with a score from 25 to 1 in increments of half a point) on 12 indicators achieved between 2001 and 2019:

- Adjusted net national income per capita (in US dollars);
- Adjusted net national income per capita (annual growth, %);
- Spends for the state external debt (in % of national exports of goods and services) (indicates the dependence of the state on external borrowing and reflects the costs associated with external debt);
- Trade balance (in % of GDP) (characterizes the competitiveness of nationally produced goods and the country's ability to import substitution, 25 points for the maximum value in the sample);
- Accumulated external debt (in % of GDP) (reflects the country's dependence on external borrowing and the state's potential to develop its own economy at the expense of domestic investment resources);
- Expenditure on final consumption (in % of GDP);
- Net volume of foreign investments (in % of GDP) (determines the investment attractiveness of the state);
- Gross domestic savings (in % of GDP) (reflects the ability of the state to ensure economic progress through the internal reserve);
- Gross investment in fixed assets (in % of GDP) (characterizes the potential for the development of production capacities and market infrastructure of states);
- Government spending (in % of GDP) (reflects the ability of the state to accumulate and effectively manage state budget funds);
- Dynamics of inflation (%);
- Exports (% of GDP) (reflects the country's dependence on supplies to world markets.

The study assessed the macroeconomic indicators of 50 countries of the world. Countries were selected based on the principles of their economy size, consumer market, territory, taking into account the diversity of their geographical location and the representativeness of various established socio-economic models, as well as the availability of the necessary statistical information in the World Bank databases (https://databank.worldbank.org/source/world-development-indicators#).
ANTHROPOGENIC CAPITAL AS A PREDICTOR OF ECONOMIC

The list of analyzed countries includes all BRICS countries, 8 countries of the European Union, all G20 countries, 5 G7 countries, 6 CIS countries, 4 American, 13 European countries (excluding Russia and Belarus), 5 countries of Southeast Asia, 5 countries of the Middle East, 15 high and 7 low income countries.

An integrated assessment of the sustainability of traditional capital is given in Tab. 1 partially.

Analyzing the obtained results, we can draw a number of conclusions regarding the indicators of economic stability of traditional capital in the leading countries of the world.

