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CULTIVATING PROSPERITY AND RESILIENCE: A HOLISTIC APPROACH TO SOCIETAL PROGRESS THROUGH MORAL-ETHICAL GROWTH INDICES

Alexander Shemetev[a], **Martin Pělucha**[a]

[a] Prague University of Economics and Business, email: alexandershemetev@gmail.com

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Abstract

This paper addresses the multiple dimensions of societal progress by challenging the conventional emphasis on economic growth as the sole measure of development. Inspired by Joseph E. Stiglitz's insights into the importance of moral-ethical growth, we introduce novel indices - the Ethics Perception Index (ETPI) and the Regional Ethics Perception Index (RETPI). These indices quantitatively measure moral-ethical growth at national, regional and local levels, filling a critical gap in existing methodologies. Importantly, we emphasise the resilience inherent in moral and ethical growth, demonstrating its capacity to recover and adapt in the face of challenges. Our systematic approach incorporates indicators related to justice, equity, environmental stewardship and general ethical behaviour, providing a comprehensive framework for assessing societal progress beyond traditional economic metrics. In examining the ethical consequences of economic growth, we emphasise the importance of values such as justice and equity in promoting inclusive development. While acknowledging the limitations of our research, we envision future applications of our indices to guide policy and research efforts aimed at promoting equitable and sustainable moral-ethical growth. This work contributes to a nuanced understanding of societal progress and highlights the need for holistic policies that ensure that the benefits of progress are shared by all citizens.

Keywords: Ethics Perception Index, ETPI, Regional Ethics Measurement, Ethics Trends, Google Search Trends in Ethics, Ethics Proxy Variables, Global Ethics Assessment, Comparative Ethics Analysis, Human Development and Ethics, Environmental Ethics, Information Ethics, Economic Freedom and Ethics, Corruption Perception Index and Ethics, Ethics in Education, Ethics and Human Rights, Ethics of Responsibility, Regional Ethics Index, RETPI, Alternative to GDP in Ethics Measurement, Sustainable Development and Ethics.

INTRODUCTION

At a time when the pursuit of economic growth often dominates discussions of social progress, the need for a nuanced understanding of development has never been more urgent. Joseph E. Stiglitz's (2005) seminal essay, 'The Ethical Economist: Growth May Be Everything, But It's Not the Only Thing,' serves as a compelling catalyst for reevaluating our conventional metrics. The essay aims to delve into the complexities of societal progress, challenging the prevailing notion that economic growth alone can adequately measure a nation's or region's prosperity. Recognising the limitations of traditional approaches, we

introduce the Ethics Perception Index (ETPI) and the Regional Ethics Perception Index (RETPI) to measure moral-ethical growth quantitatively.

Our aim is to fill a critical gap in existing methodologies by providing policymakers and researchers with a comprehensive framework for assessing the moral-ethical dimensions of development. As we navigate through the ethical consequences of economic growth, we emphasise the urgency of incorporating values such as justice, equity, environmental stewardship and general ethical behaviour into our measurement systems. In doing so, we aim to contribute to a more holistic understanding of societal progress and to ensure that the benefits of development are equitably shared among all citizens.

At the same time, economic development occurs first at the local level, then at the regional level, and then at the national and international level. These stages are missing in current policy-making because, to our knowledge, there is no specific tool for measuring economic development simultaneously using core indicators at the national, regional and local levels.

This approach enables informed policy-making, allowing decision-makers to monitor key indicators and make more nuanced decisions, promoting balanced growth with targeted attention to regions that need additional support. In addition, the implementation of this methodology fills knowledge gaps by demonstrating that ethical growth contributes to a resilient foundation for both social and economic development.

Economic development is inherently unpredictable, akin to a random walk, as evidenced by events such as the 2008 Global Financial Crisis (GFC), the COVID-19 recession and other shocks that disrupt established patterns of economic growth. The crucial aspect is not just the growth trajectory but the potential for economic growth and resilience, which derives from the moral-ethical dimensions rather than purely material indicators such as supermarket food supplies or the cost of goods and services within a country, often reflected in output.

In addition, the paper substantiates its basic concepts through empirical validation using global, regional and local data sets.

Structure of the paper

The paper adopts a comprehensive structure, exploring the development and application of the Ethics Perception Index (ETPI) as a ground-breaking quantitative measure of moral and ethical economic potential for recovery and resilience. Early chapters explore the theoretical underpinnings of the ETPI, emphasising its distinction from traditional measures of economic growth. Addressing the gap in current knowledge, the study presents an innovative

methodology for rescaling regional ETPI scores to the global index, providing nuanced insights into the moral-ethical landscape.

Subsequent sections detail the seven components of the ETPI, carefully navigating the challenge of integrating negative scale indexes. In particular, the paper introduces a rescaling approach for these components, ensuring a unified positive scale for comprehensive analysis. To illustrate the practical application of the ETPI, the research presents global and regional perspectives, focusing on countries such as Russia and the Czech Republic.

The study concludes by highlighting the relevance of the ETPI in assessing socio-economic development, emphasising its ability to inform policy-making by identifying regions with different levels of resilience and recovery potential in the face of crises.

THEORETICAL BACKGROUND

Broadening Perspectives: Stiglitz's Critique and Our Novel Indices for Holistic Measurement of Moral-Ethical Growth

Joseph E. Stiglitz's essay 'The Ethical Economist: Growth May Be Everything, But It's Not the Only Thing' (2005) provides valuable insights into why moral-ethical growth is crucial for societal development. Stiglitz challenges the traditional emphasis on economic growth as the sole indicator of progress, arguing that it often fails to address broader societal concerns. The paper argues that while growth brings economic benefits, it does not automatically guarantee moral and ethical progress, environmental sustainability or social justice.

Stiglitz highlights the moral consequences of economic growth, emphasising that societal well-being involves more than financial prosperity (Stiglitz, 2005). He discusses the ethical dimensions of resource allocation, poverty alleviation and environmental impact. The paper suggests that focusing solely on economic indicators can lead to inequalities, leaving some segments of the population vulnerable to problems such as inadequate health care and education.

In contrast, our paper introduces novel indices, namely the Ethics Perception Index (ETPI) and the Regional Ethics Perception Index (RETPI), designed to quantitatively measure moral-ethical growth at both national and regional levels. These indices provide a systematic approach to assessing the moral-ethical dimensions of economic development, filling a gap in existing methodologies. By incorporating indicators related to justice, equity, environmental stewardship and general ethical behaviour, our indices offer a comprehensive framework for assessing societal progress beyond conventional economic metrics. In doing so, our work

provides a valuable tool for policymakers and researchers seeking to holistically measure and promote moral-ethical growth, ensuring that the benefits of societal progress are equitably shared among all citizens.

The Foundations of Economic Measurement: From Kuznets to Modern Databases and Institutional Influence

The need for practical application, predictive power and quantitative estimation of economic factors has led researchers to develop applied indicators (Kuznets, 1934; Kuznets, 1941). Simon Kuznets is widely recognised as the founder of GDP (Daley et al., 1999), GNP (Neil & US Bureau of Economic Analysis, 2020) and related concepts. The modern databases (Feenstra et al., 2021; International Monetary Fund, 2022; World Bank, 2022b) contain the main components of the GDP, eleven similar indicators, and proxy variables that can estimate the national output. This underlines the importance of having robust quantitative measures to assess both economic success and failure.

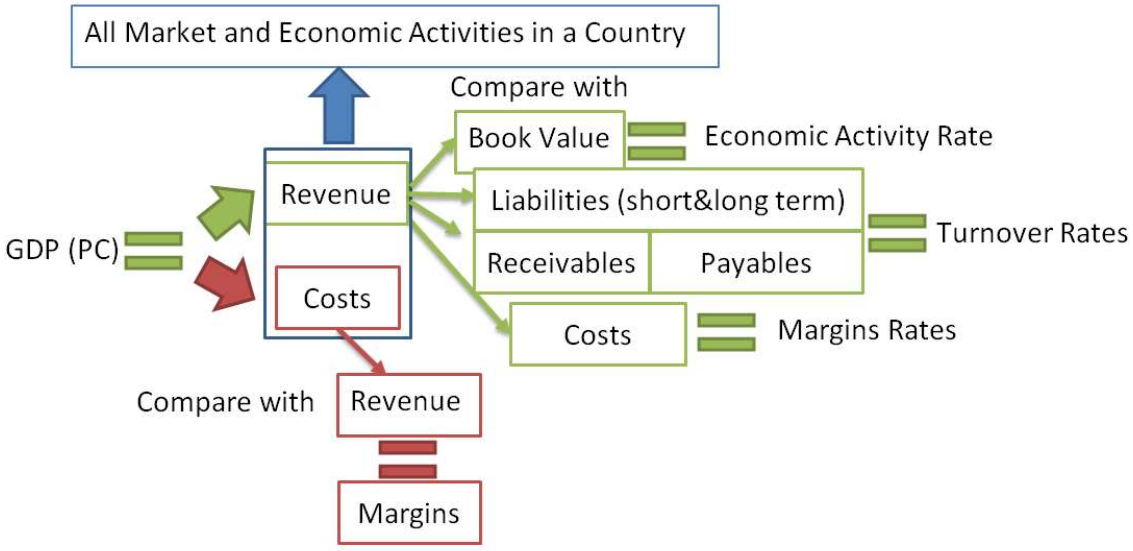
Although GDP is widely used as a key economic measure, it is not without its critics. In particular, different GDP datasets can provide different levels, trends and even indications of economic growth, adding a layer of complexity. Despite these concerns, GDP remains crucial as a primary source of information, providing insights into a country's economic size and performance. However, the following sections explore the limitations and drawbacks of relying solely on GDP to understand economic dynamics.

REASSESSING GDP: UNRAVELLING BIASES, COMPLEXITIES, AND THE SEARCH FOR A HOLISTIC MEASURE OF WELL-BEING

Analytical Dilemma: Interpreting GDP as Revenue or Cost and the Implications for Comprehensive Economic Analysis

The first line of criticism relates to the core nature of GDP, including its per capita representation and eleven comparable indicators - all collectively referred to as GDP for simplicity in this study. GDP is something like the revenue of a country (Stiglitz, 2005) or costs (Daly et al., 2007; Mishan, 1967; Shell & Mishan, 1975) of all market and economic activities in a specific country. Economic analysts may face one of two scenarios, as illustrated in Figure 1.

Figure 1 Analytical Value of GDP from an Accounting Approach



Source: Own processing

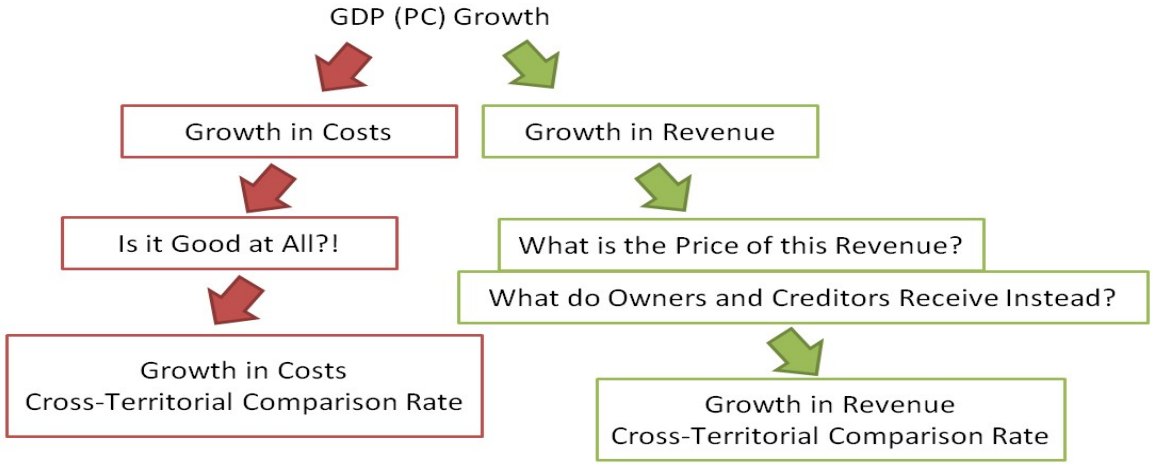
Drawing parallels between GDP and revenue is more productive in terms of analytical potential. However, the lack of parameters for a comprehensive comparison is a challenge. For example, considering the book value of all components within a country, including land, capital, labour, human capital, natural resources, nature, monetary funds, investment, property rights, currencies and taxes, is crucial for a thorough analysis from an accounting perspective (Brealey et al., 2020; Damodaran, 2014; Tirole, 2005). Current macroeconomic indicators cover only a fraction of these components. Analysts need a holistic set of indicators to make an accurate and unbiased analysis. Trying to assess liabilities without knowing the total "assets" of a country is challenging. Alternatively, comparing revenues and costs, as suggested by Prof. J. Stiglitz, raises questions about the sacrifices a country makes to generate GDP. In both scenarios (GDP is revenue or costs), the lack of clarity about the nature of GDP hampers the efficiency of precise or accounting-type analyses for regional and national economies, forcing researchers to rely on proxy models because of the inherent ambiguity.

The Dynamics of Time Series Analysis: Evaluating Analytical and Forecasting Powers of GDP (PC) and Exploring Growth Patterns

The essence of time series analysis lies in its analytical and forecasting capabilities, which revolve primarily around changes in the primary indicator. Given the common advantages and shortcomings of the related variables, this study refers to them collectively as GDP (PC). The proposal to move away from the primary GDP indicator to alternatives such as GNP and GNI is seen as having similar advantages, disadvantages and systematic problems. The value of GDP and analogous indicators has long been debated in the field of time series analysis, with

a historical focus on the growth threshold. Scholars such as Daniel & Ehrlich (1990) and Gilland et al. (1990) have debated the implications of overlooking this threshold, suggesting that it can turn growth from a positive to a negative factor for the economy. This complex pattern is further illustrated in the following diagram (Figure 2).

