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Greece and Cyprus

The relationship between green transition and economic freedom:

Is economic freedom compatible with sustainability?

Constantinos Saravakos

POLICY PAPER

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Executive summary

This policy paper seeks to explore the relationship between economic freedom and sustainability. It begins by reviewing the empirical literature on how economic freedom's impact on sustainability can vary significantly based on specific contextual factors. Some studies indicate a positive correlation between greater economic freedom and improved environmental outcomes, particularly in countries that prioritize business-friendly environments, uphold strong property rights, and foster trade freedom. In these cases, economic freedom appears to contribute positively to environmental sustainability and reduced emissions. Conversely, economic freedom may exert adverse effects on environmental conditions, particularly in developing and emerging economies, where factors like limited regulatory control and unsustainable economic growth are associated with environmental degradation.

The paper employs a comparative bivariate analysis which reveals a consistent link between environmental performance, as measured by the Environmental Performance Index (EPI), and various components of economic freedom, proxied by Economic Freedom of the World composite indicator. Across a spectrum of economic freedom indicators, including the size of government, legal systems, property rights, monetary stability, international trade freedom, and regulatory frameworks, higher economic freedom levels tend to correlate with improved environmental performance. Nevertheless, the size of government stands out as an exception, with greater government involvement corresponding with better environmental outcomes. Regions categorized as the "Least economically free" consistently exhibit lower environmental performance compared to other quartiles within each category. However, in the Size of Government category, regions with limited government involvement demonstrate, on average, lower sustainability performance than the "Least Free" quartile, suggesting that increased government influence may contribute to more favorable environmental outcomes. Focusing on Greece, the analysis demonstrates that the country falls behind the EU and OECD averages both in environmental performance and economic freedom, signaling the need for policy adjustments to boost environmental sustainability and economic freedom.

These insights emphasize the need for action for a sustainable economic model from a liberal perspective, which can foster economic growth, environmental protection, and better living standards; The paper concludes with tailored policy approaches to address environmental challenges which have occurred the last decade in the public debate.

Introduction

The institutional prevalence of liberalism over the last thirty years, particularly that of free-market capitalism, has been associated with significant social and economic progress as well as greater individual freedom.[1] However, alongside recent social and political developments, such as the financial and sovereign debt crisis[2] and the rise of populism, there have been emerging environmental challenges that raise doubts about the era of free markets. Climate change is perceived as a market failure due to external costs of emissions, advocating policy interventions like carbon pricing to stimulate low-carbon innovation and correct market shortcomings;[3] media and public intellectuals highlight the inadequacy of market-driven approaches in addressing large-scale challenges such as pandemics and climate change, advocating for a more substantial and permanent role for government in tackling such issues.[4] In theory, the so called free-market environmentalism[5] seeks to combine environmental protection and liberal economy, arguing that market solutions can more effectively address environmental challenges than government intervention. However, this perspective must be supported by empirical evidence demonstrating that free market solutions can indeed have a positive impact on the green economy. There has been criticism that the effectiveness of free market environmentalism is limited in addressing nonrival goods like clean air, arguing that government intervention and regulation are often necessary, especially where market failures persist and property rights alone cannot resolve environmental challenges.[6]A common argument in the public sphere suggests that the traditional and dominant economic models of that era must undergo reforms to effectively address issues like climate change, biodiversity loss, water scarcity, and others, all while simultaneously addressing significant social and economic challenges. These concerns have translated into a demand for a transition to a green economy.[7]

Recent trends in various environmental indicators pose a challenge to the economic institutions of modern societies, considering the status of public discourse we described earlier. This challenge is based on a set of environmental indicators, which led to the conclusion that the planet is environmentally deteriorating, or at the very least, these trends are a cause for alarm (Figure 1).[8] The land dedicated to agriculture has been expanded, with an increase of more than threefold since 1800 and a doubling since 1900. During this period, the global average temperature has increased, amounting to approximately 1°C above pre-industrial levels. This rise in temperature is primarily attributed to human-induced greenhouse gas emissions, encompassing carbon dioxide, methane, and nitrous oxide. Moreover, carbon dioxide concentrations in the atmosphere have surged from approximately 280 parts per million to surpass the critical threshold of 400 ppm. While population growth has played a notable role in driving emissions, the most influential factor appears to be the increase in prosperity; as societies become wealthier and standards of living improve, per capita emissions tend to increase. Over the past half-century, global energy consumption has surged by more than 2.5 times its previous levels. Fossil fuels maintain a dominant position in the global energy landscape: approximately 33% is sourced from oil, around 29% is derived from coal and gas contributes approximately 24%. In contrast, modern renewable energy sources such as wind, solar, geothermal, wave, and tidal power collectively represent a mere 3% of global energy production. Nuclear energy accounts for roughly 5%, while hydropower contributes around 7%. There has also been a significant increase in global freshwater utilization, which has multiplied six to sevenfold since 1900.

1 Gwartney, J., Lawson, R., Hall, J., & Murphy, R. (2022). Economic Freedom of the World: 2021. Fraser Institute: 16-20. Roser, Max. 2020. The short history of global living conditions and why it matters that we know it. https://ourworldindata.org/a-history-of-global-living-conditions-in-5-charts.