Table 1 - Integrated assessment of the sustainability of traditional capital (leading countries and outsiders in 2019)
(made by the author)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 UAE</td>
<td></td>
<td>208</td>
<td>210</td>
<td>212,5</td>
<td>212,5</td>
<td>230,5</td>
<td>228,5</td>
<td>217</td>
<td>229</td>
</tr>
<tr>
<td>2 KSA</td>
<td></td>
<td>206,5</td>
<td>262,5</td>
<td>244</td>
<td>156,5</td>
<td>169,5</td>
<td>203</td>
<td>209,5</td>
<td>227</td>
</tr>
<tr>
<td>3 Israel</td>
<td></td>
<td>158,5</td>
<td>183</td>
<td>199</td>
<td>206,5</td>
<td>219,5</td>
<td>210,5</td>
<td>214,5</td>
<td>217,5</td>
</tr>
<tr>
<td>4 Hungary</td>
<td></td>
<td>180</td>
<td>161,5</td>
<td>153</td>
<td>207</td>
<td>215,5</td>
<td>195,5</td>
<td>199</td>
<td>217</td>
</tr>
<tr>
<td>5 Switzerland</td>
<td></td>
<td>207,5</td>
<td>203,5</td>
<td>237,5</td>
<td>245</td>
<td>237</td>
<td>233,5</td>
<td>202,5</td>
<td>217</td>
</tr>
<tr>
<td>6 Norway</td>
<td></td>
<td>231,5</td>
<td>251</td>
<td>229,5</td>
<td>200,5</td>
<td>182</td>
<td>197,5</td>
<td>207</td>
<td>211</td>
</tr>
<tr>
<td>7 Australia</td>
<td></td>
<td>173,5</td>
<td>165</td>
<td>196,5</td>
<td>191</td>
<td>182</td>
<td>196</td>
<td>215,5</td>
<td>210</td>
</tr>
<tr>
<td>8 Poland</td>
<td></td>
<td>137,5</td>
<td>175</td>
<td>151,5</td>
<td>210</td>
<td>192</td>
<td>179,5</td>
<td>205</td>
<td>208,5</td>
</tr>
<tr>
<td>9 Malaysia</td>
<td></td>
<td>194</td>
<td>211,5</td>
<td>224,5</td>
<td>211,5</td>
<td>211</td>
<td>210</td>
<td>193,5</td>
<td>207</td>
</tr>
<tr>
<td>10 Netherlands</td>
<td></td>
<td>203,5</td>
<td>209,5</td>
<td>210</td>
<td>236</td>
<td>217</td>
<td>242</td>
<td>208,5</td>
<td>204</td>
</tr>
<tr>
<td>28 Russia</td>
<td></td>
<td>171,5</td>
<td>172</td>
<td>179</td>
<td>124</td>
<td>139</td>
<td>169,5</td>
<td>175</td>
<td>160</td>
</tr>
<tr>
<td>Outsiders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 South Africa</td>
<td></td>
<td>157,5</td>
<td>161</td>
<td>120</td>
<td>91,5</td>
<td>98,5</td>
<td>106,5</td>
<td>99</td>
<td>101</td>
</tr>
<tr>
<td>47 Armenia</td>
<td></td>
<td>98</td>
<td>132,5</td>
<td>77</td>
<td>58</td>
<td>84</td>
<td>112,5</td>
<td>91,5</td>
<td>87</td>
</tr>
<tr>
<td>48 Tajikistan</td>
<td></td>
<td>88,5</td>
<td>62</td>
<td>57,5</td>
<td>95,5</td>
<td>84,5</td>
<td>77,5</td>
<td>85</td>
<td>87</td>
</tr>
<tr>
<td>49 Pakistan</td>
<td></td>
<td>102,5</td>
<td>100</td>
<td>56,5</td>
<td>109</td>
<td>85,5</td>
<td>100</td>
<td>95</td>
<td>59</td>
</tr>
<tr>
<td>50 Tunisia</td>
<td></td>
<td>130,5</td>
<td>109,5</td>
<td>129,5</td>
<td>94</td>
<td>76</td>
<td>66,5</td>
<td>60</td>
<td>55,5</td>
</tr>
</tbody>
</table>

Fig. 1 shows dendrograms of an integrative assessment of the anthropogenic capital sustainability in the regions of the world.

On the dendrograms, the countries whose values of the integrative assessment decreased in the period from 2001 to 2019 are marked with dark, the line reflects the range in which the assessment indicators changed in the analyzed period.

As can be seen from Fig. 1, the integrative assessment of the sustainability of anthropogenic capital in European countries (except Serbia and Turkey) fluctuated slightly within 150-250 points, only in 3 states a significant decrease in this indicator was noted over the 19 analyzed years.
In the countries of MENA, there is a great differentiation, in Iran and Tunisia, the integrative indicator of the anthropogenic capital sustainability has fallen sharply over 19 years (almost by 100 points), despite the growth of the indicator in KSA (Fig. 2).
The Asian region is also not homogeneous. With volatility generally similar to Europe, in 4 countries, including China, South Korea, Pakistan and Japan, the integrated valuation has decreased, but the high dynamics of progress in the Philippines, Malaysia and Vietnam can be noted.

Figure 3 - Integrated assessment of the anthropogenic capital sustainability in Asian countries, 2001 - 2019
(compiled by the author)

Figure 4 - Integrated assessment of the anthropogenic capital sustainability in the Americas, 2001 – 2019
(compiled by the author)
Volatility in the countries of the Americas is low (within 60 points), only in two countries of the region (out of 6 analyzed) - Canada and Mexico - there was a drop in the integrated sustainability assessment in the period under review (Fig. 4).