Figure 2 Analytical Value of GDP from a Time Series Perspective



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If Professor Stiglitz's opponents are correct, as suggested by Daly et al. (2007), Mishan (1967) and Shell & Mishan (1975), then GDP represents the cost of all market and economic activity within a given country or territory. Consequently, an increase in GDP (and similar indicators) would imply an increase in expenditure. To illustrate, consider a simplified economy similar to a pizza house, where different pizza houses have indicators reflecting the growth of their costs - such as dough, various ingredients, baker's labour, electricity, water consumption and similar elements. If pizzeria “A” experiences 7% cost growth, while pizzeria “B” experiences only 2%, analysts can only draw limited conclusions based on these cost components alone without additional detailed information. As the scale of the example expands to that of a region or nation, the inherent bias of cost-based analysis becomes more pronounced.

On the other hand, if Professor Stiglitz is correct in his assertion that GDP is revenue, analysts can compare different regions and countries on the basis of revenue growth. However, as the only composite component, GDP lacks valuable comparables - such as changes in the total value of all assets within a given territorial unit. These assets include property rights, investments, money and currencies, taxes and refunds, inventories and more. To illustrate, consider a simplified economy resembling a pizza house, where the owners of different pizza houses have indicators of sales growth. If analysts do not have precise information beyond these revenue indicators, the efficiency of comparing this revenue growth

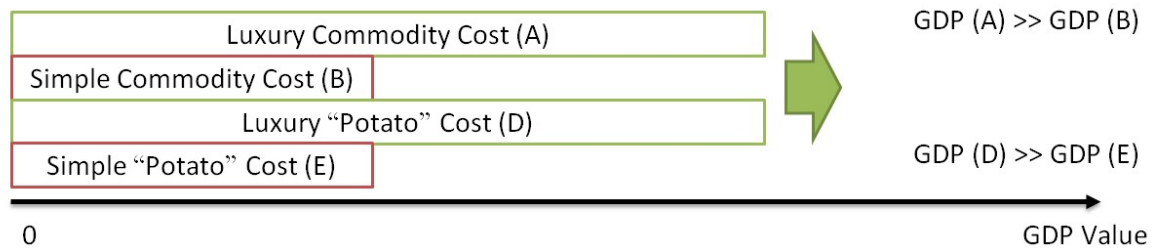
becomes a challenge. Scaling up from pizza houses to actual regions and countries only adds to the complexity of such analyses.

The Complex Dynamics of GDP Components: Examining the Inner Components and Their Implications for Economic Evaluation

GDP doesn't emerge in a vacuum; it consists of internal components that have been evaluated by various scholars (Encarnacion, 1964; Haregewoin, 2005; He, 2015; Liu et al., 2015). However, the quality of these components can be uneven, introducing significant bias into the overall measure (Sugden & Sen, 1986; Usher & Sen, 1987; Visser & Sen, 2013).

Suppose that a simplified economy produces a range of commodities labelled "A", while a neighbouring economy produces a range of commodities labelled "B". The further simplification can even call these commodities "potato" (it could be only one commodity for illustration). Figure 3 shows the basic relationships in this scenario.

Figure 3 Analytical Value of GDP from the Perspective of an Internal Structure



Source: Own processing

The above scheme shows that GDP "A" is significantly higher than GDP "B" because it produces commodities at higher prices, probably for rivalry consumption. On the other hand, a simplified model supposes that GDP "D" is higher than GDP "E", just because the sort of conditional commodity ("potato") is higher in country "D", even if the quantity would be the same.

In other words, the famous example of producing a stuffed shark (as an art object) costing 12 million dollars (Thompson, 2012) [circa 14.6 million 2022 dollars] would create the same GDP if India, for example, sold roughly 21 320 755 kilograms of rice, or China sold 13 799 937 kilograms. The rice prices are fair on March 24, 2022 (NUMBEO, 2022) compared to the 2022-adjusted price of the produced and sold stuffed shark.

Even more simplified, if India and China produced (or sold in a different method for GDP calculation) 1 kilogram of rice, China would gain 53.6% GDP more for each kilogram. Rice is

a homogenous product. Hence, does this analogy say that the productive capacity of India or China in terms of rice is greater?

Thus, the inner components of GDP can distort the picture of production. In other words, the higher the prices, the higher the GDP. Alternatively, put another way, rival consumer countries (for example, with a population segment eating more caviar, wearing more expensive jewellery, and riding more high-end cars1) produce more GDP than those who consume commodities primarily by necessity. In addition, each such luxury commodity (like the $12 million stuffed shark) generates significantly more output than units of non-rivalry items.

Therefore, the "formal" levels of GDP can rise while the real welfare of people may fall (Blanchflower & Oswald, 2004). People are more irrational in their consumption; thus, they prefer more rivalry consumption when they can afford it (Day, 1971; Encarnacion, 1964; Georgescu-Roegen, 1954; Tversky, 1972). There is even research estimating the threshold of $15 000 per capita (Helliwell, 2003). Summarizing these studies, irrational (rivalry) consumption can surpass some level that can then lead to GDP growth with an actual welfare decrease (Max-Neef, 1995).

Notwithstanding, a significant part of GDP belongs to the activities of the wealthiest people (Ferrer-i-Carbonell, 2005; Lyubomirsky et al., 2005; Rojas, 2005). Therefore, regions and countries with rich people will prosper. At the same time, several studies consider that the reverse of this logic is true (R. Inglehart, 2004; R. F. Inglehart et al., 2010; Layard, 2006). They believe that regions with higher well-being are better at creating wealthier people than regions with higher GDP and low well-being, created by irrational (as with rivalry) consumption (and production caused by this consumption).

The Dynamics of GDP per Capita: Unravelling the Complexities of Wealth Imputation and Unequal Distribution

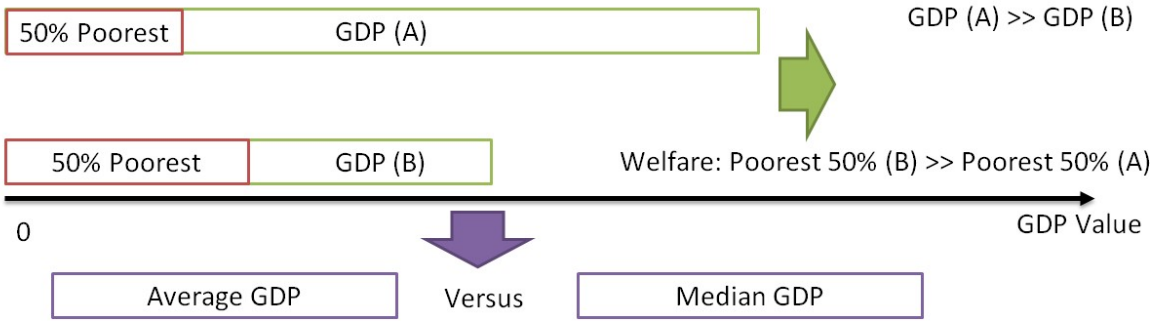
Measuring GDP (or any of other eleven similar indicators) per capita (PC) is trending nowadays. In this context, researchers impute a specific measure of wealth to every citizen within a country.

Further, an average person can never see this imputed piece of the "pie" (GDP). Several earlier studies, including those by Massey (1979), Sen (1976) and Usher & Sen (1987) estimated this phenomenon. Joseph Stiglitz considers that the average GDP is growing while the median GDP is declining (Stiglitz, 2005). In other words, wealthier people receive

[1] Rivalry and similar commodities produce GDP, even in case of imports, because of intermediate firms and delivery chains adding their bonuses to the original price.

increasingly more total shares of the pie, while the poorer 50% of the population have a decline in their claims on GDP. Figure 4 gives a better representation of this trend.

Figure 4 Analytical Value of GDP from the Perspective of an Uneven Distribution



Source: Own processing

The scheme in Figure 4 shows a situation when the well-being of the poorest half of the population is significantly higher in a country with almost 1/3 lower total GDP level.

In other words, the more affluent population group create a significant part of consumption and raise GDP. On the other hand, companies that produce commodities for people who are more prosperous generate more output.

At the same time, wealthier people can relocate in just several hours. They usually are "people of the whole world", living in any locations around the globe that they desire.

Notwithstanding, a giant corporation can quickly transfer its offices abroad, and the incentives to maximise profits by minimising taxes are higher for larger companies.

Therefore, both these sources of GDP [prosperous people and big corporations] are unstable, and they lead to fluctuations in the indicator.

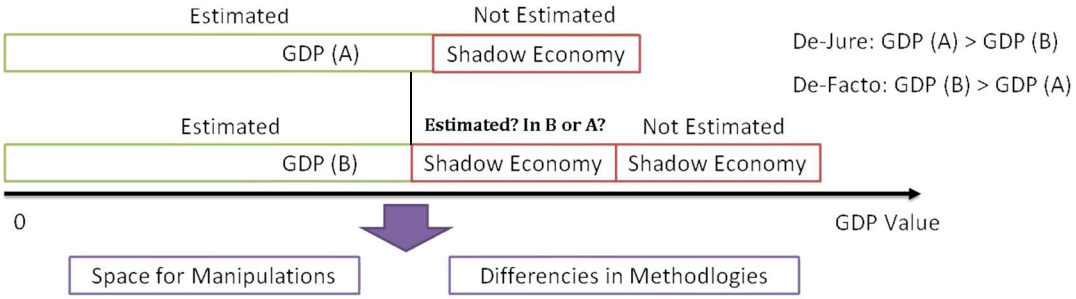
The Impact of Informal Economy: Assessing its Importance, Methodological Variations, and Potential for Manipulation in GDP Estimates

A Shadow economy can create a significant portion of the actual GDP (Ayakpat et al., 2014; Mbiriri, 2010; Mughal & Schneider, 2020). This portion is subject to changes over time (Bos, 2006) and methodology. For example, Somalia can consider piracy as an essential part of its GDP, so that without it the country will become significantly poorer (Jablonski & Oliver, 2017). The same authors estimated the opium poppy as being around 1/3 of Afghanistan's GDP in 2007 [opium poppy also motivated an economic boom in Burma, according to the same authors (Jablonski & Oliver, 2017, p. 3)]. Most countries would never estimate such elements as parts of their GDP and similar indicators, thus methodological differences are created.

Suppose that a situation where country "A" produces opium poppy and exports it to country "B" in order to reprocess it to produce heroin (Buxton, 2006). Let both countries count it in their GDP. Let it all be exported to some other country "C" where illegal drugs are part of the shadow economy. In this case, methodologies will be very different. Such differences in methods overestimate countries "A" and "B", and underestimate country "C" (where there will be intermediaries adding their costs).

The scheme in Figure 5 gives a better representation of similar situations.

Figure 5 Analytical Value of GDP from the Perspective of a Shadow Economy



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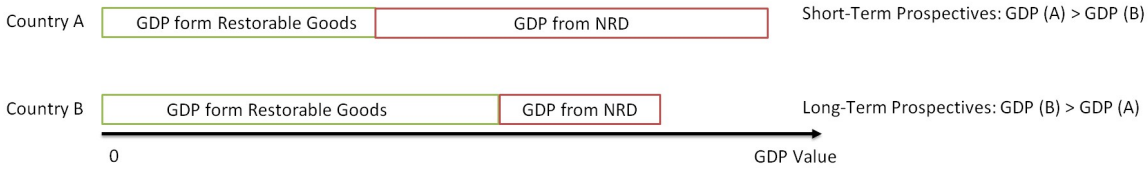
The other side effect of informal economy estimations is the space for manipulating the data. Suppose that a situation where country "A" has lower GDP than it wants. It can raise GDP just by, for example, legalising drugs or prostitution and start to count it in its GDP. It will also cause an additional GDP growth, starting from the year in which it will change its methodology. Nevertheless, the problem here is that there could be no actual changes (just a change in methods is sufficient).

The Illusion of Wealth: Exposing the Impact of Natural Resource Depletion on GDP and the Call for Sustainable Growth

Some resource economies can look wealthier [in terms of GDP] today than they are in reality, due to natural resources depletion (G. Atkinson et al., 1997). At the same time, stable GDP growth should orient towards long- rather than short-term prosperity [by depleting the natural resources] (Hicks, 1959; Nordhaus, 2013). The scheme in Figure 6 clearly displays this pattern.