2 Barbier, E. (2010). How is the global green new deal going?. Nature, 464(7290), 832-833.

3 Bowen, A., Dietz, S., & Hicks, N. (2014, March 21). Why do economists describe climate change as a market failure? The London School of Economics and Political Science.

4 Oreskes, N., & Conway, E. (2023, February 28). The True Cost of the "Free" Market. TIME.

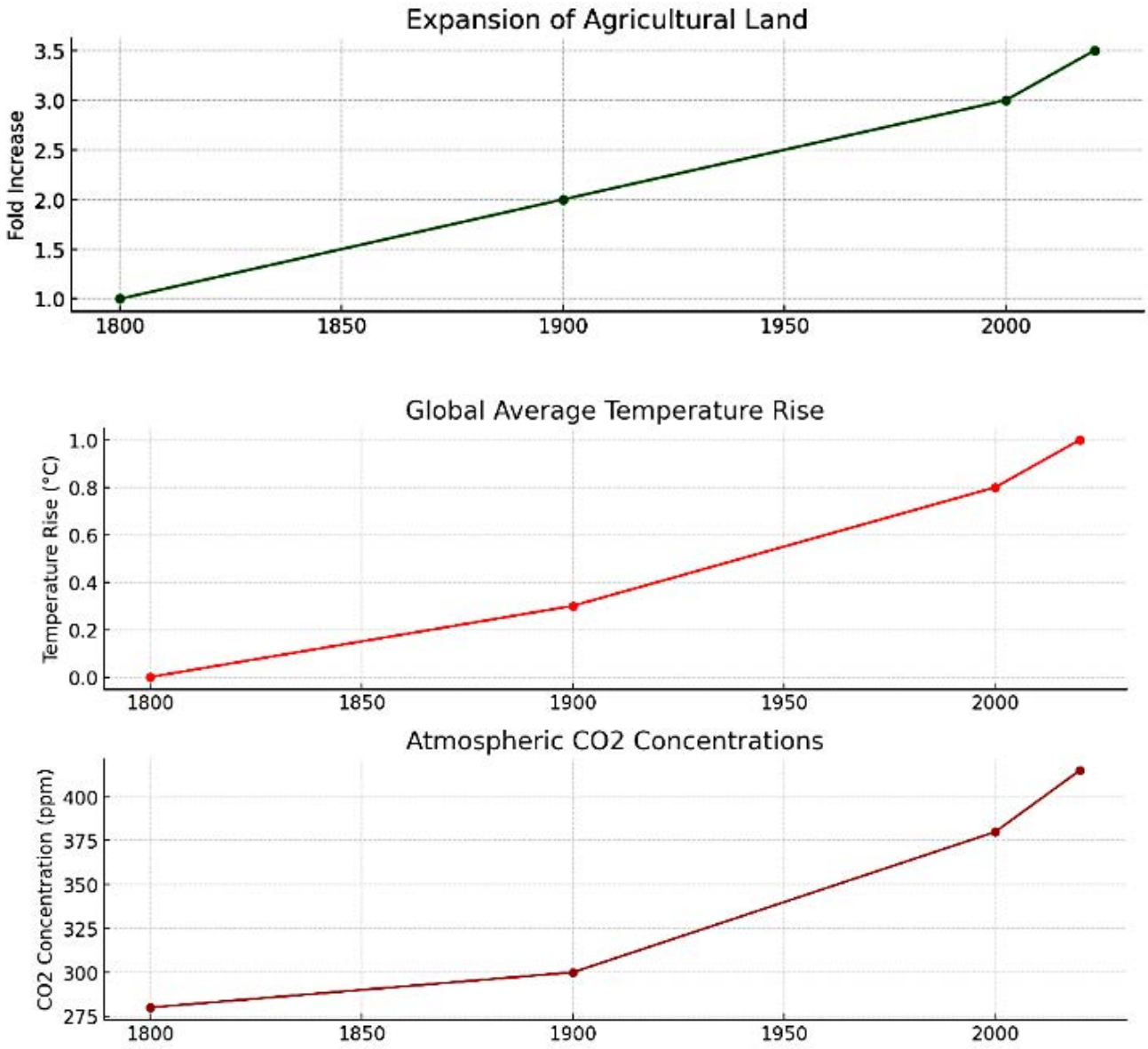
5 Stroup, R. L. (2003). *Eco-nomics: What Everyone Should Know About Economics and the Environment* (2nd ed.). Cato Institute.