All analyzed African countries showed not only high volatility, but also a sharp drop in the values of the assessment of the sustainability of anthropogenic capital in 2001-2019 (Fig. 5).
ANTHROPOGENIC CAPITAL AS A PREDICTOR OF ECONOMIC

Figure 7 - Integrated assessment of the anthropogenic capital sustainability in countries with high per capita income, 2001 - 2019
(compiled by the author)

Figure 8 - Indicators of an integrative assessment of the anthropogenic capital sustainability in countries with average per capita income, 2001 - 2019
(compiled by the author)
The negative trend in the anthropogenic capital stability is also characteristic of most of the CIS countries analyzed (only in Belarus, the value of the assessment has increased significantly over 19 years).

Fig. 7-9 show dendrograms of the indicator of the integrated assessment of the anthropogenic capital sustainability in countries with high, medium and low per capita income (according to the World Bank classification).

As can be seen from Fig. 7-9, countries with the average per capita income have shown the majority of the growth in the anthropogenic capital sustainability, while in the high-income countries the performance achieved over 19 years has been more modest, the situation among low-middle and low-income countries has been asynchronous.

Thus, we can note the relative stability of Europe, high-income countries that retain leadership in terms of the anthropogenic capital stability, the rapid growth of the stability of anthropogenic capital in Southeast Asian countries, including low-income countries, as well as the growing destabilization of traditional capital in African and CIS countries.

Separately, we can single out the success of the Persian Gulf monarchies (UAE, KSA) and Israel, which have significantly increased the value of the integrated assessment of the stability of anthropogenic capital over 19 years, although this growth has not always remained stable (in the case of the UAE and KSA).

After analyzing the dynamics of integrative assessments of the stability of anthropogenic capital, grouping countries according to geographical and material characteristics (Tab. 2), we can conclude that the factor of a country's geographical location is more decisive.
ANTHROPOGENIC CAPITAL AS A PREDICTOR OF ECONOMIC

Table 2 - Dynamics of the integrative assessment of the anthropogenic capital sustainability in groups of countries of the world, 2001-2019
(compiled by the author)

<table>
<thead>
<tr>
<th>Groups of the countries</th>
<th>Number of countries in group</th>
<th>Dynamics of the integrative assessment of the anthropogenic capital sustainability, 2001-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Growth</td>
</tr>
<tr>
<td>1 Europe</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>2 MENA</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>3 Asia</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>4 Americas</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>5 Africa</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>6 CIS</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td><strong>Totally</strong></td>
<td><strong>49</strong></td>
<td><strong>25</strong></td>
</tr>
<tr>
<td>1 high income countries</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>2 mid income countries</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>3 low mid and low income countries</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td><strong>Totally</strong></td>
<td><strong>50</strong></td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>

Number of countries in geographic groups 49, number of countries in wealth groups 50 due to Australia, which was analyzed in the study but did not fit into any geographic group.

Conclusion

The statement about the greater influence of geography, rather than the achieved level of well-being on the stability of anthropogenic capital, can be explained by the specifics of the regional economic system - countries of traditional capitalism, with a transitive economy, countries of migrating capitalism, new industrial countries (dragons, tigers), agro-industrial countries are concentrated in various (often geographically separated or remote) regions.

Despite the obvious achievements of the global economy, the formation of international production and distribution systems, the universalization of business practices, the fundamentals of management in various regions of the world retain their traditional character, the features of industrial relations, state regulation of business, financial circulation, and so on.

As was substantiated, the fixation of the fragmentation of the world economic space, the division of countries within the framework of the planetary process of specialization and the international division of labor was one of the goals of globalization, which makes it possible to accumulate the natural and infrastructural advantages of countries (territories) within the boundaries of transnational value formation and distribution chains (Ivanova, 2022).