Figure 6 Analytical Value of GDP from the Perspective of Depletion of Natural Resources



Key: natural resource depletion (NRD).
Source: Own processing

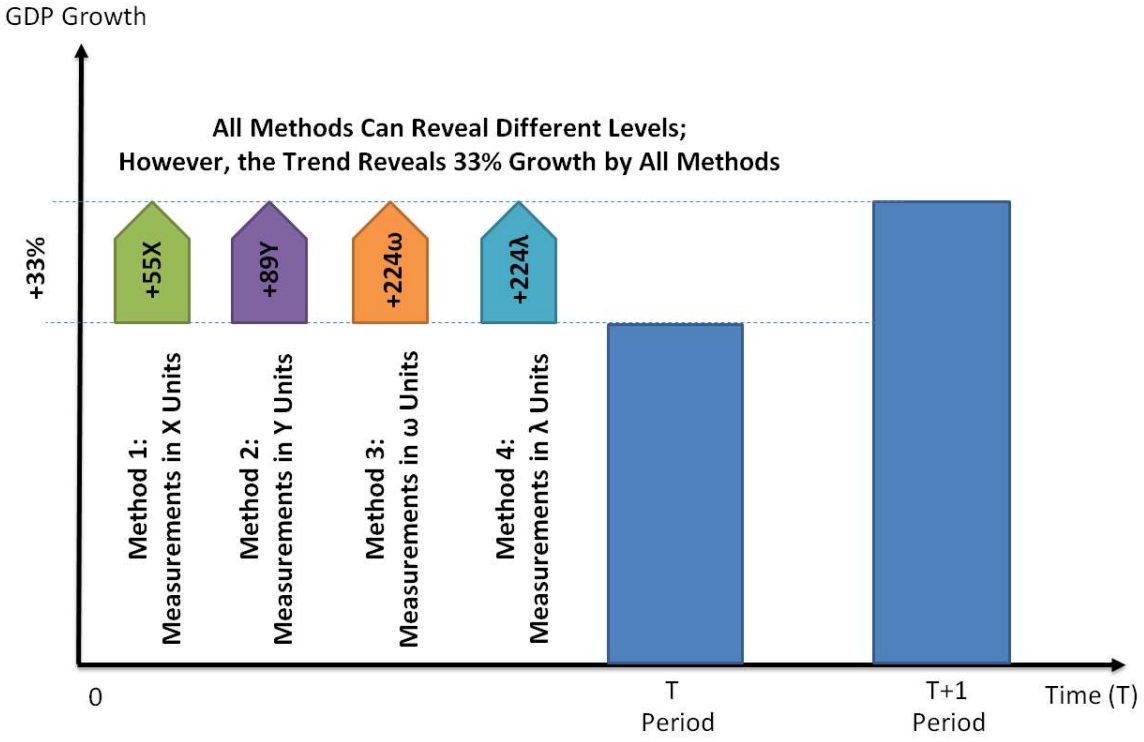
The diagram above illustrates the complex relationship between the Natural Resource Depletion (NRD) component and GDP, and its possible comes from the nature of accounting principles. Non-man-made resources, such as forests, oil, natural gas, gold ore and unprocessed diamonds, lack effective methods of calculation, leading governments to include them in GDP assessments. The lack of alternative parameters makes it difficult to conduct a comprehensive analysis of a particular economy based solely on GDP. It's important to note that while market mechanisms can estimate the current value of these resources, they often overlook the long-term consequences, including the depletion of natural resources, which can ultimately reduce a country's wealth and pose challenges for future generations. This raises questions about how to properly account for such depletion and its implications for sustainable economic practices.

Challenges in GDP Measurement: Data Source Selection, Methodological Differences, and the Search for Accurate Growth Rate Estimates

Choosing the right database is another aspect that affects the accuracy of GDP (and 11 similar indicators) measurements.The three main data sources are PWT (Feenstra et al., 2015, 2021; Zeileis, 2017), WB (World Bank, 2022b), and IMF (International Monetary Fund, 2022).

In order to assess bias in datasets, it is essential to consider factors such as measurement scales, similar to measuring child growth in different units (e.g., centimetres or inches). In this study, growth parameters are used to mitigate bias by ensuring that the primary method of measurement does not disproportionately affect the rate of growth (Shemetev & Pelucha, 2022). Using this analogy, measuring children's growth in centimetres or inches may yield different levels but the same growth rate if the measurement procedures are accurate. Figure 7 extends this logic to illustrate the impact on GDP and similar parameters.

Figure 7 Different Methods for Estimating the GDP Growth Provide the Same Growth Rate if there are no Errata in the Measurement



Source: Own processing

In other words, regardless of the methods used to estimate levels, different approaches should give the same growth rate. This consistency ideally results in a perfect fit line on a 2D observation plot, as more efficiently illustrated in Figure 8.

Figure 8 The Perfect Line Pattern of the Growth Rate Estimated by Different Levels

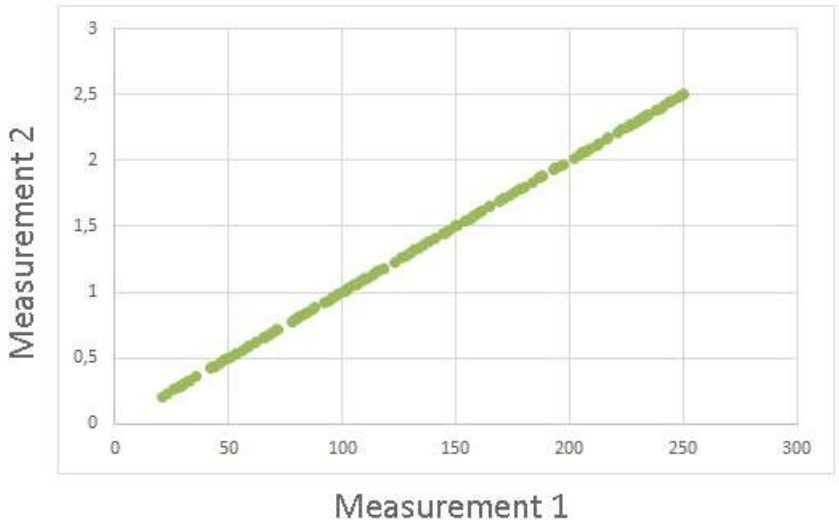


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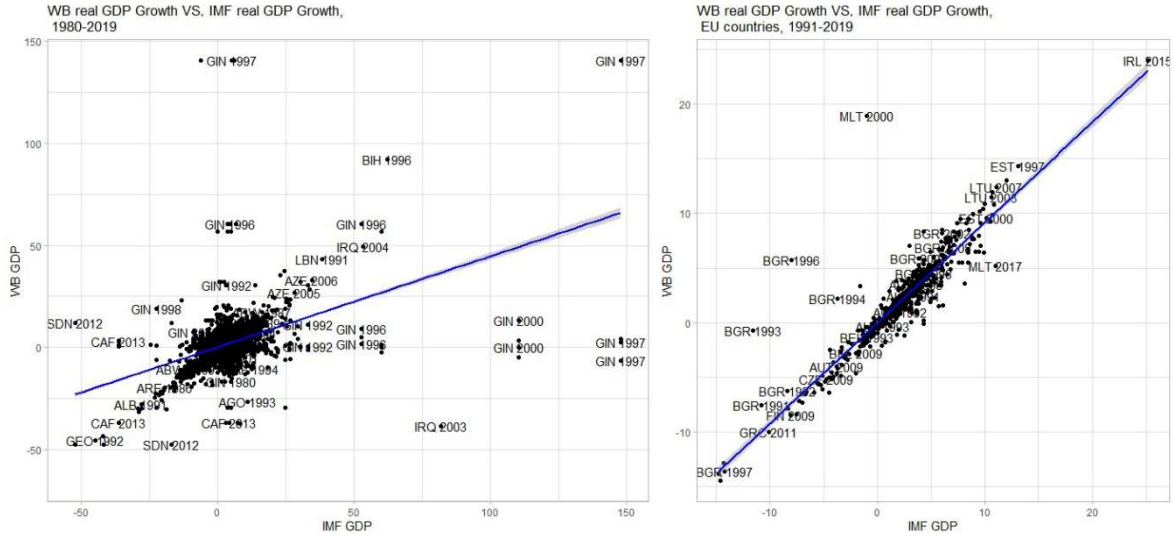
Figure 8 represents a pattern in situations of two different measurement approaches (scales) with correct estimation.

Moreover, this research implements the real growth rate with which to measure the correctness of indicators. The nominal GDP is insufficient to verify the differences between countries even, after controlling the comparable international dollars at a fixed rate for a specific date. Real GDP provides the necessary data adjustments for the comparability of results.

At the same time, in most cases, GDP provides a pattern that is closer to a "cloud" than to a perfect fit line. Figures 9, 10, and 11 represent this pattern for the world (left panel) and EU countries (right panel).

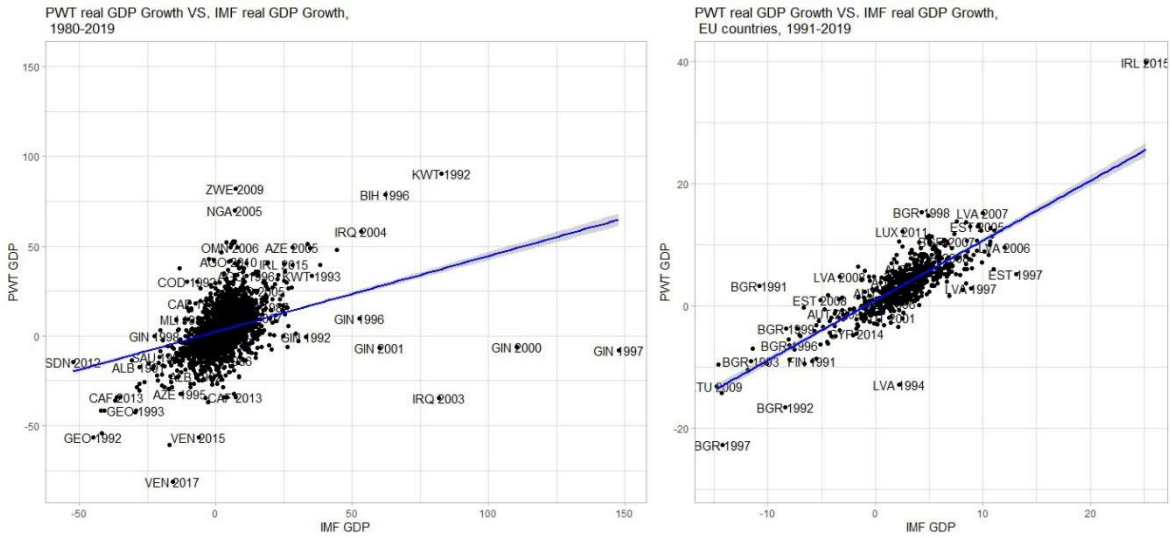
Figure 9 The Real GDP Growth for the EU and all Countries in WB and IMF Datasets



Source: Own processing

Figure 9 shows that even the most developed regions (like the EU) have many cases of different estimations within the respected datasets (IMF [International Monetary Fund] and WB [World Bank]). Implementing the most popular research database (PWT [Penn World Table]) worsens the situation. Figure 10 represents this pattern better.

Figure 10 The Real GDP Growth for the EU and All Countries in PWT and IMF Datasets

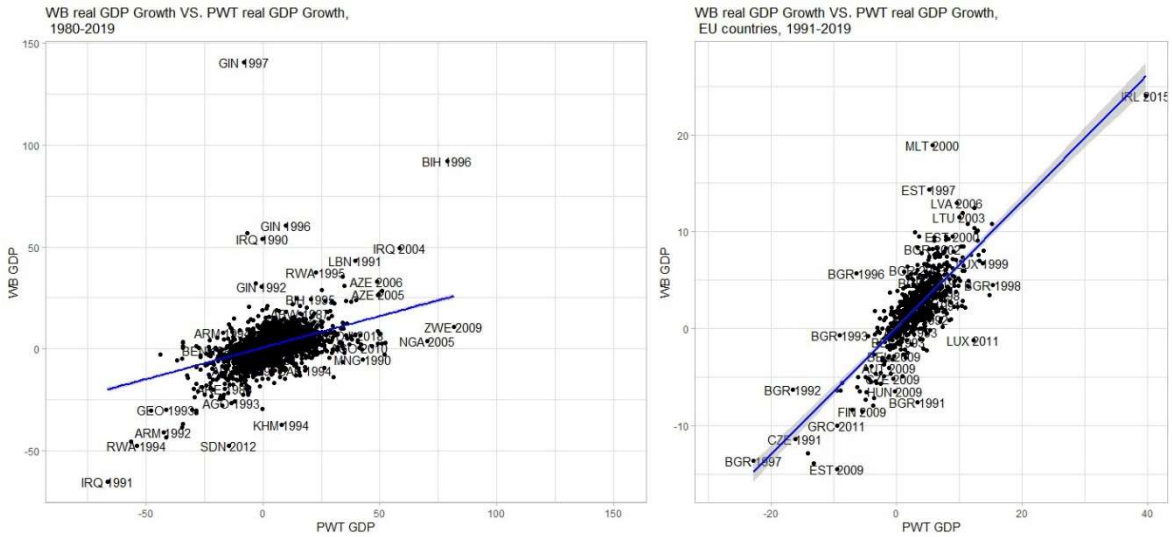


Source: Own processing

Both patterns in Figure 10 have a regression fit-line significantly driven by distant outliers. The world pattern (left panel) looks more like a cloud than a perfect-fit line. It is not similar to Figure 8 (design for exact measurements with different scales). The EU pattern (right panel) looks significantly better (but it is still far from perfect).

Nevertheless, the cloud-like pattern is still strong. Figure 11 compares the PWT and WB databases.

Figure 11 The Real GDP Growth for the EU and All Countries in PWT and WB Datasets



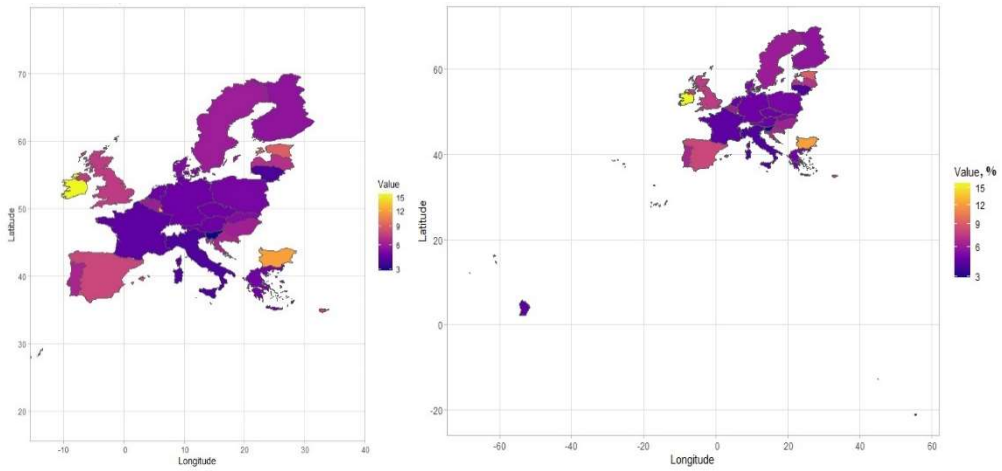
Source: Own processing

Moreover, in Figure 11 the global pattern (left panel) can have a negligible correlation between the PWT and WB datasets, because distant outliers are the main drivers for the

positive slope of the zero-intercept regression line. It means that both methods for estimating the same parameter have too little in common. The EU pattern (right panel) still represents a significant cloud-like pattern.