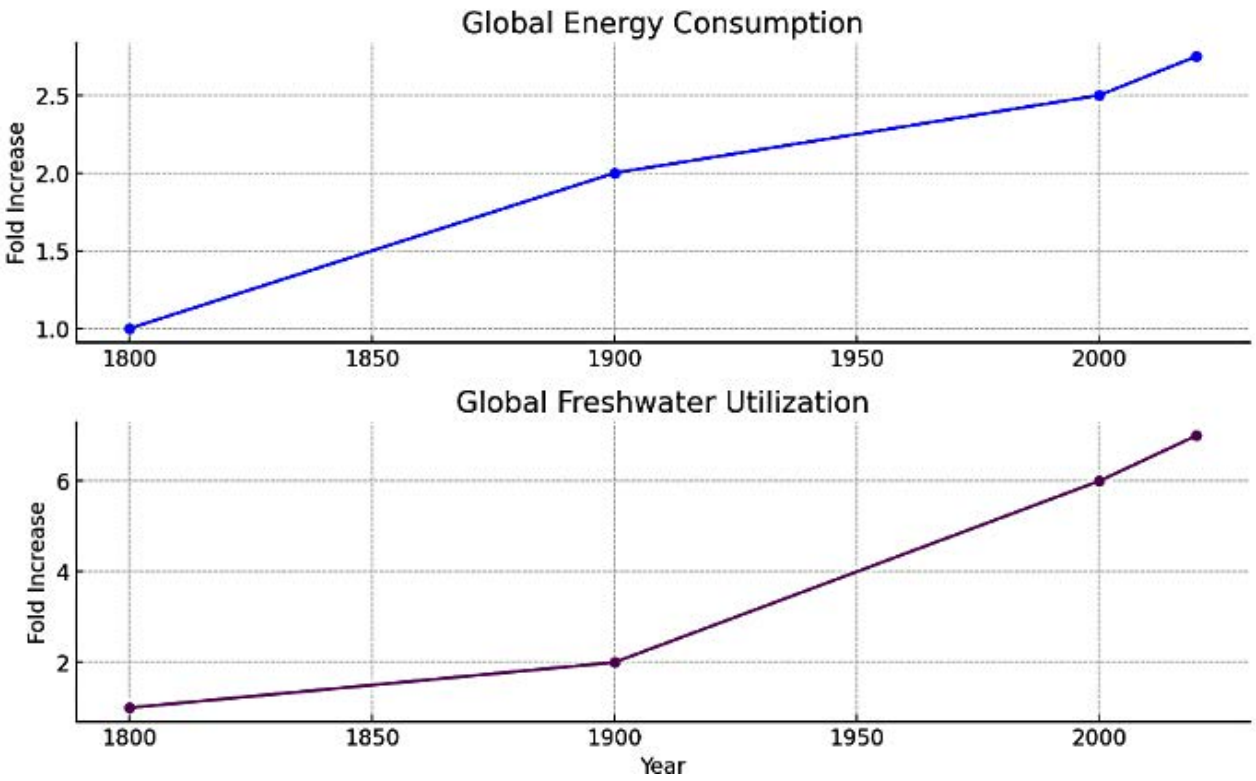
6 Kolstad, C. (2011, June 10). The Promise and Problems of Free Market Environmentalism. Property and Environment Research Center.

7 OECD. (2010). Interim report of the green growth strategy: Implementing our commitment for a sustainable future. Source OECD Environ. Sustain. Dev., 2010, i-94. United Nations Environment Programme (UNEP). A guidance manual for green economy policy assessment. New York: United Nations; 2014.

8 Sustainability through data: global trends in environmental change.

Figure 1. Selected key environmental trends, since 1800.





These trends underscore the importance of addressing the environmental challenges that emerged to ensure a sustainable future. Liberals worldwide face the challenge of providing compelling solutions to these environmental issues while remaining true to the principles of liberalism and progress that have driven global prosperity and freedom over the past three decades.

The purpose of this policy paper is to explore the compatibility of economic freedom with sustainability. To address this, we will initially examine empirical findings concerning the impact of economic freedom on sustainability. Subsequently, we will proceed to a comparative analysis to identify potential connections between economic freedom and sustainability through a bivariate approach. Additionally, we will concentrate on the Greek case and assess its performance relative to EU and OECD countries, evaluating whether there is room for reforms to improve both sustainability and economic freedom.

The structure of the paper is as follows: the following section outlines the conceptual framework of economic freedom and sustainability, underlining their significance in contemporary societies. The subsequent section delves into the empirical evidence regarding the relationship between economic freedom and sustainability, reviewing pertinent findings from the literature. The next section conducts a comparative analysis exploring the connection between economic freedom and sustainability, with a particular focus on Greece. The paper wraps up with a concluding section, followed by policy recommendations.

Conceptualizing economic freedom and sustainability: why are they important?

Economic freedom is understood within the framework of various key components that encompass the security of property rights, the liberty to partake in voluntary transactions, accessibility to a stable monetary system, the freedom to engage in voluntary exchanges across international borders, the opportunity for competition, and individual autonomy in making personal choices. These components collectively constitute the multifaceted concept of economic freedom, reflecting a society's commitment to fostering an environment where individuals can exercise these fundamental economic liberties.

