# CAN COUNTRIES BRIDGE THE GAP IN THE QUALITY OF LIFE? – INHERITANCE FOR UKRAINE

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**Abstract.** Considering that most countries exhibit substantial disparities between the rich and the poor, there is a demand for a fresh perspective on the dynamics of a country's development and its potential for convergence. The article represents an attempt to use a comprehensive econometric framework to analyze long-term trends in people's consumption levels across different countries of the world over the past 60 years. The obtained results indicate a paradoxical and strategically important trend: until 2008, all countries of the world demonstrated a steady growth of CPC, albeit at different rates. After 2008, there is a significant slowdown or complete absence of CPC growth in all countries. This trend indicates that the existing economic model has exhausted itself, and within its paradigm, it is impossible to stimulate new growth of CPC for the population. While some may view this as "reaching the point of well-being," it is a point on the brink of an abyss. Regardless of political courses, the world is moving towards a new era and a new redistribution of world forces. This can explain the growth of conflicts, wars and tensions between countries. The results of the study have significant implications for understanding the sustainability and future of the world economy, as well as for the formulation of development policies and strategies at the global level.

## 1. Introduction

In the world, the generally accepted indicator for measuring the economic power and development of a country is GDP. This indicator takes into account the added value of all goods and services produced over a certain period, so it seems that its use is quite justified. It allows us to assess the economic power, to make cross-country comparisons. An equally important function of GDP is the formation of budget policy, in particular, through adjusting public expenditures. At the same time, GDP says very little about the level of quality of life, in particular, about the capabilities of the average person (Felice, 2024). Indeed, even more, modern systems for comparing GDP adjusted for purchasing power parity (PPP) cannot effectively assess the income of the average person, because, in addition to consumption, GDP also

includes investments, government spending and net exports, which are usually redistributed in countries only for a limited number of people. If there is high inequality in the incomes of the population in a certain state, then the GDP per capita indicator is not relevant to the analysis. Moreover, the governments of countries have learned to implement anti-cyclical policies by increasing or decreasing public spending, and stimulating or discouraging investments, which in the medium term allows avoiding deep crises, and thus increases the average level of GDP. However, again, this does not mean that even in the long run people will be able to profit from such a policy. The growing disparity in the incomes of the population and the enrichment of the largest corporations indicate that not everyone benefits from the results of economic growth.

As a result, the question arises, what is the real situation with people's ability to satisfy their needs? To answer this question, we can analyze the level of consumption of people in different countries in the long term and determine why countries use the opportunities for economic and technological growth quite differently.

The questions raised are important not only for understanding the further development of humanity but also for the ability of countries to restore their economies as a result of crises, recessions and wars. The war launched in 2022 for the capture of Ukraine dealt a terrible blow to the country's economy and the standard of living of its population, and therefore the question of the speed of recovery is extremely urgent.

The choice of long-term analysis is because increasing people's consumption in the short term does not seem like a difficult task. Such a policy was and is often used by authoritarian regimes before elections when salaries and social benefits increase due to the spending of the country's national budget, which after the elections are devalued due to inflation (Bondy et al., 2024). Also, in democratic countries, in the short-term and even in the medium-term perspective, it is possible to increase consumption by stimulating lending (Salyga, 2023). However, in the long run, loans must be repaid, which discourages consumption. Therefore, it is the analysis of long-term trends and cross-country comparisons that can provide an answer to the question of a real increase in the quality of life of the population.

Thus, the purpose of this study is to analyze long-term trends in population consumption across various countries and regions of the world, highlighting disparities between states and demonstrating that while a country's GDP level may be high, an examination of consumption trends in constant prices often reveals stagnation in the economic system. Of course, all comparisons must be made in comparable units. Unlike existing studies that focus narrowly on GDP or short-term economic dynamics, this research offers a novel perspective by examining consumption as a more direct indicator of quality of life. The study seeks to identify patterns, disparities, and underlying factors that drive long-term consumption trends, offering valuable insights for policy-making and economic recovery. By considering broader socio-economic dynamics and integrating both macroeconomic and micro-level factors, the research identifies disparities and variations in how countries utilize opportunities for economic and technological growth. These insights are particularly relevant for designing evidence-based recovery strategies tailored to individual countries.

Structurally, the work consists of several parts. First, scientific works devoted to the analysis of the quality of life of the population, the level of consumption, and international comparison are analyzed. Based on the comprehensive analysis, research methodology and data analysis are further proposed. The next block is related to data modelling and description of the obtained results. The article concludes with a discussion, conclusions, and policy recommendations for national governments.

## 2. Literature review

For many years GDP (gross domestic product) has been used as the main indicator of a country's economic well-being. However, recently more and more economists and scientists have questioned its validity and effectiveness as a single measure of economic success (Macekura, 2020; Fraumeni, 2022). The main disadvantages of GDP:

- It does not take into account the distribution of wealth: GDP can grow even if the majority of the population becomes poorer (Deaton & Schreyer, 2022).
- It does not take into account people's well-being (Dwyer, 2023): GDP does not take into account such factors as the crime rate, the state of the environment, and the health and education of the population (Zhao & Sun, 2020).
- It does not take into account non-market activities (Smith, 2021): GDP does not take into account the value of housework, volunteering and other types of unpaid work (Santos & Cylos, 2024).
- It can be misleading (Swan, 2023): GDP can be artificially inflated due to speculation, bubble economy and other unstable phenomena (Qiu & Wang, 2023).

So, it is obvious that the research question of finding a transition from GDP to assessments of countries by the level of consumption is ripe. The transition from GDP to consumption-based welfare estimates can be made in several ways:

1. Use of Adjusted Net National Income (ANNI) (Benczúr et al., 2023): ANNI takes into account not only economic activity but also factors such as environmental degradation, inequality and depletion of natural resources (Jabeen & Khan, 2022).
2. Calculation of human potential development indices (HDI) (Sajith & Malathi, 2020): The HDI takes into account life expectancy, literacy and standard of living (Dasic et al., 2020).
3. Use of welfare indicators based on consumption (Kalimeris et al., 2020): These indicators include the Gini index (Bloom et al., 2021), which measures income inequality, and the Living Planet Index, which assesses the state of the ecosystem (Shrotryia & Singh, 2020).
4. Development of composite indicators (van den Bergh, 2022): These indicators can combine different economic, social and environmental indicators to get a more holistic picture of the country's well-being (Bacchini et al., 2020).
5. SDGs calculations (Kynčlová et al., 2020): There is a risk of data manipulation by governments or other stakeholders to improve their performance (Coscieme et al., 2020). Not each state has regional data in the framework of SDGs, so calculations could be much more expert-biased and generalized. Most of them are quazi-dynamic (Nate et al., 2021).

The advantages of switching to consumption-based welfare assessments argued in the literature are quite obvious: a more accurate reflection of the real standard of living of people (Hüttel et al., 2020; Castellano et al., 2024); a better understanding of the impact of economic policy on well-being (Slesnick, 2020); consideration of environmental sustainability and social justice (Jakob et al., 2020; Weimin & Zubair Chishti, 2021). However, still, some scholars are not so romantic in this, observing some challenges of moving to consumption-based welfare assessments: imperfection and complexity of calculating some indicators (Heide et al., 2023); the possibility of data manipulation (Galgóczi & Pochet, 2022); and the need for a clear definition and standardization of indicators (Sivalingam et al., 2024).