Comparing the result to the original example with the measurement of children's growth, the pattern with GDP looks like three different doctors would measure the same children [at the same time] and receive very different growth percentages. In addition, in around a quarter of all cases, they would receive different answers to whether children grew taller or became "shorter" (when one doctor would declare positive growth, while the other would declare negative). Such a pattern derives from the situation with the GDP measurement, when (in roughly a quarter of cases) experts are not sure if the same country grew or declined, in terms of the economy). It is a significant shortcoming of the classical approach. Figure 12 represents this situation in terms of data.

Figure 12 The Highest Annual Difference in Real GDP Growth in EU Countries (Without and With Specific Overseas Territories) by WB, IMF, and PWT Datasets, 1980-2019, Percentage



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Such a classical approach measures the macroeconomic well-being of countries. At the same time, GDP [PC] and eleven similar indicators provide proxy variables for calibration models for estimating regional development (Huggins et al., 2014; Pietrzykowski, 2020; Potluka, 2010).

Thus, researchers would have to trust a dataset without any opportunity to check whether or not it represents the correct outcomes.

METHODOLOGY

Comprehensive Measures of Ethical Progress: Introducing the Ethics Perception Index (ETPI)

This section provides additional perspectives on the selection of indicators for the Ethics Perception Index (ETPI). These views serve as a complementary discussion to our earlier publication on this topic (Shemetev, 2022).

The formulation of a quantitative algorithm for evaluating moral-ethical progress is of exceptional importance. The tools available in this context are limited and lack universal applicability, often focusing on measuring either economic progress or specific ethical facets, thus creating a significant gap in the scientific discourse. This research delves into the exploratory realms of the social sciences, recognising in particular the lack of well-established theories in the area of measuring moral-ethical growth. Using methods similar to exploratory social science (Pick & Azari, 2011; Pick & Sarkar, 2016; Stebbins, 2012), our strategy is to draw on antecedent literature to form a coherent empirical model through deliberate inference (Pick & Azari, 2011; Pick & Sarkar, 2016). The aim is to identify relevant factors and associations from the existing literature and integrate them into a comprehensive metric. We then seek to implement this theoretical framework through the formulation of an assessment index, recognising its central role as a valuable tool for measuring ethics in regions, municipalities and local communities, even in the absence of standardised data. This two-pronged methodology, involving the creation of a metric and an evaluative proxy index at regional and local levels, not only addresses current challenges, but also enriches the understanding of the complex interplay between communities and ethics.

Information ethics is an important branch of ethics that encompasses principles related to data, information, law, social science, publication and peer review, intellectual property, computers, the internet, privacy, security and surveillance ethics (Hauptman, 2019). Notably, there is a lack of direct tools to measure information ethics (Hauptman, 2019).

However, its influence is pervasive in societal educational processes, from early childhood education (as illustrated in a case study by Vericat Rocha & Ruitenberg (2019), where information ethics improved children's cognitive abilities after psychological trauma) to secondary school (as illustrated in the case study by Gu & Lai (2019), which shows improved education in English classes in Hong Kong due to improved information ethics; Nordkvelle & Olson (2005), which emphasises how moral values shape school education and contribute to a proper educational process) to higher education. The absence of information ethics at the

university level makes it possible to obtain a diploma without attending classes (Diplom.ORG, 2024; KazanFirst News Agency, 2022; Ogonek Journal & 360 Television, 2024), which is detrimental to the overall quality of education (Biggs & Tang, 2011).

By tracking trends in educational ethics, we can effectively assess developments in information ethics. An important tool for measuring trends in educational attainment is the Education Index (United Nations Development Programme, 2022). In our study, we include this index as a component of the broader ethics index. We acknowledge that as more advanced tools emerge, they may replace this component of the ethics index. This potential improvement in the accurate measurement of information ethics represents a prospective direction for the future development of this research.

While education plays a crucial role in social development, it doesn't cover the entire spectrum of information ethics (Hauptman, 2019). The United Nations, for example, considers education to be a key determinant of human capital (United Nations Development Programme, 2023). This importance is reflected in the Human Development Index (HDI), a proxy for the quality of human capital and the second component of the Ethics Perception Index (ETPI). The HDI includes life expectancy and GDP PPP (United Nations Development Programme, 2023), although GDP has limitations (see the background section of this paper). Our index is adaptable, making it easy to incorporate improved components that may emerge in the future.

Information ethics is only one dimension of ethics, which is closely related to human capital ethics, corruption and economics (Binder & Robeyns, 2019; Bryant & Javalgi, 2016). Nobel laureate Amartya Sen emphasises the inseparability of ethics and free economics, arguing that ethical considerations are crucial for economic development (Sen, 1991). Within the Ethics Perception Index (ETPI), economic freedom is represented by the Index of Economic Freedom (EFI) (The Heritage Foundation, 2022), which serves as a proxy for the actual level of economic freedom. An alternative index, the Index of Economic Freedom (IEF) (The Heritage Foundation, 2022), may be considered as a proxy, depending on the availability of recent and relevant data.

Furthermore, ethics is intertwined with corruption, as human capital, economics and ethics are inherently linked to corruption (Binder & Robeyns, 2019; Bryant & Javalgi, 2016; Dhami & Al-Nowaihi, 2019; Haeffele & Storr, 2019; White, 2019). This integration is reflected in the ETPI through the inclusion of the Corruption Perception Index (CPI) (Transparency International, 2022) as the fourth component, which serves as a proxy variable to measure the level of corruption in society. While these proxy variables (CPI and EFI) may have

shortcomings, our index is adaptable and allows for their replacement by more advanced tools as they become available.

At the same time, individuals in contemporary society operate within a framework of legal constraints. Legal mechanisms can sometimes act as barriers to ethical behaviour, as illustrated by Hodges (2015), who describes how different legal contexts directly influence the behaviour of companies and their employees. Further evidence comes from Agyemang et al. (2015), who conduct a statistical analysis of 39 African economies and show that legal frameworks shape the ethical behaviour of local firms, thereby influencing ethics as a whole. The complex relationship between legal constraints, ethics and human existence also extends to international relations, as highlighted by Boucher (2009). Assessing the level of human rights and its impact on ethics within each country separately is challenging. To address this, our study uses a proxy index, specifically one of the Human Rights Indices (Fariss et al., 2020; Our World in Data, 2022), chosen on the basis of data availability.

The final element of the Ethics Perception Index (ETPI) deals with one of the earliest ethical concepts - the ethics of responsibility (Jonas & Morris, 2013). This ethical framework, which dates from the time of Spinoza in the 17th century (Spinoza, 2018), focuses primarily on the interplay between humanity and nature (Jonas & Morris, 2013; Lord, 2010). Although the modern ethics of responsibility goes beyond these concerns, it places considerable emphasis on ecological and environmental issues (Jonas & Morris, 2013).

The ethics of responsibility include sustainable management of natural resources and a conscientious commitment to ecology and the environment, as exemplified by Norwegian practices (Norges Bank Investment Management & Government Pension Fund Global, 2023). These principles form the final components of the Ethics Perception Index (ETPI). The first component is represented by a proxy index that assesses a country's environmental status, known as the Environmental Performance Index (EPI) (Wendling et al., 2020). The EPI consolidates information from 278 indicators, including basic details such as country name, region and code, as well as ecological factors such as water quality, air purity and soil cleanliness. The EPI is divided into three main categories: Climate Change (38%), Environmental Health (20%) and Ecosystem Vitality (42%). In the Climate Change category, factors such as projected greenhouse gas emissions, air quality and climate change mitigation are critical, each with a specific weight. Similarly, Environmental Health assesses components such as air quality, sanitation and drinking water, while Ecosystem Vitality focuses on biodiversity, habitat and ecosystem services. The weighting given to each

component indicates its relative importance in contributing to the overall assessment of a country's environmental performance.

The second component is a proxy index, specifically the parameter of natural resource depletion, expressed as a relative value as a percentage of GDP (United Nations Development Programme, 2021b). Together, these indicators serve as the final components of the ETPI National Ethics Index.

The development of a quantitative algorithm for assessing moral-ethical progress is crucial, and this research introduces the Ethics Perception Index (ETPI) as a comprehensive metric that incorporates information ethics, education ethics, economic freedom, corruption perceptions, legal constraints and the ethics of responsibility. Adaptable to future developments, the ETPI addresses current challenges and enriches understanding of the complex relationship between communities and ethics. Information ethics significantly influences societal educational processes, and the ETPI tracks trends in educational ethics and serves as a valuable measurement tool. Furthermore, within the ETPI, information ethics is closely linked to human capital ethics, corruption and economics. Finally, the ethics of responsibility, which emphasises the interplay between humanity and nature, contributes to the final components of the ETPI. The Environmental Performance Index (with the Natural Resource Depletion proxy index) serves as the key indicator, providing a holistic assessment of a country's ethical responsibility and environmental performance.

Methodological Framework and Formulas for ETPI Estimation, Index Rescaling, and Regional-National Linkages

The standard method of calculating the ETPI index involves summing all six positive scale components (where a higher value indicates a better situation in a country) of X from formula (1), adding the rescaled natural resource depletion indicator using formulae (3) and then (4) to ensure a positive scale. The resulting sum of the six plus one (seven components) is then divided by seven, similar to an arithmetic mean. Formula (1) ensures that no positive scale component exceeds 100% for any country, while guaranteeing a 100% estimate for each component for the best performing country in a given period (formula (2) is useful for the indices that are components of the ETPI and can have negative values). Formulas (3) and (4) apply a similar procedure to the negative scale component of natural resource depletion (where a higher value indicates a worse situation in a country). If any component of the ETPI index is substituted in future studies, this study recommends using the same approach to

rescale the positive and negative scale components based on the meaning of the specific substitute component. This straightforward estimation of the ETPI ensures transparency and simplicity, while the development of more complex indicators to measure ethics at the national level could be a promising avenue for future research in this area.

However, this study refrains from assigning different weights to the components of the ETPI index, making modifications or developing an inequality-adjusted ETPI index. Such adjustments, similar to those made to the Human Development Index (HDI) by indices such as the IHDI (Alkire & Foster, 2010; Foster et al., 2005; Kovacevic, 2010) or similar inequality adjustments to indices based on the methods proposed by Atkinson (1970), are beyond the scope of this research. These aspects could be explored in future research efforts in this area.

The ETPI index has seven components. Six components have a positive scale. The higher the original index value, the better the situation is.

Such positive-scale components are:

- ✓ The Corruption Perception Index (Transparency International, 2022);
- ✓ The Economic Freedom Index (Fraser Institute, 2022) [a more frequent substitute is IEF (The Heritage Foundation, 2022)];
- ✓ The Education Index (United Nations Development Programme, 2021a, 2022);
- ✓ The Human Development Index (UNDP, 2020)[2];
- ✓ The Human Rights Indexes (Fariss et al., 2020; Our World in Data, 2022);
- ✓ The Environmental Performance Index (Conrad & Cassar, 2019; Wendling et al., 2020).

Let X be one of these six indices, then the overall equation is:

$$X_{i,t}^{RG} = \frac{100\% * X_{i,t}^{LD}}{\max(X_t^{LD})} \quad (1)$$

Notes: X – a positive scale component (CPI, EFI, EI, HDI, HRI, EPI); LD – means to the last date known by t; t – means a specific time for evaluating the index (for example, the year 2021); i – means specific country [or region]; 100%3 means the necessity to reproduce the results in comparable percentages for all indicators (if some value of 0.9 is 90% [not 0.9%],

[2] These data are available only up to March 30, 2022 [i.e., the date of the final check for the data updates for this paper].

[3] The actual output of indices might be different. For example, the economic freedom index has a scale of 6.42, meaning 6.42%, while HDI and Education Index have scales of 0.122, representing 12.2%. In our example, researchers should either divide by 100 economic freedom index (and similar indices) or raise it to 100 HDI, education index, and similar indexes before the analysis. All components of the ETPI index should have a comparable scale. The rising number of substitute indices for the parts of the ETPI demand researchers to be careful in selecting the scales.

then all indices should have a similar scale before the analysis); Max means the maximum value for a specific period t [for the last date (LD) known].

However, it is essential to note that component t becomes crucial in estimating the moral-ethical recovery and resilience potential. The primary ETPI index shows the ethics condition by the last date known (LD), i.e., the analysis date.

At the same time, resilience and recovery potentials are dynamic (not static) components. Therefore, t becomes a significant parameter.

In addition, this study explains the pattern using the human rights index [HRI] (Fariss et al., 2020; Our World in Data, 2022), and those authors (in both citations) rescaled the 50% value of this index with zero, meaning that some countries can receive negative values of this index. Such a shift in scales does not prevent applying the usual formula (1), because negative values just decrease the nominator of the final index. At the same time, this shift can provide only small discrimination in later aggregating of the ETPI index (which does not change the overall results significantly for ordinal measurements [not cardinal4]).