Numerous studies have demonstrated that economic freedom contributes to enhanced economic growth, the advancement of human capital, improved human well-being, and a greater level of respect for human rights by governments, ultimately fostering societal peace.[9] More specifically, increased economic freedom consistently improves well-being indicators, economic circumstances and increased social harmony and peace.[10] Economic freedom is positively related to human capital investment,[11] foreign direct investment,12 economic growth[13], income and productivity, entrepreneurship and innovation, human rights, democracy and social development.[14]

Sustainability, on the other hand, encompasses a range of viewpoints, including environmental preservation, ecosystem services, economic factors, societal acceptance, operational licenses, and external effects, among many others.[15] This concept revolves around two fundamental ideas: prioritizing the essential necessities, particularly for the most impoverished, and recognizing the limitations imposed by technological advancements and societal structures on the environment's capacity to meet both current and future requirements. The concept of sustainability revolves around passing on resources—natural, environmental, and capital—to future generations. While depletion of natural resources is inevitable, some argue that capital can compensate, while others stress the preservation of vital natural resources.[16] Two perspectives of sustainability have been dominant in the relevant discussion: the concepts of 'weak' and 'strong' sustainability. The former encompass the notion that environmental resources can be replaced by man-made or human capital, allowing for economic growth without preserving the specific natural resources; the latter is based upon the idea that environmental resources are irreplaceable and must be preserved for future generations, certain resources cannot be substituted by human-made capital and the preservation of ecosystems and biodiversity is of paramount importance for the planet.[17]

Economic development and environmental protection gave birth to sustainable development, which emerged to encourage global collaboration centered around economic progress, environmental preservation, and the well-being of society. It can be characterized as development that meets present needs without jeopardizing the ability of future generations to satisfy their own requirements.[18] This is the reason why sustainability should play a pivotal role in shaping the policies soon, since climate, natural resources and biodiversity are indispensable factors for the survival of the planet and the prosperity of our societies.

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9 Also, greater economic freedom is not related to bad outcomes such as homicides, see Bjørnskov, C. (2015) Does Economic Freedom Really Kill? On the Association Between 'Neoliberal' Policies and Homicide Rates. European Journal of Political Economy, 37, 207–219. Available from: https://doi.org/10.1016/j.ejpoleco.2014.12.004. de Soysa, I. (2020) Economic Governance and Homicide: Some Theory and Empirics, 1990–2017. Journal of Peace Research, 58(5), 1004–1017. Available from: https://doi.org/10.1177/0022343320962566.

10 Stroup, M.D. (2007) Economic Freedom, Democracy, and the Quality of Life. World Development, 35(1), 52–66. Available from: https://doi.org/10.1016/j.worlddev.2006.09.003.

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12 Azman-Saini, W. N., Baharumshah, A. Z., & Law , S. (2010). Foreign direct investment, economic freedom and economic growth: international evidence. Economic MOdeling, 27, 1079-1089.

13 Justesen, M. K. (2008). The effect of economic freedom on growth revisited: new evidence on causality from a panel of countries 1970-1999. European Journal of Political Economy, 24, 642-660.

14 Lawson, R. (2022). Economic Freedom in the Literature: What Is It Good (Bad) For? In Economic Freedom of the World: 2022 Annual Report (pp. 187–200). Fraser Institute.. Saravakos C., Archontas, G. (2022) Quality of Liberal Democracy and COVID-19 Pandemic Restrictions: Did Liberal Democratic Institutions Manage to Protect the Civil Liberties? The Visio Journal (7).

15 Büyüközkan, G., & Karabulut, Y. (2018). Sustainability performance evaluation: Literature review and future directions. Journal of Environmental Management, 217, 253-267. https://doi.org/10.1016/j.jenvman.2018.03.064.

16 Kuhlman, T.; Farrington, J. What is Sustainability? Sustainability 2010, 2, 3436-3448. https://doi.org/10.3390/su2113436.

17 Pearce, D.W., Markandya, A., & Barbier, E.P. (1989). Blueprint for a Green Economy. Earthscan Publications.

18 Dousi, E. (2014). Η Περιβαλλοντική Διακυβέρνηση σε κρίση: Ρίο+20: Υποσχέσεις με αβέβαιη εφαρμογή [Environmental Governance in Crisis: Rio+20: Promises with Uncertain Implementation]. Athens: Papazisis.

Economic freedom and sustainability: the empirical evidence

The relationship between economic freedom and sustainability has been a subject of considerable empirical investigation, with studies producing mixed findings, depending on the concept and the selection of indicators used to measure economic freedom and sustainability. The literature seems to be far from conclusive, given that different indicators and methodologies have been employed to explore this complex relationship, resulting in both positive, negative, and ambiguous outcomes. This literature review provides an overview of recent research that examines economic freedom's impact on sustainability and highlights the specific indicators considered.

Looking at it from one angle, the literature points to a positive relationship, that is, more economic freedom and its aspects are related to better environmental outcomes. The study of the differences in the impacts of economic freedom on environmental sustainability and atmospheric pollution indicate that economies that foster a business-friendly environment, particularly in terms of capital investment, tend to achieve greater economic prosperity with less adverse impact on overall environmental sustainability.[19] Regarding the aspects of economic freedom, greater trade freedom[20] have a positive impact on pollution concentrations and strong property rights[21] provide access to safe drinking water and sewage treatment, while bigger government size negatively impacting emissions in some cases.[22]

From a different standpoint, there is empirical research suggesting that more economic freedom is detrimental to better environmental conditions. The connection between economic freedom and ecological footprints in G-20 economies is positive, indicating that certain aspects of economic freedom may contribute to environmental degradation, posing challenges in achieving Sustainable Development Goals (SDGs) in developing and emerging economies.[23] In G-20 economies, both unrestricted international trade and efficient regulations (including business, labor, and monetary freedom) have a negative impact on the environment, leading to increased ecological footprint,[24] while governmental policy intervention has been found to be a pivotal driver in addressing environmental issues and improving environmental conditions.[25] This suggests that economic growth, when driven by unsustainable practices, can have adverse environmental consequences.[26]

There are also studies which point to mixed results, depending on the short run and long run effects of economic freedom aspects. Research on the environmental Kuznets curve (EKC) hypothesis[27] in newly industrialized nations revealed an inverted U-shaped rela-

19 de Soysa, I., (2022). Economic freedom vs. egalitarianism: an empirical test of weak & strong sustainability, 1970–2017. Kyklos. https://doi.org/10.1111/kykl.12290.