Thus, it is important to note that there is no single "best" way to measure a country's well-being. Different approaches have their advantages and disadvantages, and the choice of method depends on the context and objectives of the study. As it is seen from the literature review the shift from GDP especially works well when the developing economies are under-comparison, or the states that are fragile at the moment (i.e., Ukraine in the war).

Consequently, more and more scholars and practitioners are inclined to believe that GDP does not show how wealth is distributed among people in a country. This can lead to a situation where high GDP is accompanied by significant inequality. Along with this, GDP does not take into account such factors as access to education, health care, and the environment, which affect the general well-being of people. GDP does not take into account the damage caused to the environment by economic activity. Consequently, it becomes an extremely inconvenient indicator for tracking growth and progress.

At the same time, Consumption can give a clearer picture of people's well-being, because it reflects what people can afford indeed. This indicator is more direct about well-being, taking into account the distribution of wealth, which is more sensitive to changes in the quality of life. Of course, researchers note that consumption may be subject to the influence of external factors (for example, commodity prices) (Piligrimienė et al., 2020) and does not take into account savings and investments (Eika et al., 2020).

However, it is possible to consider the Purchasing Power Parity (PPP) (Rabe & Waddle, 2020), which takes into account the prices of goods and services in different countries, making the comparison of incomes more accurate (Ray & Singh, 2021). There are several methods of segmenting countries based on consumption, such as:

- Classification by income level (Popescu, 2022): Low, medium, high;
- Classification according to the Human Development Index (HDI) (Öztürk et al., 2024): Low, medium, high;
- Classification by clusters (Oswald et al., 2020): Grouping of countries with similar consumption characteristics.

Thus, while GDP is a popular metric for gauging a country's economic output, it falls short when considering overall well-being. It overlooks certain economic activities, like homegrown vegetables, and doesn't capture the value of non-marketed goods. Although often used as a well-being indicator, GDP wasn't designed for that purpose. Consequently, it neglects crucial aspects of societal well-being, such as environmental pollution and even happiness.

There is a common misconception that higher income (and a larger GDP) directly translates to a happier and healthier society. While this may hold up to a certain point, our research point suggests that beyond a certain income threshold, additional wealth doesn't necessarily lead to a better quality of life. Instead, factors like equitable income distribution, access to education and healthcare, and strong social bonds play a more significant role in creating a happy and thriving society (Stavytskyy & Kozub, 2020; Stavytskyy et al., 2020). Official GDP figures can sometimes paint an incomplete picture of a nation's true wealth, especially in developing countries. A large informal sector, where income is not officially recorded, can significantly underestimate the actual economic activity happening within that society. GDP figures can be misleading, particularly for countries with significant informal (grey) economies. This leads to a lower GDP compared to a scenario where all economic activity is accounted for (Kharlamova et al., 2019).

At the heart of the assessment of economic development is the desire for well-being. However, measuring well-being can be a difficult task because it depends on many factors, such as living standards, access to education and health care, social justice and political

freedom. From the point of view of an individual, economic development has no meaning if it does not improve his life. For an individual, the ability to have access to goods and services is a priority factor. This ability determines the level of satisfaction of needs and well-being in general. As the literature review showed, GDP does not always accurately reflect people's well-being. Consumption directly reflects people's access to goods and services that they consider necessary to satisfy their needs and improve their lives. The use of consumption indicators, along with other indicators, can provide a more comprehensive and people-oriented view of economic development. In this article, we propose to consider the dynamics of consumption as a key indicator of economic development, based on a human-centered approach. This approach focuses on the well-being and needs of the individual as central to economic progress.

The most deep revealing of the highlighted research question could be discussed by scholars based on consumption per capita comparisons and models. Per capita, consumption refers to the average amount of goods and services consumed by each person in a year (Jain et al., 2016). However, a thorough literature review announced the lack of research on the comparison of states based on the consumption per capita: the articles that use it mostly concentrate on energy consumption per capita and per-capita consumption-based $CO_2$ Emissions. Thus, the research novelty of the paper is clear.

## 3. Methodology and data

For analysis, we will use the largest database provided by the World Bank (n.d.). We will focus on two main indicators:

- Households and NPISHs final consumption expenditure (% of GDP);
- Households and NPISHs Final consumption expenditure per capita (constant 2015 US$).

The first indicator shows how the share of GDP that is consumed by the population changes. While a small share of consumption in the short term might be offset by significant investments that boost future consumption, we will examine long-term trends to avoid misinterpretations caused by cyclical fluctuations. The share of consumption in GDP should indicate whether the well-being of the population is increasing at a similar pace to other countries. The World Bank (n.d.) database allows us to analyze trends since 1960. This extended timeframe helps us avoid cyclical fluctuations and provides a clearer picture of long-term consumption patterns.

The second indicator, Household and NPISHs Final consumption expenditure per capita (constant 2015 US$), allows for cross-country comparison. Since all countries have different prices and currency mechanisms, we will use the Purchasing Power Parity (PPP) principle for a real comparison. This principle takes into account differences in the cost of living across countries. It is important to compare the level of consumption per capita, which also considers all the demographic changes in the countries. Unfortunately, data for most countries has only been available since the 1990s, although some countries have a complete set of data since 1960.

Methodologically, the given series of data will be analyzed using several approaches:

- Trend selection for each country or region;
- Determination of deviation from the world average level;
- Determination of the deviation of the indicator from the indicator of the USA, a country with a well-established economy that serves as a common reference point for international comparisons.

The next stage will be to determine the impact of certain factors on the level of consumption. We will achieve this by constructing a panel regression. The work employs the methodology of panel data with fixed effects to analyze and model the dynamics of the research object. This approach allows for the consideration of fixed country-specific effects over time, providing more accurate and reliable results.

The first step of this modelling process involves collecting and preparing panel data. Panel data consists of observations for several objects (countries) across multiple time periods. Testing for stationarity is an important part of time series analysis. This involves tests such as the Dickey-Fuller test to ensure that the dynamics of the variables are stationary. Stationarity indicates that the statistical properties of the data remain constant over time. The presence of stationarity allows the use of standard econometric methods for data analysis. In simpler terms, the null hypothesis for these tests assumes that the data series is not stationary, meaning it has a trend or seasonal component, while the alternative hypothesis states that the data series is stationary.

Verification of the panel regression with fixed effects is an important part of the study because it helps to determine the adequacy and reliability of the model for analyzing panel data. In this study, checking the correctness and adequacy of the model was based on several tests:

- Hausman test: This test compares the estimates of the model with fixed effects and the model with random effects. If the parameters of the fixed effects model are statistically different from the random effects model, then the fixed effects model is considered more appropriate for our data.
- Tests for heteroskedasticity: The Breusch-Pagan test helps determine whether the error variance in the model is constant or depends on other factors.
- Tests for autocorrelation of errors: The Durbin-Watson test helps determine the presence of autocorrelation in the residuals of the model.
- Endogeneity tests: If there is doubt about the independence of some variables from the effects, endogeneity tests, such as the Hausman-Taylor test, are performed.
- Model adequacy tests: These include tests for model adequacy, functional form adequacy, etc.
- R-squared coefficients of determination: This measures model efficiency and the degree of explained variability.

Overall, the text effectively explains the steps involved in panel data analysis using fixed effects.