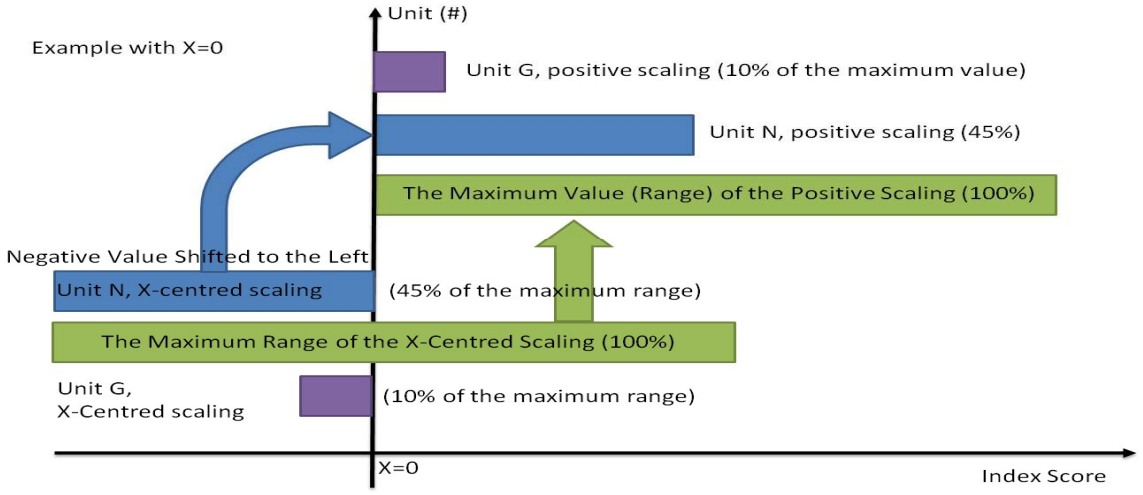
However, the application of the ETPI for estimating the recovery potential and resilience requires a precise estimate of the ETPI index. The proper method for indexes with negative minimum scales is:

$$IHRI_{i,t}^{RG} = \frac{HRI_{i,t}^{LD} - \min(HRI^{*})}{\max(HRI^{*}) - \min(HRI^{*})} \quad (2)$$

Notes: $IHRI_{i,t}^{RG}$ is the human rights index [or any potential substitute for any component of the ETPI that may have negative values] to apply to the formula (1); $HRI_{i,t}^{LD}$ – is the original human rights index, $\max(HRI^{*}) - \min(HRI^{*})$ is the theoretical HRI range (originally scaled -4 to 6; the original minimum and maximum values for each period are preferred for the ETPI), Min means minimum, and max means maximum values.

[4] This small discrimination does not shift the order significantly (i.e., country number five will remain country number five in the rating), but it changes the cardinal result. Compare (80+20)/2=50 with (80-30)/2=25, and (20+20)/2=20 with (20-30)/2=-5. 50>20; 25>-5 (the order for the ordinal measures is the same), while the values are different.

Figure 13 The Principle of Rescaling the X-Centred Indexes for the ETPI Estimation



Source: Own processing

The former version of the ETPI estimation, with HRI potentially assessed by formula (1), provided penalties in statistical discrimination for the countries with severe violations of human rights (negative values of the human rights score index in the case of the zero-centred scale variant). Formula (2) was applied de facto when creating the preliminary version of the ETPI (these researchers used HRI positive-scaled (Shemetev, 2022)). Annex 2 provides a detailed discussion of the application of formulae (1) and (2) in different scenarios.

At the same time, one component of the ETPI index has a negative scale. The higher the original index value, the worse the situation is. For example, the index of natural resource depletion [in the percentage of the output] (United Nations Development Programme, 2021b; World Bank, 2022a) has a negative scale [NRD is its abbreviation name]. A higher index values mean a worse situation with the natural resources in a particular country, region, or society. Then, the formulas to reprocess this index are next:

$$NRDh_{i,t} = 100\%*(1\text{-}NRD(\%\ of\ GNI)_{i,t}) \quad (3)$$

$$NRDh_{i,t}^{RG} = \frac{100\% * NRDh_{i,t}^{LD}}{\max(NRDh_{t}^{LD})} \quad (4)$$

Notes: $NRDh_{i,t}$ is a rescaled [to positive scale] NRD index; i is a specific country or territory; t is a particular time; $NRDh_{i,t}^{RG}$ is the final rescaled by the formula five NRD index for the ETPI estimation; $NRDh_{i,t}^{LD}$ is the $NRDh_{i,t}$ index estimated for the last date (LD); max means the maximum value for a specific period t [for the last date (LD) known].

It is noteworthy that this study does not recommend mixing the indexes for the potential time-series estimation (e.g. avoid mixing two human rights indices for time series analysis

(see Annex 2)); which can, moreover, create bias in data due to methodological changes in the main indexes of the ETPI. For example, EPI [environmental performance index] (one of the seven components of the ETPI) can have the highest time series bias among all the indices.

The research to reduce this ETPI time-series bias is the direction of the future improvement of the ETPI index. We have obtained the most necessary of data to date. At the same time, no significant time-series bias in the regional/local ETPI (REPTI) index exists due to the same methodology, indicators, and approach. On the contrary, the national-level ETPI contains too many complex variables. That is why some distortion in the national-level final ETPI result can occur.

An additional question on data updates can arise in this case. For example, some indexes (HRI, EI, HRI, NRD, and EFI) have low frequencies in updates. The ME-matrix (missing data evaluation matrix [ME stands for Moral-Ethical]) is a designed approach to deal with this problem.

Table 1 The Designed ME-Matrix Principle to Process the Evaluation of the Missing Data

Indicator	2017	2018	2019	2020	2021
CPI					LD
EFI<-IEF					LD
EI			LD		
HDI			LD		
HRI			LD		
NRD			LD		
EPI			LD	LD	
	The data are missing (they will appear as soon as they are available; the ETPI values will become updated at that point)				
	The data are valid for this year				
LD	The last available data for the calculation of the index; LD – latest date when data are available				

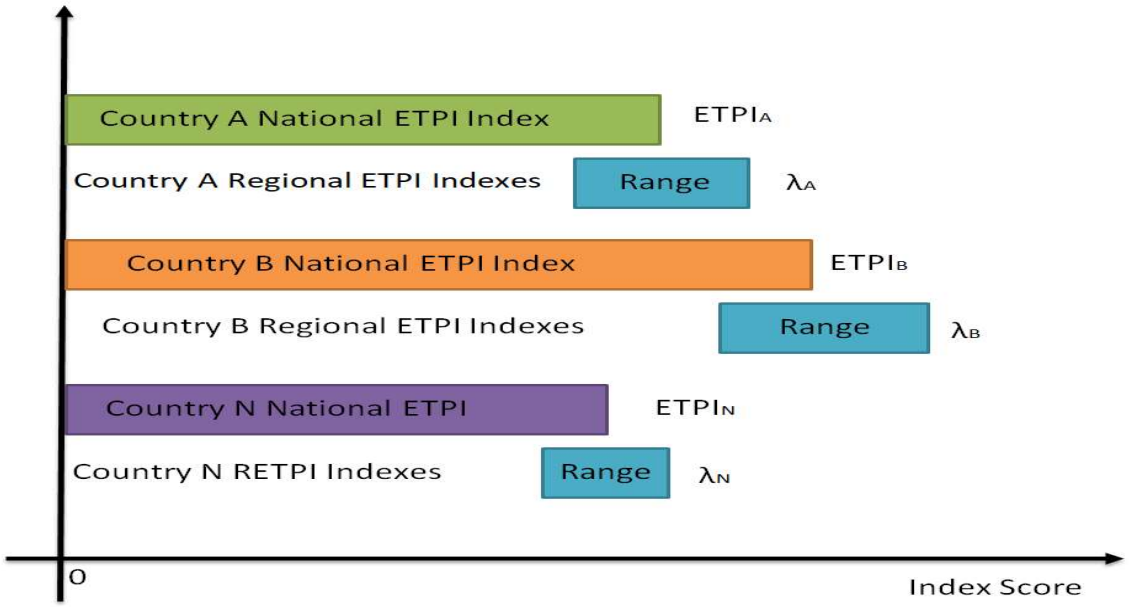
Source: Own processing

Notes: CPI – corruption perception index. EFI – economic freedom index; IEF – index of economic freedom (a more frequent substitute of the EFI); EI – education index; HDI – human development index; HRI – human rights index; NRD –natural resource depletion; EPI – environmental performance index.

Moreover, the updates of the missing values make the ETPI index values add precision. Similar updates with long intervals are standard even, for such popular indicators as GDP (the data will arrive to statistical offices and international agencies within the next five years after the year of GDP; these data update the actual values of GDP and similar indicators).

An additional essential element of the analysis is the regional-national interconnection. This paper offers the concept of the regional ETPI rescaling by the national ETPI. The scheme below represents this concept even better.

Figure 14 The Principle of Rescaling the Regional ETPI to the National Level ETPI



Source: Own processing

RETPI is a per capita internet-revealed interest in ethics that are detectable through search queries and online interest in ethics (Shemetev, 2022, pp. 88–91) [The manual estimation of RETPI is described in the following section]. Thus, it creates an amplitude among all of a country's regions (or municipalities, in the case of estimating the local-level RETPI). This amplitude forms deviations among the original national ETPI index within some amplitude λ. The higher the national ETPI is – the higher the regional amplitude (λ) is (due to the higher potential in terms of ethics). For example, the most ethical region in the least ethically-developed country, can have extremely poor ethics compared to the ethically poorest areas of the countries with the highest ethical standards.

The additional method is the amplitude (λ) normalisation by a constant; we estimate that +/- 10% borders are sufficient primary borders (i.e., it can be any other justified value). This justification follows the expert evaluation of the internet search data and national proxy variables related to ethics. Such an approach creates an ordinal measure of ethics development within all countries' regions with a cardinal quantitative basis (all the components have a solid quantitative background).

The better estimation of λ for each case is a topic of future research in this field, so that λ will receive a more robust quantitative basis. Equation 7 provides the understanding of implementing the first model for the ETPI/RETPI rescaling principle:

$$\mathrm{R}ETPI\_A_{c,i,t}^{RG} = ETPI_{c,t}^{Y} * \left(1 + \left(\frac{\left(RETPI_{c,i,t}^{Y} - \left(\frac{RANGE_{RETPI}}{2} \right) \right)}{\left(\frac{RANGE_{RETPI}}{\phi_{RETPI}} \right)} \right) / 100 \right) =$$

$$= ETPI_{c,t}^{Y} * \left(1 + \left(\frac{\left(RETPI_{c,i,t}^{Y} / 100 - \left(\frac{RANGE_{RETPI} / 100}{2} \right) \right)}{\left(\frac{RANGE_{RETPI} / 100}{\phi_{RETPI}} \right)} \right) \right); \quad (7)$$

$$RETPI_{c,i,t}^{Y} \in [0;100]; \phi_{RETPI} \neq 0; RANGE_{RETPI} \neq 0$$

Notes: $\mathrm{R}ETPI\_A_{c,i,t}^{RG}$ is the adjusted RETPI to the global ETPI; c is a specific country (or another higher-level territory unit); i is a particular region or municipality; t is a time variable; $RETPI_{c,i,t}^{Y}$ is a RETPI index; Y means annual basis (for example, RETPI index for the year 2021 [not monthly, weekly, or daily RETPI indicator]); ϕ_{RETPI} is the number of cuts depending on λ (for example, ϕ_{RETPI} = 20 will create the leverage of five for the global ETPI value; the value of ϕ_{RETPI} = 5 will make the leverage of 20 [20 times decrease in the transmission of the percentages of the original RETPI to the globally-rescaled RETPI]); $RANGE_{RETPI}$ is the maximum range of values of the RETPI index ($RETPI_{c,i,t}^{Y} \in [0;100]$ in the classical index). The value 100 is rescaling the original index to the proper percentage value (but, there is no need in this operation if the original $RETPI \in [0;1]$).

Such an approach, in Equation (7) will diminish the rescaled ETPI for regions with the actual RETPI below half of the maximum value by λ, and increase the value of the λ for the areas with the actual values of RETPI above the mean value.

At the same time, to our knowledge, no better approach exists until now. This study estimates that even such classical indicators as GDP can create significant bias in the research. ETPI can be a new tool for quantitative measurement of the moral and ethical background, resilience, and recovery potential from a socio-economic perspective. ETPI can potentially be a substitute for measuring regional, national, and international growth.

Comprehensive Guide: Manual Estimation of Regional Ethics Trends Using RETPI and Google Search Data

The RETPI index is derived from the ETPI to estimate ethics at regional and local levels, and consists of components such as the CPI, EFI, EPI, NRD, EI, HDI and HRI. While these components can only be estimated at the national level, limiting the ETPI to the national level, a manual method can be used to calculate the RETPI index. The RETPI method assumes that data is obtained via the internet, specifically by tracking Google search trends as a proxy for

ethics-related queries globally (other similar search engines may be used depending on research interests). A unique algorithm in R is designed to collect data from Google searches, providing proxy and latent variables. The algorithm converts the data into a matrix, allowing for time series analysis and visualisation through a variety of plots. Modifications to the R code enrich the possible operations on the data. Here's a step-by-step guide to manually estimating the RETPI:

1) Identify Relevant Search Queries:

For each country, identify keywords that are closely related to ethics. Use specific terms such as 'ethics' or a curated set of potent ethics-related search queries, taking into account language and cultural nuances. Tools such as 'Answer The Public' (NP Digital, 2024) are useful for constructing ethics-related search queries tailored to specific territories; this tool provides insights into how people use different terms within specific countries.

2) Obtain Search Query Statistics:

Use statistical tools such as Google Trends (Google, 2024), WordsStat (Yandex, 2024) or similar tools to gather statistics for the selected search queries. Make sure that these tools provide regional and/or local data for each country.

3) Regional Mapping:

Collect statistics for the selected countries and their regions from the selected sources. Use statistical software to map the names of regions from search engines to actual geographic areas within the countries of interest.

4) Data Analysis:

Use statistical software to estimate and visualise which regions show the most interest in ethics-related topics based on search queries. Select appropriate statistical methods based on research objectives and goals.