20 Taylor, M.S.; Antweiler, W.; Copeland, B.R. Is Free Trade Good for the Environment. Am. Econ. Rev. 2001, 94. Available online: http://works.bepress.com/taylor/23/ (accessed on 15 December 2020).

21 Norton, S. W. (1998). "Property Rights, the Environment, and Economic Well-Being." In Who Owns the Environment? ed. Peter J. Hill and Roger E. Meiners. Lanham, MD: Rowman & Littlefield, 37–54.

22 Chen, L. (2022). How CO2 emissions respond to changes in government size and level of digitalization? Evidence from the BRICS countries. Environmental Science and Pollution Research, 29(1), 457–467. https://doi.org/10.1007/s11356-021-15693-6.

23 Alola, A. A., Alola, U. V., Akdag, S., et al. (2022). The role of economic freedom and clean energy in environmental sustainability: Implications for the G-20 economies. *Environmental Science and Pollution Research*, 29, 36608–36615. https://doi.org/10.1007/s11356-022-18666-5.

24 Except for advanced economies that have consistently implemented carbon reduction policies across various economic sectors, the findings suggest that the primary economic activities in many member countries are predominantly reliant on conventional energy and business-as-usual practices. Alola, A.A. (2019) The trilemma of trade, monetary and immigration policies in the United States: accounting for environmental sustainability. *Sci Total Environ* 658:260–267. https://doi.org/10.1016/j.scitotenv.2018.12.212.

25 Carlsson, F.; Gable, S. Political and Economic Freedom and the Environment: The Case of CO2 Emissions January 2000. Available online: https://www.researchgate.net/publication/228542880_Political_and_Economic_Freedom_and_the_Environment_The_Case_of_CO2_Emissions/ (accessed on 15 December 2020).

26 Nathaniel, S., & Khan, S. A. R. (2020). The nexus between urbanization, renewable energy, trade, and ecological footprint in ASEAN countries. Journal of Cleaner Production, 272, 122709. https://doi.org/10.1016/j.jclepro.2020.122709.

27 The concept of the Environmental Kuznets Curve (EKC) posits a potential correlation between different measures of environmental deterioration and per capita income. Initially, during the early phases of economic development, pollution emissions tend to rise, resulting in a decline in environmental quality. However, once a certain threshold of per capita income is reached (which may vary depending on the specific environmental indicator), this pattern reverses. At higher income levels, economic growth becomes associated with environmental enhancement. The Environmental Kuznets Curve (EKC) provide degradation of the environment in another aspect. From: Water, Land, and Forest Susceptibility and Sustainability, 2023.

tionship between GDP and the ecological footprint, suggesting that economic growth initially contributes to environmental degradation but can lead to improvements in sustainability at higher income levels.[28] The impact of government size on environmental quality remains a topic of debate, with varying results depending on the specific context. Environmental effect of government expenditure can be different in the short term and long term.[29]

The most extensive and systematic literature review on the relationship between economic freedom and environment has been done by Lawson (2022). The research examines the relationship of economic freedom, measured specifically by the Economic Freedom of the World score with selective environmental indicators such as CO2 emissions, pollution measures, and biodiversity in empirical studies; among the 24 pertinent studies, 41.7% reported a positive association between economic freedom and improved environmental outcomes, 41.7% found no distinct correlation, and 16.7% identified a negative relationship.

Although the above studies indicate a non-conclusive direction, the empirical evidence suggests greater economic freedom and environmental outcomes are positively related, particularly in countries fostering a business-friendly environment with strong property rights and trade freedom. Free trade and legal rights are associated with better environmental sustainability and reduced emissions. Economic freedom can be detrimental to environmental conditions, especially in developing and emerging economies in the beginning of their economic development. Aspects like government size and limited regulatory control have been linked to environmental degradation, while unsustainable economic growth, trade expansion, and non-renewable energy use can contribute to environmental harm. Table 1 compiles the above literature review presenting the main finding and impact of economic freedom to sustainability.

28 Destek, M. A., & Sarkodie, S. A. (2019). Investigation of environmental Kuznets curve for ecological footprint: The role of energy and financial development. Science of the Total Environment, 650, 2483–2489. https://doi.org/10.1016/j.scitotenv.2018.10.017.

29 Adewuyi, A. O. (2016). Effects of public and private expenditures on environmental pollution: A dynamic heterogeneous panel data analysis. Renewable and Sustainable Energy Reviews, 65, 489–506. https://doi.org/10.1016/j.rser.2016.06.090.

Table 1. The impact of economic freedom on sustainability in the empirical literature.