## 4. Results

Figure 1 displays the dynamics of per capita consumption level (adjusted for purchasing power parity in constant 2015 dollars) and the share of consumption in GDP for various countries worldwide. The trends are quite evident. Per capita consumption has steadily increased in an almost linear fashion since 1970, with a temporary decline in 2020 due to global quarantine measures implemented during the COVID-19 pandemic. However, this level quickly rebounded the following year. Since 1970, per capita consumption at constant prices has grown by a factor of 2.19, representing an annual increase of about 1.5%.

At the same time, the share of consumption in GDP exhibits a starkly different trend. While this share hovered around 57% in the 1970s, it gradually increased, reaching a peak of 60.31% in 2001 before the dot-com bubble burst. Following this event, the share of

consumption began a significant decline, persisting even through the 2008 global financial crisis when governments worldwide implemented expansionary fiscal policies intended to stimulate consumption.
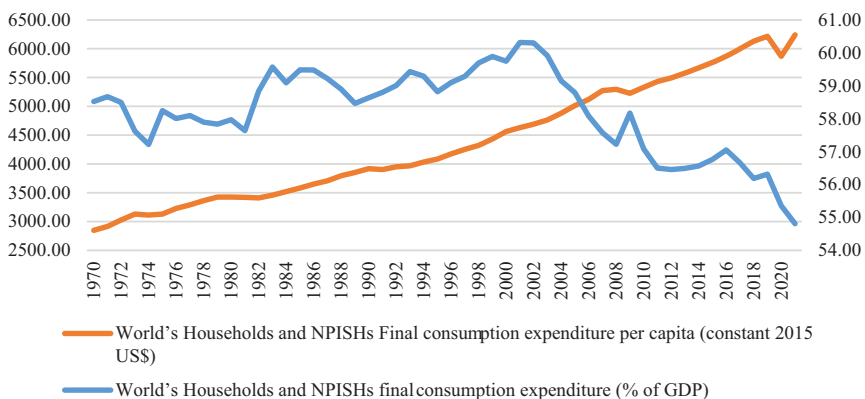
Explaining the discrepancy between these indicators becomes a compelling question. On the one hand, technological progress has undeniably enabled a significant increase in consumption levels. On the other hand, a growing portion of GDP is being allocated to areas beyond consumption. It's important to note that this doesn't solely reflect investments, which are expected to ultimately boost future consumption.

Table 1 further highlights the disparities between countries based on their income levels. High-income countries have witnessed a gradual rise in the share of consumption in GDP, reaching nearly 60%.

**Table 1.** The share of consumption in GDP by different groups of countries (source: calculated by authors)

| Period | High income | Upper middle income | Middle income | Lower middle income | Low income | Heavily indebted poor countries (HIPC) |
|--------|-------------|---------------------|---------------|---------------------|------------|----------------------------------------|
| 60-s | – | 64.26 | 66.16 | – | – | – |
| 70-s | 57.39 | 60.96 | 60.92 | – | – | – |
| 80-s | 58.41 | 59.82 | 60.21 | 63.04 | – | 75.99 |
| 90-s | 58.67 | 59.40 | 60.79 | 65.23 | 84.48 | 77.60 |
| 00-s | 59.66 | 54.22 | 55.98 | 61.62 | 77.70 | 72.31 |
| 10-s | 59.10 | 48.42 | 51.54 | 62.77 | 78.59 | 71.55 |
| average | 58.62 | 57.46 | 58.96 | 63.25 | 80.34 | 73.81 |

When we consider the share of consumption from the perspective of demographic development (Table 2), we also observe significant differences. Countries in the "pre-demographic dividend" stage, characterized by high fertility rates (above 4 births per woman), show a clear upward trend in the share of consumption, increasing from 50% to 65%.



World's Households and NPISHs Final consumption expenditure per capita (constant 2015 US$)

World's Households and NPISHs final consumption expenditure (% of GDP)

**Figure 1.** The dynamics of consumption per capita by PPP in constant dollars and the share of consumption in GDP (source: compiled by the author based on World Bank (n.d.) data)

The next group of countries, with fertility rates below 4 births per woman, exhibits a downward trend in the share of consumption, from 68% to 60%. Finally, "post-demographic dividend" countries, where the birth rate is lower than the death rate, show an increase in the share of consumption from 57% to 60%. It is evident that the state of demographic development plays a significant role in analyzing individual consumption levels.

**Table 2.** The share of consumption in GDP according to the demographic dividend (source: calculated by authors)

|  | Pre-demographic dividend | Early-demographic dividend | Late-demographic dividend | Post-demographic dividend |
|---|---|---|---|---|
| 60-s | – | 68.11 | 65.69 | – |
| 70-s | – | 61.20 | 61.01 | 57.65 |
| 80-s | 49.95 | 62.67 | 59.55 | 58.69 |
| 90-s | 59.65 | 65.71 | 55.63 | 58.73 |
| 00-s | 57.70 | 61.27 | 50.28 | 60.18 |
| 10-s | 65.04 | 59.95 | 45.42 | 60.19 |
| average | 58.52 | 62.88 | 55.86 | 59.08 |

When analyzing the geographical location of countries, it can be seen (Table 3) that African countries tried to raise the share of consumption in GDP from 52–58% to 65–70%.

**Table 3.** Share of consumption in GDP by geographic location (source: calculated by authors)

|  | Africa Eastern and Southern | Africa Western and Central | Sub-Saharan Africa | Middle East & North Africa | Arab World | Central Europe and the Baltics | European Union | Euro area | East Asia & Pacific | South Asia | Latin America & Caribbean | North America |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60-s | – | – | – | – | 59.82 | – | – | – | 59.58 | 83.01 | 72.57 | – |
| 70-s | – | – | – | 41.03 | 47.14 | – | 56.77 | 56.82 | 52.67 | 78.36 | 70.81 | 59.98 |
| 80-s | 58.11 | 43.54 | 52.40 | 49.67 | 55.52 | – | 57.70 | 57.88 | 53.53 | 75.31 | 67.85 | 61.70 |
| 90-s | 66.96 | 57.41 | 63.98 | 56.11 | 59.96 | 59.27 | 56.28 | 56.46 | 52.77 | 67.94 | 66.89 | 64.06 |
| 00-s | 63.45 | 61.03 | 62.74 | 47.35 | 47.57 | 59.49 | 55.44 | 55.68 | 51.71 | 63.16 | 64.29 | 66.34 |
| 10-s | 65.57 | 70.06 | 67.56 | 45.97 | 45.89 | 57.21 | 54.47 | 54.74 | 46.76 | 61.54 | 64.23 | 66.83 |
| average | 63.68 | 58.69 | 62.08 | 48.07 | 51.57 | 58.18 | 55.88 | 56.06 | 51.68 | 71.20 | 67.61 | 63.89 |

An analysis of Tables 1–3 reveals that most countries have pursued varying strategies to achieve a certain level of consumption relative to GDP over the past 60 years. Developed countries tend to maintain this share around 60%, while poor countries typically hover around 73–80%. Some of the highest consumption-to-GDP ratios are observed in South Asia, North America, Latin America, and parts of Africa.

Examining the G20 countries, which collectively represent 85% of global gross national product, 75% of world trade, and two-thirds of the world's population, reveals a wide range of approaches to the optimal level of consumption relative to GDP. Overall, the share of consumption in GDP has been on a downward trend, particularly since 2002.