As a predictor of economic stability, the economic stability of anthropogenic capital (in the light of the statistical indicators used in the study) is, in fact, a continuation of organization, manageability, predictability, autonomy from external factors, stability in its proposed understanding of local production relations.

Industrial relations in the countries of traditional capitalism due to their greater historical experience, including the practice of competition protecting, private property, the development of state regulation infrastructure on the principles of transparency, pluralism of ownership forms and synergy of private and public interests, financial markets, infrastructure for generating and commercializing innovations, marketing technologies, and so on, of
course, are different from production relations in the countries of migrating capitalism (dominant liberalism and freedom of enterprise, limited state regulation, aggressive, constantly expanding capitalism), with a transitive economy (the legacy of a planned administrative system, a powerful and often ineffective state sector, high budget expenditures, including administrative costs, weak protection of competition, weak financial markets, voluntarism of regulators, low entrepreneurial activity of the majority of the population), new industrial countries (merger of state and business, strict development strategy, minimal social programs, state regulation of financial markets, dominant competitiveness, dependence on technology and innovation imports), and even more so in developing countries that remain at the agro-industrial stage of their development (low labor efficiency, weak infrastructure, production and management technologies, low efficiency of the state, dependence on the export of raw materials and primitive goods).

In this connection, the factors of sustainability in the development of these production relations will also differ significantly.

In the countries of traditional capitalism, the dominant factors in the sustainability of industrial relations will be the efficiency of business as a creator of material and social benefits, society as a responsible and active consumer, and the state as a guarantor of balance and protection of the interests of business and society.

In the countries of migrating capitalism, as the main factors in the stability of production relations, we can consider the expansionism of business as a guarantor of national well-being (including beyond the national economy), society as an environment for growing consumer demand and the formation of highly qualified professionals with unique knowledge, skills, technologies, the state as defender of the interests of corporations and investors (and through the active involvement of the population in investment processes, most of society). Consequently, in order to ensure the protection of their own interests, the population needs to integrate as much as possible with business - to strive either to become carriers of unique knowledge and skills, or to invest and become co-owners of companies.

The stability of production relations in countries with transitional economies is associated, first of all, with the state, its effectiveness as a manager of large property, providing conditions and quality of life for a high proportion of the population (public sector), the effectiveness of public budget expenditures, including investment, stabilizing, protectionist policy towards national or foreign business, and finally, personnel policy in the management structures themselves. The population in need of stability (employees, business owners) should associate their activities with the state as much as possible (government orders work in the public sector, access to state benefits or budget funds).

The sustainability of production relations in the newly industrialized countries is associated with the effectiveness of the symbiosis between the state and business under the dominant idea of national competitiveness (goods, services, business conditions, investment attractiveness, world trade, and so on). The efficiency and sustainability of a business will be determined not only by the entrepreneurial talents of managers or owners, but also by the correspondence of corporate interests to the interests of the state (internal stability and external competitiveness, constant economic growth). In such conditions, the population is not able to plan for its own stability and security in the long term (lack of social programs, long-term attachment to corporations in most cases), must effectively manage its own human capital, and in the short term (change jobs, place of residence, profile of activities, level of professionalism and education and so on).
Finally, the sustainability of developing countries, often in the agro-industrial phase of development, is more related to the efficiency of integrating local businesses into transnational value chains, as well as how effectively the state promotes such integration by attracting foreign investment, improving business conditions, forming national personnel and domestic demand for their own products. The population does not have a sense of long-term stability, it is forced either to connect its life with exporting enterprises or the state itself, entrepreneurial initiative is suppressed; entry barriers to business remain insurmountable for the majority of local residents.

Geography, both historically and currently, remains important in the localization of economic systems, and, therefore, differentially affects the economic stability of geographic regions through the sustainability factor of traditional capital.

References:


---

*Paper submitted* 28 December 2022
*Paper accepted for publishing* 06 March 2023
*Paper published online* 30 March 2023