Study	Sample	Finding	Impact
Destek and Sarkodie (2019)	Newly industrialized nations	Economic growth initially contributes to environmental degradation but can lead to improvements in sustainability at higher income levels.	Mixed
Adewuyi (2016)	A panel of 40 top emitters (top 10 emitters per region)	In the long-run, the negative direct effect of government spending is offset by positive indirect effects, resulting in an overall reduction in carbon emissions. In the short-run, the negative direct effect is amplified by negative indirect effects, leading to increased emissions.	Mixed
Alola et al. (2022)	G-20 economies	Economic factors, such as the legal system and property rights, sound money, freedom to international trade, and regulatory efficiency, had a significant and positive impact on the ecological footprint.	Negative
Nathaniel and Khan (2020)	ASEAN countries	Economic expansion, trade, and non-renewable energy usage significantly contributed to environmental degradation.	Negative
Carlsson and Gable	Panel of countries worldwide	Governmental policy intervention has been found to be a pivotal driver in addressing environmental issues and improving environmental conditions*	Negative
Chen (2022)	BRICS countries	Larger government size increases environmental pollution*	Positive
Taylor et al. (2001)	Panel of countries includes primarily developed countries	Greater trade freedom seems to have a positive impact on the environment.	Positive
Norton (1998)	Panel of countries worldwide	In countries where property rights are robust, several indicators of environmental quality surpass those in nations with weaker property rights.	Positive
de Soysa (2022)	160 countries worldwide	Economies that foster a business-friendly environment, particularly in terms of capital investment, tend to achieve greater economic prosperity with less adverse impact on overall environmental sustainability.	Positive

Positive= more economic freedom (or certain aspects) is associated with better sustainability outcomes.
Negative = more economic freedom (or certain aspects) is associated with worse sustainability outcomes.
*in these cases, the reversed trend is observed, more / less government intervention is associated with better / worse sustainability outcomes.

A comparative analysis of the relationship between economic freedom and sustainability in developed countries

In our analysis, we aim to determine whether there are statistically significant differences in environmental performance among four groups of countries based on their level of economic freedom, without taking potential confounding factors into account. While we acknowledge certain limitations in this operationalization (which will be discussed later), this approach may yield preliminary insights on this relationship, calling for further investigation. To examine our research question, we employ the concept of economic freedom proxied by the Economic Freedom of the World Annual report (EFW), published by the Fraser Institute.[30] This approach involves quantifying the degree to which a country's institutions and economic policies align with pro-market principles, encompassing aspects like "personal choice, voluntary exchange, freedom to participate in markets and competition, and the protection of personal and private property rights".[31] The composite index score is determined based on evaluations across five distinct areas:

- Area 1: Size of Government—As government spending, taxation, and the size of government-controlled enterprises increase, government decision-making takes the place of individual choice and economic freedom is reduced.

- Area 2: Legal System and Property Rights—Protection of persons and their rightfully acquired property is a central element of both economic freedom and civil society. Indeed, it is the most important function of government. If property is not secure, if individuals are not safe, if the judiciary is not impartial, or if the rule of law is undermined, then, again, economic freedom is reduced.

- Area 3: Sound Money—Inflation erodes the value of rightfully earned wages and savings. Sound money is thus essential to protect property rights. When inflation is not only high but also volatile, it becomes difficult for individuals to plan for the future and thus use economic freedom effectively.

- Area 4: Freedom to Trade Internationally—Freedom to exchange—in its broadest sense, buying, selling, making contracts, and so on—is the essence of economic freedom. And this freedom is reduced when government impediments to trade make it costly or even impossible to exchange with businesses and individuals in other nations.

- Area 5: Regulation—Governments not only use a number of tools to limit the right to exchange internationally, they may also impose onerous regulations, domestically as well as on international trade, that limit the right to exchange, gain credit, hire or work for whomever one wishes, or freely operate one's business. As these limits multiply, economic freedom decreases.

The primary rationale behind opting for the Fraser Institute's Index over other economic freedom measures is rooted in its broader usage within academic literature,[32] and its more precise and transparent measurement methodologies.[33] Additionally, Fraser's Index does not incorporate special weighting schemes in its components. Given our objective of not only analyzing the relationship between the economic freedom Index score and the EU accession period but also identifying which specific sub-components of economic freedom are most closely associated with the EU accession process, we prefer to utilize composite scores that are derived using consistent coefficients for aggregation.

The concept of sustainability is proxied by the 2022 Environmental Performance Index (EPI),[34] which offers a comprehensive assessment of global sustainability based on empirical data. It evaluates 180 countries using a set of 40 performance indicators spanning 11 different issue categories. The EPI ranks nations in terms of their performance in areas such as climate change, environmental health, and ecosystem vitality. These indicators serve as a measure of how well countries are progressing toward established environmen-

30 Economic Freedom of the World: 2023 Annual Report.
31 Gwartney, J., Lawson, R., Hal, J., & Murphy, R. (2019). Economic Freedom of the World: 2019 Annual Report. Fraser Institute. Retrieved 10 29, 2020, from https://www.fraserinstitute.org/sites/default/ files/economic-freedom-of-the-world-2019.pdf.
32 Hall, J. C., Lawson, R. A., & Wogsland, R. (2011). The European Union and economic freedom. Global Economy Journal, 11(3).
33 Hall, J. C., & Lawson, R. A. (2013). Economic Freedom of the World: An accounting of the Literature. Contemporary Economic Policy, 32, 1-19.
34 Environmental Performance Index 2022. Wolf, M. J, Emerson, J. W., Esty, D. C., de Sherbinin, A., Wendling, Z. A., et al. (2022). 2022 Environmental Performance Index. New Haven, CT: Yale Center for Environmental Law & Policy. epi.yale.edu.