Now let's consider the situation from the perspective of nominal consumption based on Purchasing Power Parity (PPP) in constant 2015 dollars. Table 4 highlights the highly uneven growth rates in consumption across countries with different wealth levels.

These trends suggest a widening gap between rich and poor countries. Wealthier nations are expected to become even richer, while poorer countries risk losing ground in the competitive landscape. Furthermore, except for average- and above-average-income countries, nearly all nations have reduced their real consumption growth to 1% per year. This scenario presents an intriguing situation. Nominally, a 1% growth rate in wealthy countries translates to a larger increase ($235) than a 2.5% growth rate in middle- and upper-middle-income countries ($80). Under the current economic model, it appears increasingly difficult for the rest of the world to catch up to the level of rich countries.

**Table 4.** Consumption level by PPP in constant 2015 dollars by level of wealth (source: calculated by authors)

|  | High income | Upper middle income | Middle income | Lower middle income | Low income | Heavily indebted poor countries (HIPC) |
|---|---|---|---|---|---|---|
| 60-s | – | – | – | – | – | – |
| 70-s | 11049.15 | – | – | – | – | – |
| 80-s | 13682.52 | – | – | 604.22 | – | – |
| 90-s | 17178.40 | 1620.05 | 1175.11 | 672.69 | 554.03 | 534.67 |
| 00-s | 21380.63 | 2179.15 | 1536.89 | 895.25 | 601.77 | 602.63 |
| 10-s | 23548.28 | 3654.69 | 2411.12 | 1263.94 | 613.46 | 688.11 |
| average | 17639.92 | 2785.92 | 1889.26 | 902.91 | 593.21 | 626.92 |

Let's analyze whether demographic changes can change the situation (Table 5). Pre-demographic dividend countries increased their consumption rather unevenly, reaching positive dynamics only in the early 2000s.

**Table 5.** The level of consumption by the PCS in constant dollars of 2015 by the level of the demographic dividend (source: calculated by authors)

|  | Pre-demographic dividend | Early-demographic dividend | Late-demographic dividend | Post-demographic dividend |
|---|---|---|---|---|
| 60-s | – | 756.53 | – | – |
| 70-s | – | 925.59 | – | 11 123.28 |
| 80-s | 698.90 | 1066.16 | – | 13 944.78 |
| 90-s | 689.52 | 1195.23 | 1445.20 | 17 566.33 |
| 00-s | 902.10 | 1463.06 | 2086.83 | 21 984.98 |
| 10-s | 1062.48 | 1943.50 | 3669.10 | 24 452.07 |
| average | 852.68 | 1288.58 | 2737.71 | 18 107.38 |

Geographically, the level of consumption in the countries of South Asia and Africa remains the lowest in the world (Tables 6–7). The leaders are expected to remain the countries of North America, the European Union and the Eurozone. However, more important is the trend of changing consumption levels between countries. Table 8 shows the share of consumption level of world regions relative to the leader – North America.

**Table 6.** Share of consumption in GDP for G20 countries (source: calculated by authors)

| Period | Аргентина | Australia | Brazil | Canada | China | Germany | France | United Kingdom | Indonesia | India | Italy | Japan | Korea, Rep. | Mexico | Russian Federation | Saudi Arabia | Turkiye | United States | South Africa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60-s | 67.38 | 57.26 | 66.33 | 59.77 | 60.55 | – | 56.38 | 72.05 | 86.89 | 83.81 | – | – | 80.43 | 74.74 | – | 34.31 | 53.48 | – | 57.54 |
| 70-s | 62.09 | 55.39 | 68.09 | 54.88 | 51.15 | 57.00 | 54.22 | 66.58 | 70.10 | 78.27 | 59.07 | 49.67 | 67.37 | 69.08 | – | 23.71 | 56.91 | 60.46 | 57.19 |
| 80-s | 74.22 | 55.99 | 68.81 | 54.19 | 51.40 | 58.38 | 55.99 | 65.57 | 62.82 | 73.52 | 59.16 | 52.48 | 56.15 | 62.57 | 49.83 | 44.68 | 61.47 | 62.39 | 58.75 |
| 90-s | 72.42 | 57.03 | 62.51 | 56.75 | 46.15 | 56.15 | 54.73 | 66.64 | 63.61 | 65.01 | 58.88 | 52.42 | 51.59 | 68.44 | 49.92 | 44.93 | 68.40 | 64.65 | 64.84 |
| 00-s | 64.26 | 56.68 | 61.52 | 55.15 | 40.48 | 55.80 | 54.28 | 64.96 | 63.72 | 59.27 | 59.52 | 55.08 | 53.37 | 68.09 | 49.89 | 31.90 | 63.51 | 67.32 | 63.49 |
| 10-s | 65.87 | 55.02 | 62.91 | 57.06 | 36.99 | 53.43 | 54.38 | 64.51 | 56.95 | 58.04 | 60.58 | 56.20 | 49.40 | 65.30 | 52.10 | 35.48 | 60.02 | 67.79 | 63.50 |
| average | 66.63 | 55.96 | 64.90 | 56.19 | 47.48 | 55.82 | 54.91 | 66.45 | 66.80 | 69.24 | 59.39 | 53.19 | 59.11 | 67.92 | 50.51 | 36.33 | 60.44 | 64.64 | 60.96 |

**Table 7.** Consumption by geographic location (source: calculated by authors)

| | Africa Eastern and Southern | Africa Western and Central | Sub-Saharan Africa | Middle East & North Africa | Arab World | Central Europe and the Baltics | European Union | Euro area | East Asia & Pacific | South Asia | Latin America & Caribbean | North America |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60-s | – | – | – | – | – | – | – | – | – | 352.54 | 2023.77 | – |
| 70-s | – | – | – | – | – | – | 8677.94 | 10316.06 | – | 347.47 | 3017.87 | 17113.96 |
| 80-s | 815.56 | 800.16 | 805.87 | – | – | – | 10614.96 | 12740.10 | – | 387.05 | 3626.59 | 21055.70 |
| 90-s | 803.32 | 779.54 | 787.73 | – | – | 3807.38 | 12932.62 | 15555.59 | 2379.17 | 466.50 | 3864.50 | 25896.95 |
| 00-s | 908.71 | 1130.81 | 994.91 | 3110.84 | 2761.64 | 5380.02 | 15529.43 | 18180.66 | 2954.55 | 620.13 | 4496.78 | 33032.23 |
| 10-s | 1024.10 | 1334.50 | 1149.80 | 3618.48 | 3160.71 | 7185.45 | 16649.10 | 18895.81 | 4382.02 | 942.66 | 5563.30 | 36723.73 |
| average | 899.76 | 1033.86 | 948.07 | 3391.72 | 2981.59 | 6104.83 | 13119.63 | 15352.29 | 3542.49 | 551.73 | 3852.91 | 27252.64 |