5) Ranking of Regions:

Create a ranking of regions or local areas based on their interest in ethics-related search queries. This ranking reflects the relative intensity of interest in ethics issues in different regions.

6) Analyse Trends Over Time:

Explore trends in public interest in ethics by examining how interest changes over time in each community and how it relates to the national picture. Use statistical tools to perform time series analysis.

7) Integration with RETPI and ETPI:

Merge the results of the RETPI with the national index of the ETPI (e.g. using formula 7). This integration provides a comprehensive proxy assessment of the state of ethics in countries, regions and local communities.

This step-by-step guide provides specific methods for researchers or analysts to manually estimate the RETPI. The RETPI serves as a qualitative, ordinal measure that captures trends in the population's interest in ethics and provides a valuable regional proxy for assessing the relative interest in ethics within regions of a country.

Application and Implications: Assessing Regional and National Well-being Through Ethical Growth Analysis

The core limitation to this research is the data availability, but the primary data are sufficient for the sources to estimate the ETPI and RETPI indexes (Shemetev, 2022). In addition, the mentioned research contains the justification of each component of the ETPI and RETPI indexes.

Therefore, the complete indexes create the next model:

$$ME_{resilience} = \frac{\left(\frac{ETPI_t^M - ETPI_{t-1}^M}{ETPI_{t-1}^M} - \frac{ETPI_t^R - ETPI_{t-1}^R}{ETPI_{t-1}^R} \right)}{\left(\left| \frac{ETPI_t^R - ETPI_{t-1}^R}{ETPI_{t-1}^R} \right| \right)} \quad (8)$$

Notes: t – time; M – municipality [or regional-level territory unit]; R – region at a higher hierarchical level than municipality/region [M] (up to the country level); ETPI – Ethics Perception Index [so that national level estimator is ETPI and regional/municipal level estimator is RETPI] (Shemetev, 2022); $ME_{resilience}$ – moral-ethical [ME stands for Moral-Ethical] regional resilience index.

$$ME_{recovery} = \frac{\left(\frac{ETPI_t^M - ETPI_{t-1}^M}{ETPI_{t-1}^M} \right)}{\left(\frac{ETPI_t^R - ETPI_{t-1}^R}{ETPI_{t-1}^R} \right)} \quad (9)$$

Note: As before, except for $ME_{recovery}$ – moral-ethical regional recovery potential index.

Therefore, the following four situations are possible for the regions and municipalities:

- ✓ $ME_{resilience} \geq 0; ME_{recovery} \geq 0$ indicates good resilience and high recovery potential.
    - These territories can develop faster and decline slower than the regional/national/international growth rate in prosperous times and times of crisis, respectively

- ✓ $ME_{resilience} < 0; ME_{recovery} < 0$ means poor resilience and low recovery potential.
  - It is a typical pattern for territories that decline in prosperous times.
- ✓ $ME_{resilience} \geq 0; ME_{recovery} < 0$ means good resilience and low recovery potential;
  - These territories can grow in regional/national/international crisis times but potentially can have troubles in prosperous times.
- ✓ $ME_{resilience} < 0; ME_{recovery} \geq 0$ means poor resilience and high recovery potential.
  - These territories are slow in **growth** in prosperous times.
  - These territories rapidly head for recession in times of crisis.

Thus, the essence of the analysis of recovery and resilience is in comparing the inferior with the superior level territories. For example, it can be a comparison of municipalities (inferior level) within a region or nation (superior level), or it can be a comparison of a region with national trends.

Another alternative is the comparison of the country with the international community (other countries in a specific area or the whole world). The additional variant compares municipalities or regions in the international community (for example, to verify how New York City looks within all the global cities).

This paper provides an example of comparing regions within a specific big mediocre country (in terms of the socio-economic development), namely Russia (because it has continually attracted the attention of the whole world within the last decade), and a typical Central European country, namely the Czech Republic (because of its national background, in terms of ethical resilience and recovery potential).

Such a wide variety of potential applications of the ETPI recovery and resilience concepts provides practical tools for a profound analysis of social and economic development within ethical growth.

RESULTS AND DISCUSSION

Analysis of the Ethics Perception Index (ETPI): Global and Regional Perspectives

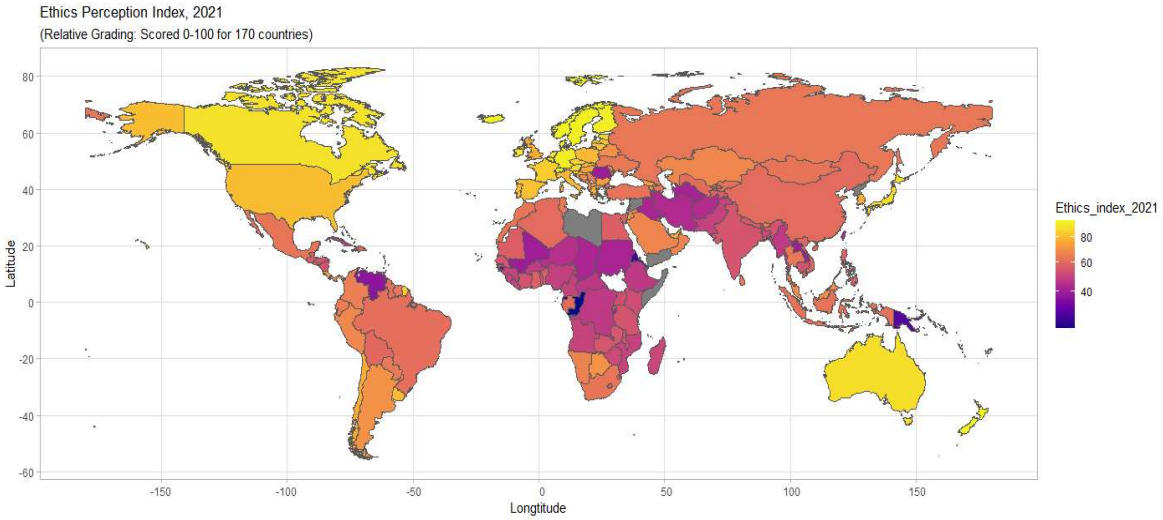
The ME [ME stands for Moral-Ethical] indexes represented in this study have similar mathematical apparatus to the classical regional recovery model (Giannakis & Bruggeman, 2020; Lagravinese, 2015), which is designed to capture employment trends. The classical index does not capture the moral-ethical side of the economy.

The actual economic level (including employment) can be unstable, while the moral-ethical potential creates a long-term stable basis for recovery and resilience (Stiglitz, 2005, 2016).

On the contrary, the suggested ME model is the only quantitative method to estimate the moral-ethical economic potential of recovery and resilience, to the best of our knowledge.

Figure 15 represents the national-level ETPI index (2021). Annex 1 contains a complete table with values of the index (and ranks of countries).

Figure 15 Ethics Perception Index (ETPI), 2021



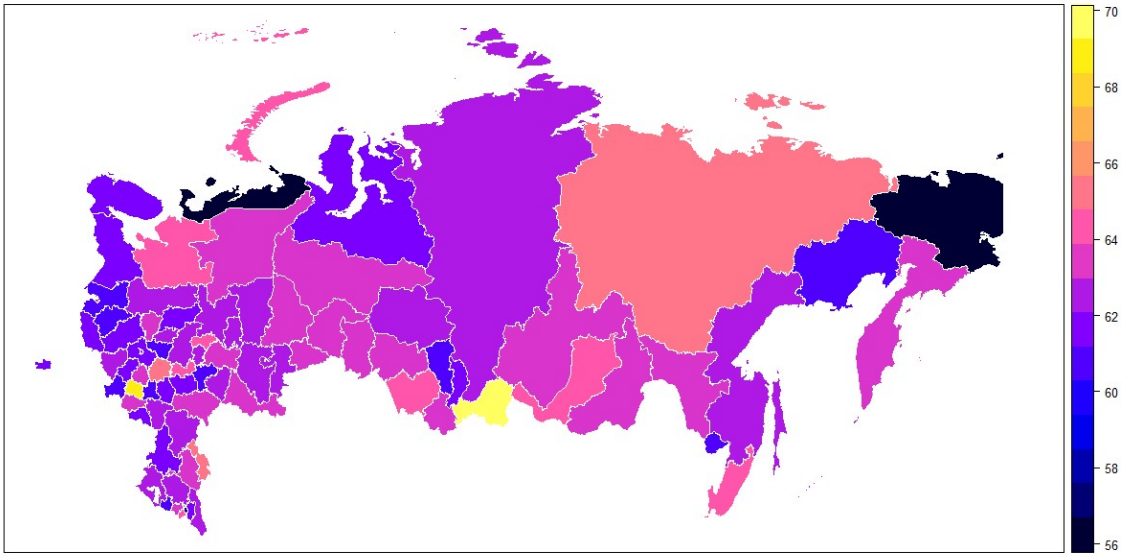
Source: Own processing

The top-10 countries in terms of ETPI are Luxembourg (#1), Denmark (#2), New Zealand (#3), Iceland (#4), Norway (#5), Switzerland (#6), the Netherlands (#7), Sweden (#8), Finland (#9), and Germany (#10). The Czech Republic has #20 in the rating (with France (#21) and Slovenia (#19) as neighbours), the United States is #25 (while Canada is #12), while Slovakia is #31 in the rating. These (and similar) countries had the best ethical performance situation in 2021.

Some countries are in the middle of the rating. Russia, for example, has #84 in the ETPI rating. The significant ethical problems do not give this indicator for growth (judging by proxy variables within the ETPI concept).

At the same time, regional-national interrelation is an integral part of the rating.

Figure 16 Regional Ethics Perception Index (RETPI) Rescaled to the Global ETPI in Russia [Example Country], 2021[5]



Source: Own processing

The paradox of Figure 16 is that the highest RETPI rating is in the Russian Tuva region, which has a high crime rate (Atkinson, 2017; Chigarskych, 2021; UNPO, 2006). At the same time, it has the highest per-capita interest in morality and ethics (judging by its inhabitants' internet activities and interests). Thus, this region has the highest motivation in knowing more about ethics and having a population that is becoming increasingly more ethical. This pattern has been stable in the Tuva region in the long run since 2017.

Notwithstanding, Russia is a mediocre country in terms of moral and ethical social-economic development. The average global value of ethics was roughly 63.1 in the period of 2020-2021 (removing six distant lowest6 outliers [North Korea, Somalia, Libya, Syria, South Sudan, and Yemen] due to data insufficiency). The global average is roughly similar to the average level of ethics in Russia in 2017-2021.

[5] The pattern for the Chukotka and Nenets regions is beyond the proper RETPI estimation because of the internet unavailability in these regions. The number of internet accesses is minimal (in the per capita estimation), and transmitting information by physical devices (like flashcards) can be a cheaper and more accessible tool for data transmission in these regions.

[6] Judging by the small amount of data that are available for the ETPI index estimation in these countries.

Figure 17 Regional Ethics Perception Resilience and Recovery Potential in Russia [example country], 2020-2021

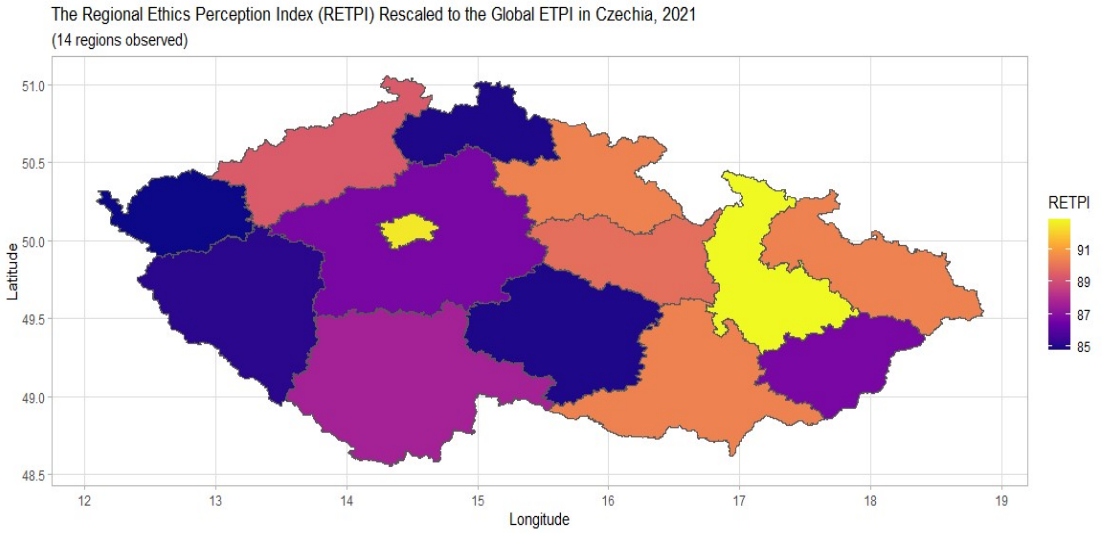
Source: Own processing

Figure 17 represents the moral and ethical socio-economic resilience and recovery potential for Russia (example country) in 2021. The negative global trends of the ETPI index, due to such crisis factors such as pandemics and lockdown, made most Russian regions non-resilient (that figure shows that the majority of Russian regions are non-resilient to negative global trends).

The blue regions in Figure 17 can create a slow ethical economic growth in times of prosperity, while quickly losing this progress (in accumulated level of ethics) in the times of shocks and crises. The grey regions develop ethical economies in times of crisis, but can have troubles in periods of prosperity.

Therefore, the blue regions should be the primary policymaking targets for the crisis management measures to deploy in times of shock. In contrast, the gray areas will demand significant attention in prosperous times.