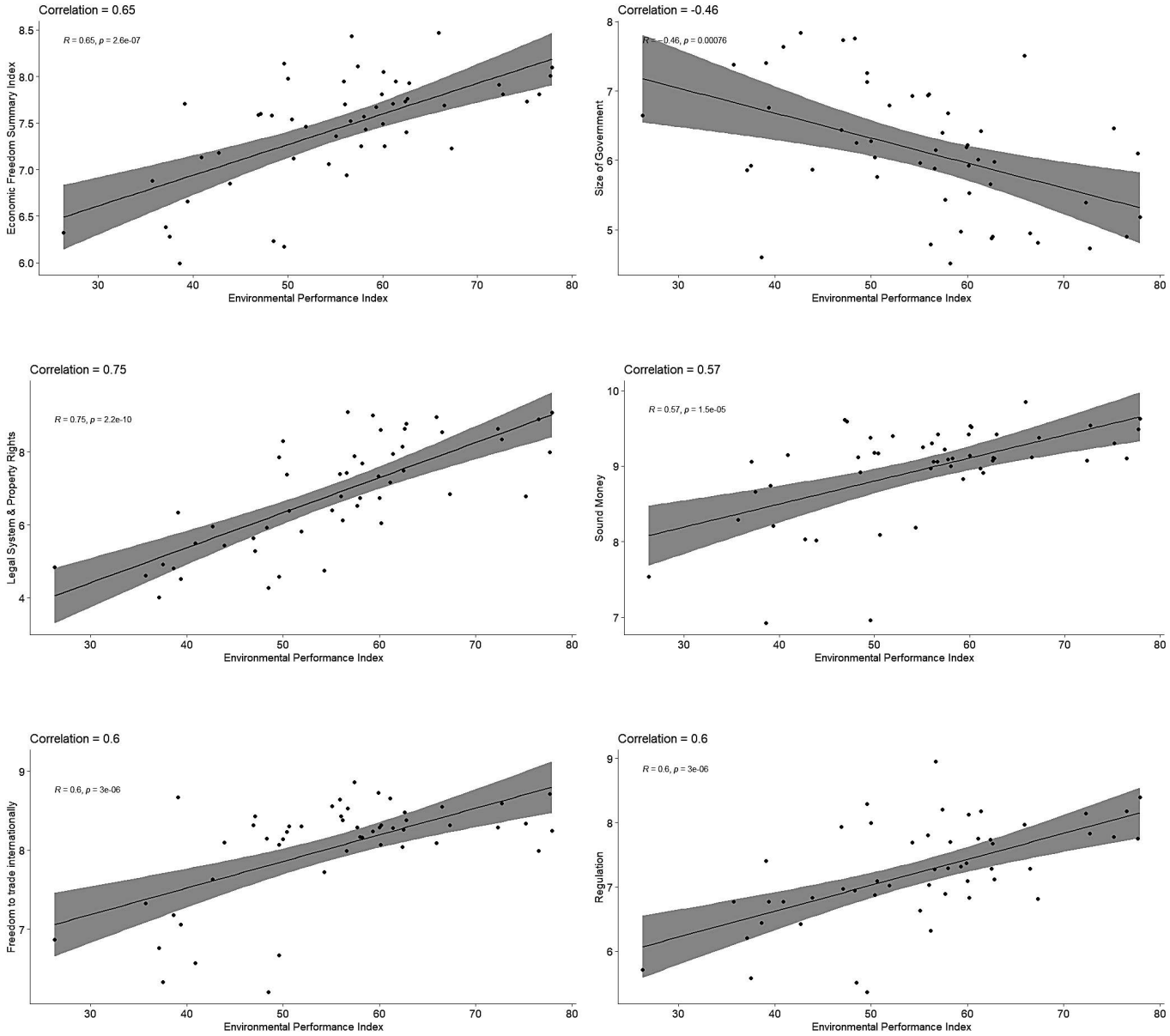
tal policy objectives on a national level. By identifying top performers and those lagging behind, the EPI serves as a valuable tool for guiding countries towards a more sustainable future, providing practical recommendations for improvement. The Environmental Performance Index incorporates information from 40 sustainability indicators, which are categorized into 11 broader issue areas. These components are combined to generate a single comprehensive EPI score for each country. The 2022 EPI is based on well-known sustainability categories, such as:

- Climate Change Mitigation
- Air Quality
- Sanitation & Drinking Water
- Heavy Metals
- Waste Management
- Biodiversity & Habitat
- Ecosystem Services
- Fisheries
- Acid Rain
- Agriculture
- Water Resources

The EPI offers an assessment of worldwide environmental performance alongside individual scorecards for each country. Whenever feasible, EPI researchers compile data at the global level and calculate indicator scores using the same methodologies employed for country-level scores. The global scorecard proves particularly valuable for evaluating the world's advancement in achieving international sustainability objectives.