**Table 8.** Share of consumption in world regions relative to North America, % (source: calculated by authors)

| | Africa Eastern and Southern | Africa Western and Central | Sub-Saharan Africa | Middle East & North Africa | Arab World | Central Europe and the Baltics | European Union | Euro area | East Asia & Pacific | South Asia | Latin America & Caribbean |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60-s | – | – | – | – | – | – | – | – | – | – | – |
| 70-s | – | – | – | – | – | – | 50.7 | 60.3 | – | 2.0 | 17.6 |
| 80-s | 3.9 | 3.8 | 3.8 | – | – | – | 50.4 | 60.5 | – | 1.8 | 17.2 |
| 90-s | 3.1 | 3.0 | 3.0 | – | – | 14.7 | 49.9 | 60.1 | 9.2 | 1.8 | 14.9 |
| 00-s | 2.8 | 3.4 | 3.0 | 9.4 | 8.4 | 16.3 | 47.0 | 55.0 | 8.9 | 1.9 | 13.6 |
| 10-s | 2.8 | 3.6 | 3.1 | 9.9 | 8.6 | 19.6 | 45.3 | 51.5 | 11.9 | 2.6 | 15.1 |

**Table 9.** Comparison of consumption per capita in G20 countries (source: calculated by authors)

| | Argentina | Australia | Brazil | Canada | China | Germany | France | United Kingdom | Indonesia | India | Italy | Japan | Korea, Rep. | Mexico | Russian Federation | Saudi Arabia | Turkiye | United States | South Africa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60-s | – | 11775.33 | 1615.81 | – | – | – | 7570.95 | – | 332.10 | 266.79 | – | – | 1260.87 | 2760.73 | – | – | – | – | 2065.47 |
| 70-s | – | 15217.38 | 2685.90 | 12845.46 | – | 11769.01 | 11038.02 | 12109.18 | 426.32 | 282.89 | 10500.40 | 9332.63 | 2275.96 | 4037.56 | – | – | – | 17568.51 | 2530.26 |
| 80-s | – | 17724.34 | 3545.08 | 15018.43 | – | 14700.92 | 13650.50 | 15269.89 | 707.65 | 335.37 | 14050.86 | 12585.06 | 3852.71 | 4635.66 | – | – | 3228.07 | 21712.40 | 2665.48 |
| 90-s | 6493.01 | 20799.13 | 3726.62 | 16965.55 | 647.64 | 18074.40 | 15832.96 | 20306.37 | 1022.12 | 415.02 | 17415.27 | 16506.71 | 7623.41 | 5012.88 | 1863.26 | – | 3784.81 | 26878.19 | 2573.09 |
| 00-s | 6667.35 | 27165.36 | 4310.17 | 21231.83 | 1194.11 | 19790.58 | 18657.78 | 26818.47 | 1324.30 | 576.16 | 19780.95 | 18199.49 | 11284.11 | 6068.94 | 3143.39 | 5247.12 | 4537.82 | 34317.84 | 3290.93 |
| 10-s | 8935.32 | 31668.72 | 5554.35 | 25024.40 | 2970.90 | 21761.90 | 19951.81 | 28838.45 | 1884.58 | 925.41 | 18885.09 | 19377.09 | 13984.56 | 6402.23 | 5045.24 | 7893.95 | 6350.11 | 38028.45 | 3959.11 |
| average | 7486.65 | 21255.72 | 3663.57 | 18628.24 | 1975.88 | 17484.97 | 14720.97 | 21107.02 | 1009.48 | 501.45 | 16256.36 | 15340.30 | 7113.83 | 4895.13 | 3905.00 | 6861.59 | 5040.17 | 28216.79 | 2897.49 |

**Table 10.** Comparison of consumption per capita with the USA in G20 countries, % (source: calculated by authors)

| | Argentina | Australia | Brazil | Canada | China | Germany | France | United Kingdom | Indonesia | India | Italy | Japan | Korea, Rep. | Mexico | Russian Federation | Saudi Arabia | Turkiye | United States | South Africa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60-s | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 70-s | – | 86.6 | 15.3 | 73.1 | – | 67.0 | 62.8 | 68.9 | 2.4 | 1.6 | 59.8 | 53.1 | 13.0 | 23.0 | – | – | – | 100.0 | 14.4 |
| 80-s | – | 81.6 | 16.3 | 69.2 | – | 67.7 | 62.9 | 70.3 | 3.3 | 1.5 | 64.7 | 58.0 | 17.7 | 21.4 | – | – | 14.9 | 100.0 | 12.3 |
| 90-s | 24.2 | 77.4 | 13.9 | 63.1 | 2.4 | 67.2 | 58.9 | 75.5 | 3.8 | 1.5 | 64.8 | 61.4 | 28.4 | 18.7 | 6.9 | – | 14.1 | 100.0 | 9.6 |
| 00-s | 19.4 | 79.2 | 12.6 | 61.9 | 3.5 | 57.7 | 54.4 | 78.1 | 3.9 | 1.7 | 57.6 | 53.0 | 32.9 | 17.7 | 9.2 | 15.3 | 13.2 | 100.0 | 9.6 |
| 10-s | 23.5 | 83.3 | 14.6 | 65.8 | 7.8 | 57.2 | 52.5 | 75.8 | 5.0 | 2.4 | 49.7 | 51.0 | 36.8 | 16.8 | 13.3 | 20.8 | 16.7 | 100.0 | 10.4 |
| average | 0.265326 | 0.753301 | 0.129837 | 0.660183 | 0.070025 | 0.619665 | 0.521709 | 0.74803 | 0.035776 | 0.017771 | 0.576124 | 0.543659 | 0.252114 | 0.173483 | 0.138393 | 0.243174 | 0.178623 | 1 | 0.102687 |

As we can see, there is generally no levelling of the level of real consumption. African countries on average consume 2–3.8% of the consumption of North America, South Asia – about 2%. However, consumption in the EU itself, even taking into account its expansion, significantly worsened in comparison with the countries of North America, and first of all, the USA. Let's illustrate this by comparing consumption in the G20 countries in relation to the USA (Tables 9–10). These tables show both nominal and relative figures.

Tables 9–10 show that GDP per capita consumption in constant dollars increased in all G20 countries, but this increase was not uniform.

Summing up, it can be noted that virtually all the countries of the European Union are losing the competitive struggle of the USA and Asia. If Asian countries, taking advantage of the demographic transition, are catching up to the highest level, then European countries, on the contrary, are worsening their situation, falling behind the consumption level of the USA. At the same time, it should be stated that virtually all countries of the world are faced with the problem of slowing the rate of consumption growth. Most of them can no longer provide growth of more than 1% per year, which is significantly inferior to the trends observed during the last 60–70 years. This means that the potential of the current economic system is being exhausted, and therefore humanity needs a more stable, fair and capable alternative.

To analyze changes in the level of consumption and to study the influence of the factors discussed above, it was decided to use the tool of panel regression with fixed effects. This approach allows taking into account not only time variables but also differences between countries. The analysis was conducted on the data of 19 countries that are part of the G20. Since the EU is the 20th country, and the G20 group includes its representatives (Germany, France, Italy, and partly Great Britain), the EU indicators were not considered.

In the first stage, data for the model was selected. For this, the variables analyzed in the previous paragraph were used: consumption in constant prices of 2015, the share of consumption in GDP and the fertility level. It should be taken into account that not all countries have complete datasets. The study used all available data from 1960 to 2022. All missing values were discarded, so the final panel of 19 countries contained 947 observations or just over 80%. The main data gaps were due to missing data from 1960 to 1969 (11 countries), and from 1970 to the mid-1990s (Saudi Arabia, China and the Russian Federation). Also, not all countries have complete datasets for 2022.