Figure 18 Regional Ethics Perception Index (RETPI) Rescaled to the Global ETPI in the Czech Republic, 2021



Source: Own processing

The Czech Republic has good RETPI values. Year 2021 made the overall interest in ethics significantly higher than the average global per-capita level. Therefore, the RETPI is higher than the ETPI for most regions. This rapid jump in the development of ethics provides a solid basis for stable moral-economic growth in the future, thus granting long-term prosperity for the country. The relatively low economic prosperity indicators prevent the ETPI indicator from increasing significantly.

At the same time, regions push the development of the Czech Republic forward in terms of social-economic growth (which is significantly more stable than pure economic growth measured by GDP (Stiglitz, 2001, 2005, 2016)).

Beyond Economic Growth: Exploring the Role of Moral-Ethical Growth in Regional and National Well-being

The current state of knowledge has to implement economic growth to estimate the level of development of regions and countries. The proxy variable for this indicator is GDP (PC) and eleven other similar indicators (such as GRP (PC), National Income, GNP, and others).

Joseph Stiglitz, for example, argues that such an approach is flawed (Stiglitz, 2005, 2016). He argues that moral-ethical growth is the primary source of national and regional prosperity, rather than economic growth (measured by GDP and similar parameters).

Moreover, moral issues are an essential part of decision-making and policymaking. For example, moral-ethical issues were at the core of the implementation of crucial decisions to overcome the 2008-2011 financial crisis (Shiller, 2008; Shiller & Pozen, 2009).

Another example is a long-lasting moral dispute on manipulations, breaking with rational decision-making on regional and macroeconomic scales (Akerlof & Shiller, 2015; Ariely & Haefeli, 2015). Sellers unethically cheat the population by marketing and similar tools with the message of consuming more, thus, stimulating more GDP (through production and sales). It can lead to formal economic growth with an actual ethical decline.

Similar studies declare that economic agents behave in a "good" way, but only if the chances of being caught and punished are high (Dubner & Levitt, 2006; Levitt & Dubner, 2009). Therefore, purely inherent morality without proper estimation is almost useless.

In conclusion, the literature review provides a solid foundation for our study of moral-ethical growth. By delving into the work of prominent economists such as Joseph Stiglitz, Amartya Sen and many others, we have identified the limitations of conventional growth indicators and recognised the broader dimensions of societal development. As we navigate through the existing literature, it becomes clear that there is an urgent need for innovative measurement tools to accurately measure moral and ethical growth. This need is the background to our novel indices (Shemetev, 2022), the Ethics Perception Index (ETPI) and the Regional Ethics Perception Index (RETPI). In the following sections we present these indices and explain how they address the identified gaps and contribute to a more comprehensive understanding of moral and ethical growth at both national and regional levels.

CONCLUSION

In conclusion, our study seeks to shed light on the often overlooked dimensions of societal progress by introducing the Ethics Perception Index (ETPI) and the Regional Ethics Perception Index (RETPI). By synthesising the insights of established economists such as Joseph E. Stiglitz, we have highlighted the critical importance of moral-ethical growth for holistic development. The ME indices provide a quantitative framework that goes beyond traditional economic metrics to offer a nuanced understanding of the moral and ethical fabric of a society.

These concepts find their empirical verification in the global and regional data. The applicability of this method to the local data provides an additional benefit to this economics toolbox.

Like all research, however, our study has its limitations. Reliance on quantitative data may not capture the full range of moral and ethical nuances, and cultural differences may pose challenges to universal application of our indices.

Looking forward, future research could explore qualitative methods to complement the quantitative aspects and delve deeper into the intricate tapestry of moral-ethical growth. In addition, refining our indices to account for cultural context and evolving societal norms could enhance their applicability across different regions.

Despite these limitations, our work makes a significant contribution to the burgeoning field of ethical economics. The systematic approach of our indices fills a critical gap in existing methodologies and provides a valuable tool for policymakers and researchers alike. As we continue to refine and expand our understanding of moral-ethical growth, we envision a future where societal progress is measured not only in economic terms, but also in the richness of its ethical fabric, ensuring more equitable and sustainable development for all.

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APPENDIX 1. The Ethics Perception Index, 2017-2021 (by 2022)

ISO3	Country	ETPI 2017	ETPI 2018	ETPI 2019	ETPI 2020	ETPI 2021	Rank 2017	Rank 2018	Rank 2019	Rank 2020	Rank 2021
AFG	Afghanistan	45.78	45.64	44.27	45.24	44.45	159	159	160	158	159
AGO	Angola	49.7	47.87	48.8	49.17	49.78	154	157	150	147	144
ALB	Albania	70.93	70.14	68.4	68.56	68.09	54	56	59	59	59
ARE	United Arab Emirates	77.1	76.52	76.84	76.49	76.23	36	36	33	35	38
ARG	Argentina	70.06	70.07	70.86	70.43	69.69	58	57	52	54	53
ARM	Armenia	69.35	68.8	69.41	70.93	71.1	61	62	57	51	49
AUS	Australia	87.78	87.34	88.16	88.29	87.56	14	15	13	13	14
AUT	Austria	86.63	86.37	87.45	87.35	87.08	17	17	15	15	16
AZE	Azerbaijan	63.94	61.76	61.19	61.76	61.85	88	100	96	92	92
BDI	Burundi	42.67	40.94	42.17	42.15	42.26	167	169	164	164	164
BEL	Belgium	87.67	87.51	87.74	88.02	87.69	15	14	14	14	13
BEN	Benin	57.46	56.98	56.08	55.99	56.82	125	127	119	119	116
BFA	Burkina Faso	51.95	48.08	48.37	47.86	48.13	144	156	151	153	152
BGD	Bangladesh	51.49	50.74	51.53	51.61	51.6	146	147	139	139	138
BGR	Bulgaria	73.5	73.14	72.72	73	72.67	48	49	47	46	46
BHR	Bahrain	68.38	67.59	68.69	68.59	69.13	63	69	58	58	57
BHS	Bahamas	73.34	73.34	72.01	71.98	72.13	49	48	48	48	47
BIH	Bosnia and Herzegovina	66.34	66.28	67.32	67.2	67.22	77	74	63	63	63
BLR	Belarus	71.11	70.58	69.62	70.47	69.35	53	53	56	53	56
BOL	Bolivia	63.19	61.24	59.57	59.59	59.39	92	104	104	106	106
BRA	Brazil	62.68	61.09	60.35	61.06	60.98	96	105	99	98	98
BRB	Barbados	74.11	74.24	74	73.68	74.38	45	45	42	43	41
BRN	Brunei Darussalam	75.9	73.9	72.93	73.06	63.29	38	46	45	45	80
BTN	Bhutan	67.54	68.35	68.02	67.77	67.13	72	64	61	61	64
BWA	Botswana	72.05	71.86	71.25	70.99	69.82	51	51	49	50	52
CAF	Central African Republic	45.32	45.46	47.25	47.63	46.97	161	160	156	154	157
CAN	Canada	89.45	89.08	89.13	89.07	88.49	13	13	12	12	12
CHE	Switzerland	92.07	92.29	92.43	92.28	92.06	6	5	6	6	6
CHL	Chile	78.07	77.25	76.8	76.9	76.6	31	33	34	33	34
CHN	China	61.59	60.62	59.74	60	60.28	106	108	103	104	103
CIV	Cote d'Ivoire	56.09	55.73	53.24	52.91	53.2	128	129	131	132	134
CMR	Cameroon	50.61	49.68	49.49	49.64	49.9	150	151	144	144	142
COD	Democratic Republic of the Congo	45.8	44.32	46.5	46.57	47.38	158	165	157	157	155
COG	Congo	24.78	22.14	20.58	20.54	20.87	180	180	180	180	180
COL	Colombia	66.67	65.77	64.63	65.19	64.98	74	79	73	73	73
COM	Comoros	58.03	57.37	55.29	54.33	54.45	122	122	122	128	125
CPV	Cabo Verde	67.94	68.81	66.14	66.12	66.11	70	61	68	70	70
CRI	Costa Rica	76.32	76.02	74.31	74.45	74.32	37	38	41	41	42

ISO3	Country	ETPI 2017	ETPI 2018	ETPI 2019	ETPI 2020	ETPI 2021	Rank 2017	Rank 2018	Rank 2019	Rank 2020	Rank 2021
CUB	Cuba	51.05	50.31	48.28	47.88	47.9	148	150	153	152	153
CYP	Cyprus	79.23	79.32	78.83	78.88	78.4	29	28	29	28	30
CZE	Czechia	83.82	84.12	84.92	84.66	84.46	20	20	20	20	20
DEU	Germany	90.86	90.74	91.38	91.23	91.04	9	9	9	9	10
DJI	Djibouti	50	49.43	48.32	48.7	49.69	153	153	152	150	145
DMA	Dominica	41.8	41.77	39.78	39.68	39.68	169	166	169	169	169
DNK	Denmark	92.36	92.57	93.57	93.83	93.7	5	4	3	1	2
DOM	Dominican Republic	64.55	64.09	61.45	61.17	60.93	85	84	94	97	99
DZA	Algeria	61.78	60.99	59.99	60.2	60.13	104	106	102	102	104
ECU	Ecuador	64.53	64.21	64.11	64.9	64.56	86	82	75	74	74
EGY	Egypt	58.89	58.73	56.69	56.54	56.78	117	115	116	118	118
ERI	Eritrea	28.64	28.37	26.74	26.31	27.05	178	177	178	178	178
ESP	Spain	79.58	79.55	80.4	80.47	80.75	27	27	25	25	24
EST	Estonia	85.62	85.79	86.63	86.83	86.71	18	19	18	17	17
ETH	Ethiopia	47.32	47.08	47.4	47.49	47.32	157	158	155	155	156
FIN	Finland	90.29	89.91	90.93	90.73	91.24	10	11	10	10	9
FJI	Fiji	63.51	63.08	60.54	60.73	69.44	90	90	98	100	55
FRA	France	83.13	82.9	82.77	82.99	83.23	21	22	21	21	21
GAB	Gabon	59.88	58.91	60.18	60.03	60.38	113	114	100	103	102
GBR	United Kingdom	89.72	89.59	76.51	76.43	76.41	11	12	35	37	37
GEO	Georgia	75.67	75.71	73.79	73.87	73.69	40	39	43	42	43
GHA	Ghana	59.77	59.32	56.89	57.45	57.38	114	112	115	114	113
GIN	Guinea	51.9	51.77	49.95	50.03	49.63	145	142	142	142	147
GMB	Gambia	53.77	55.15	54.05	54.61	54.98	136	131	128	126	121
GNB	Guinea Bissau	32.16	32.01	30.39	30.52	30.84	175	175	176	176	176
GNQ	Equatorial Guinea	28.32	27.05	24.07	24.04	24.2	179	179	179	179	179
GRC	Greece	75.25	75.08	76.03	76.62	76.59	42	42	38	34	35
GRD	Grenada	49.07	49.02	48.89	48.79	48.79	156	154	148	149	150
GTM	Guatemala	60.12	59.53	56.56	56.58	56.54	112	111	117	117	119
GUY	Guyana	62.59	62.67	61.62	61.61	61.45	97	91	93	95	96
HND	Honduras	57.32	57.18	55	54.77	54.37	126	125	124	124	127
HRV	Croatia	75.89	75.65	75.87	75.91	76.1	39	40	39	39	39
HTI	Haiti	51.39	51.66	49.91	49.82	49.87	147	145	143	143	143
HUN	Hungary	74.69	74.71	74.91	75.06	74.99	44	43	40	40	40
IDN	Indonesia	61.92	61.92	62.02	61.68	61.76	103	98	90	93	93
IND	India	54.77	54.4	54.49	54.46	54.43	133	133	127	127	126
IRL	Ireland	89.59	89.95	90.19	89.79	90.15	12	10	11	11	11
IRN	Iran	61.18	59.7	44.59	44.07	43.73	109	110	158	160	160
IRQ	Iraq	41.88	41.41	41.91	42.03	42.36	168	168	166	165	163
ISL	Iceland	93.45	93.88	94.12	93.48	93.33	2	1	1	3	4
ISR	Israel	77.69	77.63	77.16	77.24	77.01	34	32	32	32	33
ITA	Italy	77.79	78.11	78.21	78.36	78.99	32	31	30	30	28