In the second stage, the level of integration of indicators was chosen. Testing for stationarity can be performed using statistical tests for panel data, one of the most common tests being the ADF – Fisher Chi-square test. The results of its application are given in Table 11.

**Table 11.** Stationarity test (source: calculated by authors)

| Variable | ADF – Fisher Chi-square | Prob | Result |
|---|---|---|---|
| CONS | 25.8346 | 0.9334 | Non-stationary |
| Δ CONS | 199.640 | 0.0000 | Stationary |
| Fert | 117.885 | 0.0000 | Stationary |
| CtoGDP | 51.2185 | 0.0744 | Non-stationary |
| ΔCtoGDP | 375.298 | 0.0000 | Stationary |

Given the unbalanced sample and the stationarity of the series, a panel regression with fixed effects was chosen:

$$\Delta Cons_{i,t} = \beta_{i0} + \beta_1 Fert_{i,t} + \beta_2 \Delta CtoGDP_{i,t} + \mu_{i,t}. \tag{1}$$

The dependent variable is the increase in consumption at constant 2015 prices (Cons), and the independent variable is the increase in the share of consumption to GDP (CtoGDP) and the fertility rate (Fert). $\beta_{0i}$ – a fixed effect for country i that captures all fixed characteristics of that country, such as cultural characteristics, geographic location, etc. $\mu_{i,t}$ – residuals of the model for the i-th country in the t-th period.

Model estimation was performed in EViews 9.5 using the least squares method for panel regression. The obtained results are presented in Table 12.

**Table 12.** Model assessment (source: calculated by authors)

| Dependent variable: D(CONS) | | | | |
|---|---|---|---|---|
| Method: Panel least squares | | | | |
| Sample (adjusted): 1961 2021 | | | | |
| Periods included: 61 | | | | |
| Cross-sections included: 19 | | | | |
| Total panel (unbalanced) observations: 928 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 297.8333 | 48.99618 | 6.078706 | 0.0000 |
| FERTILITY | –42.79552 | 19.16559 | –2.232935 | 0.0258 |
| D(TOGDPRATE) | 31.86695 | 5.576654 | 5.714349 | 0.0000 |
| | Effects specification | | | |
| Cross-section fixed (dummy variables) | | | | |
| The period fixed (dummy variables) | | | | |
| R-squared | 0.459971 | Mean dependent var | | 185.7908 |
| Adjusted R-squared | 0.408965 | S.D. dependent var | | 379.5453 |
| F-statistic | 9.017944 | Durbin-Watson stat | | 1.617083 |
| Prob(F-statistic) | 0.000000 | | | |

The obtained model is adequate, and all coefficients are significant. It can be concluded from the model that consumption growth at constant prices depends on the considered variables. Specifically, a 1% decrease in fertility increases per capita consumption growth at constant prices by about $43. At the same time, an increase in consumption growth to GDP by 1% leads to an increase in consumption growth in constant prices per capita by almost $32.

However, the influence of fixed effects differs significantly between countries (Table 13). The different influences in Japan (–$15) and Korea (+$39.5) are thought-provoking.

Fixed effects by year are shown in Figure 2. The global financial crisis of 2008–2009 led to a drop in consumption by almost 464 dollars. In 2020, as a result of the start of the COVID-19 pandemic, there was a worldwide decrease in the level of consumption by $1197.5 at constant 2015 prices, but already in 2021, this level has increased by $507. In other periods, we observe minor fluctuations, the average annual increase was $12.5 with a Standard Error of $25.99. The median of these effects is $40, that is, in half of the periods the increase did not exceed this value.

**Table 13.** Fixed effects between states (source: calculated by authors)

| State | Effect |
|---|---|
| ARG | −103.4465 |
| AUS | 127.5241 |
| BRA | −107.5957 |
| CAN | 65.57200 |
| CHN | −37.78782 |
| DEU | −0.073055 |
| FRA | 11.80212 |
| GBR | 130.9953 |
| IDN | −112.7191 |
| IND | −109.6744 |
| ITA | −49.51917 |
| JPN | −15.31776 |
| KOR | 39.59916 |
| MEX | −63.14084 |
| RUS | −48.74209 |
| SAU | 85.59885 |
| TUR | −14.65717 |
| USA | 314.2947 |
| ZAF | −112.7127 |
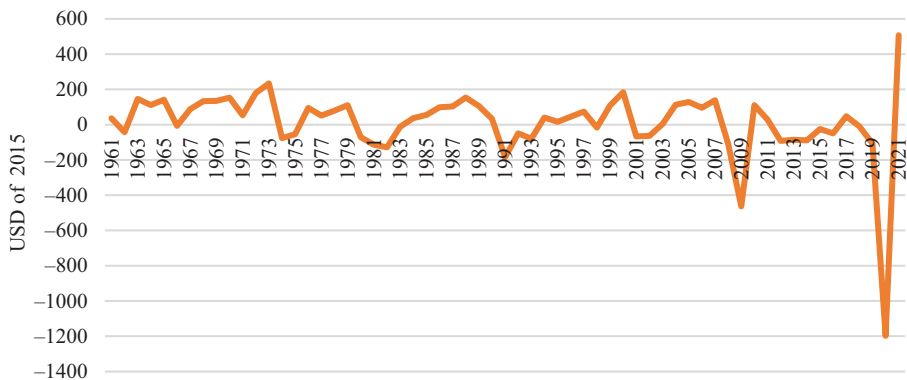


**Figure 2.** Fixed effects by year (source: calculated by the authors)

## 5. Discussion

The conducted study showed that the economic model of the world currently does not solve the main task of raising the global standard of living. We considered consumption per capita as the main parameter of the quality of life, which is a fairly representative indicator, at least in the long term. It allows us not only to take into account the effect of economic growth but

also to check the role of demographic influence in the countries of the world. It is obvious that the role of demography is extremely important, as can be seen from the latest conflicts in territories where different population groups grew at different rates. In this aspect, one can note the conflicts in Kosovo, Bosnia and Herzegovina, Israel, and African countries, where the Muslim population has become larger than the non-Muslim population. On the one hand, the increase in population increases the power of the respective country, and on the other hand, it worsens the quality of life indicator, at least in the short term.

The existing unification of the level of consumption poses a huge threat to overcoming poverty and property stratification. As shown above, in nominal terms the level of consumption between groups of countries with different incomes is only increasing. This means that under this economic model, humanity is already close to reaching the point where the further growth of individual consumption itself will approach the zero level. Thus, there will be another consolidation of the level of development of the countries (Hirsch & Silverstone, 2003). As the study showed, without changing the economic model, it is almost impossible to change the level of individual consumption in such a way that, for example, to move from the group of poor countries to at least the group with incomes above average.

The richest countries, finding themselves in a situation of inhibition of the level of individual consumption, decided to focus more attention on other goals (Torvik, 2001). In fact, this is how the Sustainable Development Goals were born, which aim to replace the usual economic indicators in favour of more qualitative ones. However, from the point of view of the economy, it is obvious that such a replacement does not solve the main question: how to achieve further growth in the quality of life. That is why even the latest data for Ukraine show that the indicators of the Central Bank are not able to reflect the real situation in the country, neither in terms of dynamics nor in terms of the components of indicators and assessments (Kharlamova et al., 2018).

## 6. Conclusions and directions for future research

The conclusions of our modelling partly explain the increase in geopolitical tensions in the world in recent years. Criticism of the existing economic model, the impossibility of equalizing the standard of living on the planet, dependence on low income etc. give rise to the prospects of revision and disruption of the world order and attempts of some countries or blocs to take leading positions in order to improve their personal situation. However, without a conceptual solution to the problem of inhibiting the growth of the quality of life, all these attempts will not give the desired result. It can be argued that the winner in the new battle of countries will not be the one that has the biggest and strongest weapons, but that will be able to offer a fairer and more efficient economic model for the entire planet.

From the point of view of policy recommendations, the following should be noted. First, the possible conservation of the current economic model will lead to clear social explosions and significant pressure on migration processes in the world. It is obvious that the active population of poor countries will try to move to richer ones, which will lead to a further drop in the level of individual consumption in rich countries, except the USA. The latter will be able to remain the richest economy for some time precisely because of the possibility of issuing dollars and maintaining a much higher level of consumption in GDP than in other countries of the world. Thus, rich countries will either integrate with poorer ones or will be forced to build regional entities with closed entrances.

Secondly, the degradation of the current economic model requires a significant revision of state policy in the area of stimulating individual consumption. The countries still have important reserves in this aspect, which consist of a radical revision of the tax legislation. It is obvious that the growing migration of the population, freelancing, and the decrease in the labour intensity of enterprises require a completely new approach to the taxation of personal incomes, a change in the concept of indirect taxation. Those countries that can be the first to find and implement a competitive taxation mechanism will gain a competitive advantage and have a chance to enter the group of countries with the highest incomes.

In this aspect, the creation of a new economic model becomes possible, which could be applied to the rapid recovery of the country after a major crisis or war, which is very relevant, for example, for Ukraine, which is fighting a liberation war. Therefore, the new economic model must be based on the free market, economic initiative and global security guarantees, which have already become clear from the consequences of the war in Ukraine.

*Limitations of the research*: in this study, we did not take into account other important factors that may influence the level of individual consumption. First of all, short-term factors were not taken into account, since the main emphasis of the study was on the long-term impact. An important component that was not modelled is the technological development and measurement of its speed. This issue was partially studied in works but was not used in the considered models. A third component that should improve the analysis in the future is the use of other indicators instead of per capita consumption. Obviously, due to the inequality of the population's income, it would be better to talk not about consumption per capita, but, for example, about the median of this indicator. However, unfortunately, such data are not yet collected in a sufficient number of countries.

## Author contributions

AS and GK conceived the study and were responsible for the design and development of the data analysis. AS, SN and LT were responsible for data collection and analysis. AS, GK and SN were responsible for data interpretation. AS and LT wrote the first draft of the article.

## Disclosure statement

Authors declare that they have no competing financial, professional, or personal interests from other parties.

## References

Bacchini, F., Baldazzi, B., & Di Biagio, L. (2020). The evolution of composite indices of well-being: An application to Italy. *Ecological Indicators*, *117*, Article 106603. https://doi.org/10.1016/j.ecolind.2020.106603

Benczúr, P., Kvedaras, V., & Preziosi, N. (2023). *Health-adjusted income: Complementing GDP to reflect the valuation of life expectancy* (Technical Report No. JRC134152). Publications Office of the European Union. https://data.europa.eu/doi/10.2760/91140

Bloom, D. E., Fan, V. Y., Kufenko, V., Ogbuoji, O., Prettner, K., & Yamey, G. (2021). Going beyond GDP with a parsimonious indicator. *Vienna Yearbook of Population Research*, *19*, 127–140. https://doi.org/10.1553/populationyearbook2021.res1.1

Bondy, A. S., Maggor, E., & Tassinari, A. (2024). Putting wage growth back on the table: Labour incorporation, political exchange, and wage-boosting policies in advanced peripheral economies. *Competition & Change*. https://doi.org/10.1177/10245294241226733

Castellano, R., De Bernardo, G., & Punzo, G. (2024). Sustainable well-being and sustainable consumption and production: An efficiency analysis of sustainable development goal 12. *Sustainability*, *16*(17), Article 7535. https://doi.org/10.3390/su16177535

Coscieme, L., Mortensen, L. F., Anderson, S., Ward, J., Donohue, I., & Sutton, P. C. (2020). Going beyond gross domestic product as an indicator to bring coherence to the sustainable development goals. *Journal of Cleaner Production*, *248*, Article 119232. https://doi.org/10.1016/j.jclepro.2019.119232

Dasic, B., Devic, Z., Denic, N., Zlatkovic, D., Ilic, I. D., Cao, Y., Jermsittiparsert, K., & Le, H. V. (2020). Human development index in a context of human development: Review on the western Balkans countries. *Brain and Behavior*, *10*(9), Article e01755. https://doi.org/10.1002/brb3.1755

Deaton, A., & Schreyer, P. (2022). GDP, wellbeing, and health: Thoughts on the 2017 round of the International Comparison Program. *Review of Income and Wealth*, *68*(1), 1–15. https://doi.org/10.1111/roiw.12520

Dwyer, L. (2023). Tourism development and sustainable well-being: A beyond GDP perspective. *Journal of Sustainable Tourism*, *31*(10), 2399–2416. https://doi.org/10.1080/09669582.2020.1825457

Eika, L., Mogstad, M., & Vestad, O. L. (2020). What can we learn about household consumption expenditure from data on income and assets? *Journal of Public Economics*, *189*, Article 104163. https://doi.org/10.1016/j.jpubeco.2020.104163

Felice, E. (2024). GDP and convergence in modern times. In C. Diebolt & Haupert, M. (Eds.), *Handbook of cliometrics* (pp. 827–857). Springer. https://doi.org/10.1007/978-3-031-35583-7_5

Fraumeni, B. M. (2022). Gross domestic product: Are other measures needed? *IZA World of Labor*. https://doi.org/10.15185/izawol.368.v2

Galgóczi, B., & Pochet, P. (2022). Introduction. Welfare states confronted by the challenges of climate change: A short review of the issues and possible impacts. *Transfer: European Review of Labour and Research*, *28*(3), 307–316. https://doi.org/10.1177/10242589221132781

Heide, M., Hauschild, M. Z., & Ryberg, M. (2023). Reflecting the importance of human needs fulfilment in absolute sustainability assessments: Development of a sharing principle. *Journal of Industrial Ecology*, *27*(4), 1151–1164. https://doi.org/10.1111/jiec.13405

Hirsch, E., & Silverstone, R. (2003). The long term and the short term of domestic consumption. In *Consuming technologies* (pp. 206–222). Routledge. https://doi.org/10.4324/9780203401491-23

Hüttel, A., Balderjahn, I., & Hoffmann, S. (2020). Welfare beyond consumption: The benefits of having less. *Ecological Economics*, *176*, Article 106719. https://doi.org/10.1016/j.ecolecon.2020.106719

Jabeen, A., & Khan, S. A. (2022). Economic growth, social inclusion, and environmental protection: Assessing the existence of green growth in Pakistan. *Environmental Science and Pollution Research*, *29*(44), 66675–66688. https://doi.org/10.1007/s11356-022-20467-9

Jain, R. K., Cui, Z., & Domen, J. K. (2016). Environmental impacts of mining. In *Impact of mining and mineral processing* (pp. 53–157). Butterworth-Heinemann. https://doi.org/10.1016/B978-0-12-804040-9.00004-8