ISO3	Country	ETPI 2017	ETPI 2018	ETPI 2019	ETPI 2020	ETPI 2021	Rank 2017	Rank 2018	Rank 2019	Rank 2020	Rank 2021
JAM	Jamaica	68.18	67.44	66.15	66.22	66.26	66	70	67	69	69
JOR	Jordan	68.95	68.47	68.12	68.11	67.85	62	63	60	60	60
JPN	Japan	85.57	85.93	86.96	87.18	87.11	19	18	16	16	15
KAZ	Kazakhstan	67.17	66.06	65.53	66.79	66.83	73	78	72	66	65
KEN	Kenya	53.2	52.74	52.05	52.52	52.26	138	139	137	136	137
KGZ	Kyrgyzstan	62.34	62.61	61.65	61.85	61.3	99	94	92	90	97
KHM	Cambodia	54.78	53.83	52.86	52.91	53.2	132	134	134	133	135
KOR	Korea, South	73.78	74.32	76.11	76.33	76.55	46	44	37	38	36
KWT	Kuwait	68.03	67.32	53.43	54.07	54.34	69	71	130	129	128
LAO	Laos	40.98	40.53	40.44	40.08	39.96	170	170	167	167	167
LBN	Lebanon	62.13	61.62	59.28	58.83	58.6	102	101	105	107	109
LBR	Liberia	52.7	52.8	49.05	48.89	49.06	140	138	147	148	149
LCA	Saint Lucia	71.39	71.18	69.8	69.78	69.63	52	52	55	55	54
LKA	Sri Lanka	66.62	66.81	64.1	64.19	63.73	75	72	76	76	79
LSO	Lesotho	55.56	55.54	54.93	55.24	54.57	129	130	125	122	124
LTU	Lithuania	82.67	82.22	81.96	82.25	82.41	22	23	22	22	22
LUX	Luxembourg	92.77	92.73	93.97	93.81	93.96	3	3	2	2	1
LVA	Latvia	81.67	81.51	80.82	81.12	81.47	25	24	24	23	23
MAR	Morocco	64.97	65.59	63.06	62.89	62.69	81	80	83	86	87
MDA	Moldova	64.24	63.8	63.1	63.83	64.2	87	88	82	77	76
MDG	Madagascar	52.24	51.39	50.27	51.01	50.69	142	146	141	140	140
MDV	Maldives	61.46	60.76	58.91	61.65	60.93	108	107	108	94	100
MEX	Mexico	62.59	62.1	62.16	62.64	62.52	98	97	89	87	89
MKD	North Macedonia	69.91	70.22	70.04	69.72	70.19	59	55	53	56	51
MLI	Mali	42.95	41.54	40.03	39.96	39.76	166	167	168	168	168
MLT	Malta	68.11	67.66	66.61	66.49	66.73	67	67	65	67	66
MMR	Myanmar	50.06	50.33	47.45	47.3	47.46	152	149	154	156	154
MNE	Montenegro	73.58	73.35	71.02	71.1	71.53	47	47	51	49	48
MNG	Mongolia	65	64.81	61.41	61.43	62.43	80	81	95	96	90
MOZ	Mozambique	50.92	49.59	49.26	49.36	49.67	149	152	146	146	146
MRT	Mauritania	58.31	58.09	56.54	56.77	56.81	119	117	118	115	117
MUS	Mauritius	38.1	37.92	36.95	37.02	37.18	174	174	173	173	172
MWI	Malawi	53.92	53.71	52.49	52.5	53.31	135	135	135	137	133
MYS	Malaysia	70.37	69.64	69.9	69.59	69.01	57	58	54	57	58
NAM	Namibia	68.37	68.09	65.8	65.89	65.8	64	65	70	71	72
NER	Niger	45.27	44.65	44.54	44.98	45.2	163	162	159	159	158
NGA	Nigeria	52.72	52.03	48.89	48.66	48.71	139	141	149	151	151
NIC	Nicaragua	59.59	57.29	54.74	54.62	54.12	115	124	126	125	129
NLD	Netherlands	91.18	91.22	92.24	92.12	92.04	8	8	7	7	7
NOR	Norway	92.59	92.26	93.14	93.04	93.17	4	6	5	5	5
NPL	Nepal	55.05	54.72	55.95	55.79	55.2	131	132	120	120	120
NZL	New Zealand	93.61	93.27	93.49	93.44	93.36	1	2	4	4	3
OMN	Oman	67.7	67.62	66.38	66.9	66.6	71	68	66	65	67
PAK	Pakistan	50.58	50.43	50.54	50.28	49.27	151	148	140	141	148

ISO3	Country	ETPI 2017	ETPI 2018	ETPI 2019	ETPI 2020	ETPI 2021	Rank 2017	Rank 2018	Rank 2019	Rank 2020	Rank 2021
PAN	Panama	73.08	73	71.07	70.84	70.8	50	50	50	52	50
PER	Peru	69.61	69.02	67.44	67.71	67.32	60	60	62	62	61
PHL	Philippines	61.74	61.32	58.44	58.49	58.23	105	103	109	109	110
PNG	Papua New Guinea	29.29	28.11	27.72	27.51	28.15	177	178	177	177	177
POL	Poland	79.52	79.05	79.02	78.79	78.85	28	30	28	29	29
PRT	Portugal	79.09	79.08	79.1	79.09	79.3	30	29	27	27	27
PRY	Paraguay	64.57	64.15	63.43	63.57	63.8	84	83	79	79	77
QAT	Qatar	77.62	77.11	72.9	72.9	72.81	35	35	46	47	45
ROU	Romania	39.19	38.79	39.39	39.31	39.47	172	173	170	170	170
RUS	Russia	64.85	63.64	62.48	63.09	62.97	82	89	86	84	85
RWA	Rwanda	58.23	58.63	57.65	57.68	57.06	120	116	113	113	115
SAU	Saudi Arabia	68.06	66.15	65.71	65.89	66.43	68	76	71	72	68
SDN	Sudan	45.67	45.23	42.7	42.24	41.92	160	161	162	163	165
SEN	Senegal	57.96	57.59	55.06	55.24	54.89	124	121	123	123	122
SGP	Singapore	87.01	86.92	86.74	86.58	86.58	16	16	17	18	18
SLB	Solomon Islands	62.83	63.93	61.15	60.8	61.51	93	86	97	99	95
SLE	Sierra Leone	52.2	51.74	49.39	49.41	50.14	143	144	145	145	141
SLV	El Salvador	62.17	61.5	60.14	60.37	59.91	101	102	101	101	105
SRB	Serbia	70.49	70.46	64.28	64.38	64.54	56	54	74	75	75
STP	Sao Tome and Principe	68.26	68.07	65.94	66.36	65.96	65	66	69	68	71
SUR	Suriname	62.81	62.67	64.05	63.22	62.86	94	92	77	82	86
SVK	Slovakia	77.76	77.23	77.3	77.33	77.7	33	34	31	31	31
SVN	Slovenia	82.6	83.36	85.28	85.54	85.09	23	21	19	19	19
SWE	Sweden	91.29	91.56	92.15	91.94	91.87	7	7	8	8	8
SWZ	Eswatini	60.14	59.03	58.19	58.06	57.83	111	113	110	111	112
SYC	Seychelles	75.46	76.32	76.14	76.48	77.41	41	37	36	36	32
TCD	Chad	45.28	44.35	42.41	42.59	42.43	162	164	163	162	162
TGO	Togo	54.24	53.15	52.1	52.65	53.32	134	137	136	135	132
THA	Thailand	63.32	62.63	63.24	63.35	63.19	91	93	80	80	83
TJK	Tajikistan	57.97	58.04	57.29	56.7	57.15	123	118	114	116	114
TKM	Turkmenistan	45.09	57.7	41.93	41.59	41.71	164	120	165	166	166
TLS	Timor-Leste	55.37	52.38	52.93	53.46	53.4	130	140	133	131	131
TTO	Trinidad and Tobago	70.58	69.23	66.88	67.01	67.26	55	59	64	64	62
TUN	Tunisia	65.78	66.08	63.55	63.7	63.8	79	77	78	78	78
TUR	Turkey	64.69	64.05	62.39	62.45	62.03	83	85	87	89	91
TWN	Taiwan	44.45	44.38	43	42.85	43.53	165	163	161	161	161
TZA	Tanzania	56.27	55.83	53.6	53.93	54	127	128	129	130	130
UGA	Uganda	53.36	53.62	53.02	52.77	52.6	137	136	132	134	136
UKR	Ukraine	61.48	61.77	62.35	63.19	63.21	107	99	88	83	81
URY	Uruguay	81.06	80.92	79.22	79.17	79.49	26	25	26	26	26
USA	United States of America	82.25	80.77	81	80.52	80.19	24	26	23	24	25

ISO3	Country	ETPI 2017	ETPI 2018	ETPI 2019	ETPI 2020	ETPI 2021	Rank 2017	Rank 2018	Rank 2019	Rank 2020	Rank 2021
UZB	Uzbekistan	58.22	57.11	59.2	59.94	60.41	121	126	106	105	101
VCT	Saint Vincent and the Grenadines	75.01	75.32	73.02	73.07	72.96	43	41	44	44	44
VEN	Venezuela	40.97	39.63	37.43	37.13	36.87	171	171	172	172	173
VNM	Vietnam	59.35	58	57.7	58.03	58.95	116	119	112	112	107
VUT	Vanuatu	65.98	66.7	62.84	62.95	63.21	78	73	84	85	82
ZAF	South Africa	62.76	62.61	62.57	62.56	62.68	95	95	85	88	88
ZMB	Zambia	58.63	57.37	55.52	55.28	54.76	118	123	121	121	123
ZWE	Zimbabwe	52.31	51.76	51.56	51.95	51.19	141	143	138	138	139

APPENDIX 2. Normalisation and Rescaling Formulas for Index Values: Ensuring Consistency and Comparability in Composite Indices

For example, let the HRI index value for country D be -2 [HRI∈[-4;6]], then (formula 2): [-2-(-4)]/[6-(-4)]=20%; thus, 2 is 20% of the maximum range of 10 (2/10=20%). Another example: let the HRI_E index value for country E be +2 [HRI_Z∈[-4;4]], then, [+2-(-4)]/[6-(-4)]=60%; thus, 6 is 60% of the maximum range of 10 (6/10=60%).

In addition, formula (2) will not "spoil" indexes in zero/positive minimum-value cases. For example, let some index with G value for country A be +2 [G∈[0;10]], then (formula 4): [+2-(0)]/[10-(0)]=20%.

Suppose another example case: the absolute minimum and maximum of the HRI are unknown (e.g., lack of documentation). Then, researchers can still estimate proxy. Suppose the absolute minimum HRI value was -3.5 in country U, and the maximum value was 5.1 for country H. Thus, HRI for country D is: [-2-(-3.5)]/[5-(-3.5)] ≅ 18%. The country with the maximum index value will have 100% [this is the necessary scaling for estimating the ETPI]. Researchers can apply formula 2 for rescaling different potential substitute indexes for future modifications in the estimation of ETPI.

There is a small precaution in applying formulas 2 and 1 (together), regarding the maximum values. Suppose the actual minimum and maximum values of some index X never appear in reality. In that case, the new maximum and minimum values for calculating formula 2 should come from the actual (not theoretical) values up to a specific date.

Otherwise, the application of the theoretical maximum value (not actually achievable in the real life estimations) can lead to a slight bias in the estimates of the ETPI (because the purpose of the ETPI estimation process is to receive equally-scaled indexes from the actual data [i.e., not the theoretical data]).

Thus, this modification (HRI* does not become the absolute theoretical range but rather the actual range) will not change anything in the final value of the ETPI [i.e., ETPI is very stable in terms of the original data and instructions for availability and clearance of these data].

Thus, the algorithm described in formula (2) and Figure 13 can rescale indexes in the case of zero or any other X-centring of the original data.

At the same time, ETPI for resilience and recovery potential is better in having all components equally scaled (0 to 100, positively scaled [i.e., the higher the value, the better the situation is]). Other modifications of the estimations are potentially possible for different research purposes where ETPI can play a particular role.

Therefore, formula (2) will not change the values of the positive-scaled indexes starting from 0 as their minimum value. It changes indexes when part of their meanings can have negative values or [in the second case] when the theoretically minimum value of the indexes is above zero.

It is noteworthy that the actual HRI values below -4 never happened historically, while values above 5 are rare (a good example is Iceland in 2019 that has the value of this index of 5.16, while Luxembourg has 5.31 for the same date [total high-score was Luxembourg in 2014 in 5.34]). Fariss et al. (2020) and Our World in Data (2022) apply this index for a time series analysis of relative change.

Thus, formula (2) rescales the HRI to the standard index with positive values: $IHRI_{i,t}^{RG} \in [0;10]$. The approach of formula (2) can rescale any X-centred indexes of any potential substitutes of the components of the ETPI index (with the potential difference being in the choice of the value to add [it was the absolute theoretical minimum value of -4 in the case of HRI]).

Furthermore, the economic freedom index has two types: percentage (0-100) and score (0-10). Suppose that the maximum value of the economic freedom index is 8 of 10 in year Y. In addition, suppose that some country A has a value of 6 in the same year Y. Then, the final index is 100*(6/8)=75(%). Thus, formula (1) successfully deals with both variants of economic freedom (or other scaled indexes). Therefore, it does not matter if some index has scales of 0 to 20 and others have 0 to 100, because formula (1) successfully rescales them into a fully comparable format by way of simple arithmetic. Both will have a scale of 0 to 100 percent.

At the same time, the human rights index (Fariss et al., 2020; Our World in Data, 2022) is rare in updates. There is a new index with a higher update frequency called the Human Rights and the Rule of Law Index [HRRI] (The Global Economy.COM, 2022); it is an excellent

substitute for the original Human Rights Index. It is a negative scale index ranging from 0 [best] to 10 [worst]. The greater the value of the index – the worse the situation is. Formulas 5 and 6 represent the proper algorithm for rescaling this index for ETPI [instead of common Human Rights Index for applying to the ETPI formula]:

$$MHRRI_{i,t} = (100\text{-}10 * HRRI_{i,t})/100 = 1\text{-}(0.1) * HRRI_{i,t} \quad (5)$$

$$EMHRRI_{i,t}^{RG} = \frac{100\% * MHRRI_{i,t}^{LD}}{\max(NRDh_t^{LD})} \quad (6)$$

Notes: $MHRRI_{i,t}$ is a modified Human Rights and the Rule of Law Index; HRRI is the original Human Rights and the Rule of Law Index; $EMHRRI_{i,t}^{RG}$ is the Human Rights and the Rule of Law index for estimating the ETPI index (substitute for the Human Rights Index (Fariss et al., 2020; Our World in Data, 2022) with higher frequencies of updates). LD – means to the last known date by t; t – means specific time for evaluating the index (for example, year 2021); i – means specific country [or region]; 100% indicates the necessity to reproduce the results in comparable percentages for all indicators. Max means the maximum value for a specific period t [for the last date (LD) known].

Nevertheless, there can be a question conerning what index is better for the ETPI: the Human Rights Index or the Human Rights and the Rule of Law Index. Both indexes represent a similar proxy variable for describing the situation with human rights.

Further, the Human Rights Index (HRI) is a better fit for the final estimation of the ETPI index. At the same time, HRI has a lower frequency of updates. Therefore, HRRI can become a proxy index for estimating human rights for the most recent periods. Researchers can replace HRRI with HRI as soon as HRI becomes available (it will correct the final ETPI index).