Jakob, M., Lamb, W. F., Steckel, J. C., Flachsland, C., & Edenhofer, O. (2020). Understanding different perspectives on economic growth and climate policy. *WIREs Climate Change*, *11*(6), Article e677. https://doi.org/10.1002/wcc.677

Kalimeris, P., Bithas, K., Richardson, C., & Nijkamp, P. (2020). Hidden linkages between resources and economy: A "Beyond-GDP" approach using alternative welfare indicators. *Ecological Economics*, *169*, Article 106508.  https://doi.org/10.1016/j.ecolecon.2019.106508

Kharlamova, G., Stavytskyy, A., & Zarotiadis, G. (2018). The impact of technological changes on income inequality: The EU states case study. *Journal of International Studies*, *11*(2), 76–94. https://doi.org/10.14254/2071-8330.2018/11-2/6

Kharlamova, G., Stavytskyy, A., Chernyak, O., Giedraitis, V. R., & Komendant, O. (2019). Economic modeling of the GDP gap in Ukraine and worldwide. *Problems and Perspectives in Management*, *17*(2), 493–509. https://doi.org/10.21511/ppm.17(2).2019.38

Kynčlová, P., Upadhyaya, S., & Nice, T. (2020). Composite index as a measure on achieving Sustainable Development Goal 9 (SDG-9) industry-related targets: The SDG-9 index. *Applied Energy*, *265*, Article 114755. https://doi.org/10.1016/j.apenergy.2020.114755

Macekura, S. J. (2020). *The mismeasure of progress: Economic growth and its critics*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226736440.001.0001

Nate, S., Bilan, Y., Cherevatskyi, D., Kharlamova, G., Lyakh, O., & Wosiak, A. (2021). The impact of energy consumption on the three pillars of sustainable development. *Energies*, *14*(5), Article 1372. https://doi.org/10.3390/en14051372

Oswald, Y., Owen, A., & Steinberger, J. K. (2020). Large inequality in international and intranational energy footprints between income groups and across consumption categories. *Nature Energy*, *5*, 231–239. https://doi.org/10.1038/s41560-020-0579-8

Öztürk, E. G., Guimarães, P., & Silva, S. T. (2024). Building a composite index using the multi-objective approach: An application to the case of human development. *Socio-Economic Planning Sciences*, *91*, Article 101756. https://doi.org/10.1016/j.seps.2023.101756

Piligrimienė, Ž., Žukauskaitė, A., Korzilius, H., Banytė, J., & Dovalienė, A. (2020). Internal and external determinants of consumer engagement in sustainable consumption. *Sustainability*, *12*(4), Article 1349. https://doi.org/10.3390/su12041349

Popescu, A. (2022) Income inequality in the countries of the European Union. *Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development"*, *22*(3), 547–560. https://managementjournal.usamv.ro/index.php/scientific-papers/2977-income-inequality-in-the-countries-of-the-european-union

Qiu, D., & Wang, Y. (2023). Gross Domestic Products (GDP) is not a proper indicator of measurement and economic power comparison for emerging economies: A judgement from international distributions of net factor income from abroad. *Journal of Economic Statistics*, *1*(1), 1–44. https://doi.org/10.58567/jes01010001

Rabe, C., & Waddle, A. (2020). The evolution of purchasing power parity. *Journal of International Money and Finance*, *109*, Article 102237. https://doi.org/10.1016/j.jimonfin.2020.102237

Ray, R., & Singh, P. (2021). Regionally disaggregated estimates of global income inequality with evidence on sensitivity to purchasing power parity. *Journal of the Asia Pacific Economy*, *26*(2), 252–270. https://doi.org/10.1080/13547860.2021.1926120

Sajith, G. G., & Malathi, K. (2020). Applicability of human development index for measuring economic well-being: a study on GDP and HDI indicators from Indian context. *The Indian Economic Journal*, *68*(4), 554–571. https://doi.org/10.1177/0019466221998620

Salyga, J. (2023). Democratic facades, authoritarian penchants: post-communist monetary restructuring in the Baltic states. *Globalizations*, 1–16. https://doi.org/10.1080/14747731.2023.2236881

Santos, J. V., & Cylus, J. (2024). The value of healthy ageing: Estimating the economic value of health using time use data. *Social Science & Medicine*, *340*, Article 116451. https://doi.org/10.1016/j.socscimed.2023.116451

Shrotryia, V. K., & Singh, S. V. P. (2020). Measuring progress beyond GDP: A theoretical perspective. *Emerging Economy Studies*, *6*(2), 143–165. https://doi.org/10.1177/2394901520983784

Sivalingam, V., Liu, H., Selvam, B., Kai, G., Kumar, P. G., Gupta, M. K., Korkmaz, P. G., & Sun, J. (2024). Towards sustainability assessment, energy consumption, and carbon emissions in cryogenic drilling of Alloy 20: A new approach towards sustainable future and challenges. *The International Journal of Advanced Manufacturing Technology*, *131*, 1151–1165. https://doi.org/10.1007/s00170-024-13144-3

Slesnick, D. T. (2020). GDP and social welfare: An assessment using regional data. In *Measuring economic growth and productivity* (pp. 481–508). Academic Press. https://doi.org/10.1016/B978-0-12-817596-5.00021-4

Smith, J. (2021, August 23–27). Accounting for non-market household production 'Beyond GDP': 20th century Trends in mother's milk production. In *Proceedings of the 36th IARIW Virtual General Conference*. Oslo, Norway. https://iariw.org/wp-content/uploads/2021/08/Smith_paper.pdf

Stavytskyy, A. V., & Kozub, M. B. (2020). Modeling of economic convergence processes in eastern Europe countries. *Ekonomika*, *99*(2), 6–19. https://doi.org/10.15388/Ekon.2020.2.1

Stavytskyy, A., Kharlamova, G., Giedraitis, V. R., Osetskyi, V., & Kulish, V. (2020). Can key interest rates decrease output gaps? *Investment Management and Financial Innovations*, *17*(3), 205–218. https://doi.org/10.21511/imfi.17(3).2020.16

Swan, P. L. (2023). Why ABS volume GDP figures can be misleading. In *Trevor Winchester Swan, Vol. 2. Contributions to Economic theory and policy* (pp. 129–138). Springer. https://doi.org/10.1007/978-3-031-23807-9_14

Torvik, R. (2001). Learning by doing and the Dutch disease. *European Economic Review*, *45*(2), 285–306. https://doi.org/10.1016/S0014-2921(99)00071-9

van den Bergh, J. C. J. M. (2022). A procedure for globally institutionalizing a 'beyond-GDP' metric. *Ecological Economics*, *192*, Article 107257. https://doi.org/10.1016/j.ecolecon.2021.107257

Weimin, Z., & Zubair Chishti, M. (2021). Toward sustainable development: Assessing the effects of commercial policies on consumption and production-based carbon emissions in developing economies. *SAGE Open*, *11*(4). https://doi.org/10.1177/21582440211061580

World Bank. (n.d.). *Households and NPISHs Final consumption expenditure per capita (constant 2015 US$)*. https://data.worldbank.org/indicator/NE.CON.PRVT.PC.KD

Zhao, X., & Sun, Z. (2020). The effect of satisfaction with environmental performance on subjective well-being in China: GDP as a moderating factor. *Sustainability*, *12*(5), Article 1745. https://doi.org/10.3390/su12051745