The countries included in the analysis are the relatively advanced economies of the world (OECD) and all European, non-EU and non-OECD countries, to focus on the most prosperous and institutionally developed countries in the world (total 51 countries, see Table 2). As Figure 2 demonstrates, environmental performance (measured by EPI Index) is positively correlated with economic freedom and its subcategories in all cases, except for the size of government. Only in that case, less economic freedom (bigger government) indicates better environmental performance.

Figure 2. Correlation between Environmental Performance Index and economic freedom.



In our analysis below, we adopt a bivariate approach to explore the association between the Environmental Performance Index (EPI) and economic freedom and its sub-categories.[35] For this purpose, we construct four groups of countries based on their scores in economic freedom, following the analysis of the Economic Freedom of the World Report from least to most free quartiles.[36] Table 2 presents the countries grouped in each indicator, given their respective rank.

35 The data in each quartile does not significantly deviate from a normal distribution. The Shapiro-Wilk normality test results for each Economic Freedom Summary Quartile are as follows: Quartile 1: p-value = 0.337, Quartile 2: p-value = 0.629, Quartile 3: p-value = 0.920 Quartile, 4: p-value = 0.743. For all quartiles, the p-values are above alpha level of 0.05, indicating that we do not have enough evidence to reject the null hypothesis of normality.

36 Gwartney, J., Lawson, R., Hall, J., & Murphy, R. (2022). Economic Freedom of the World: 2022. Fraser Institute:16-20.

Table 2. Groups of economic freedom performance.

Indicator	Least free quartile	Third quartile	Second quartile	Most free quartile
Economic Freedom Summary	Azerbaijan, Greece, Poland, Serbia, Tajikistan, Russia, Bosnia and Herzegovina, Turkey, Belarus, North Macedonia, Kyrgyzstan, Kazakhstan, Ukraine.	Belgium, France, Italy, Slovenia, Spain, Portugal, Croatia, Hungary, Cyprus, Slovakia, Bulgaria, Armenia, Moldova.	Finland, Sweden, Netherlands, Norway, Austria, Latvia, Germany, Montenegro, Malta, Czech Republic, Georgia, Romania, Albania.	Denmark, Luxembourg, Australia, United Kingdom, Iceland, New Zealand, Ireland, Estonia, Canada, USA, Switzerland, Lithuania.
Size of Government	Denmark, Luxembourg, Finland, Sweden, Netherlands, Norway, Austria, Belgium, France, Italy, Slovenia, Azerbaijan, Greece.	Australia, United Kingdom, Iceland, Latvia, Germany, Spain, Portugal, Croatia, Hungary, Poland, Serbia, Tajikistan, Russia.	New Zealand, Ireland, Estonia, Canada, Montenegro, Malta, Czech Republic, Cyprus, Slovakia, Bulgaria, Bosnia and Herzegovina, Turkey, Belarus.	USA, Switzerland, Lithuania, Georgia, Romania, Albania, Armenia, Moldova, North Macedonia, Kyrgyzstan, Kazakhstan, Ukraine.
Legal System & Property Rights	Albania, North Macedonia, Kyrgyzstan, Kazakhstan, Ukraine, Montenegro, Bulgaria, Bosnia and Herzegovina, Turkey, Belarus, Serbia, Tajikistan, Russia, Azerbaijan,	Georgia, Romania, Armenia, Moldova, Malta, Cyprus, Slovakia, Croatia, Hungary, Poland, Italy, Greece.	USA, Lithuania, Ireland, Estonia, Czech Republic, United Kingdom, Latvia, Germany, Spain, Portugal, Belgium, France, Slovenia.	Switzerland, New Zealand, Canada, Australia, Iceland, Denmark, Luxembourg, Finland, Sweden, Netherlands, Norway, Austria.
Sound Money	Tajikistan, Norway, Estonia, Georgia, Moldova, Poland, North Macedonia, Kyrgyzstan, Ukraine, Bosnia and Herzegovina, Turkey, Belarus, Serbia, Russia, Azerbaijan,	Luxembourg, Finland, Netherlands, Lithuania, Latvia, Germany, Spain, Belgium, Cyprus, Italy, Greece.	Canada, Austria, USA, Ireland, Portugal, France, Slovenia, Romania, Armenia, Malta, Slovakia, Hungary, Kazakhstan.	Switzerland, New Zealand, Australia, Iceland, Denmark, Sweden, Czech Republic, United Kingdom, Croatia, Albania, Montenegro, Bulgaria,
Freedom to trade internationally	Kazakhstan, Finland, Spain, Tajikistan, Moldova, North Macedonia, Kyrgyzstan, Ukraine, Bosnia and Herzegovina, Turkey, Belarus, Russia, Azerbaijan,	Switzerland, Australia, Denmark, Canada, USA, Portugal, France, Armenia, Germany, Belgium, Cyprus, Norway, Serbia.	Iceland, Croatia, Montenegro, Bulgaria, Slovenia, Romania, Malta, Slovakia, Luxembourg, Italy, Greece, Estonia, Poland.	New Zealand, Sweden, Czech Republic, United Kingdom, Albania, Austria, Ireland, Hungary, Netherlands, Lithuania, Latvia, Georgia.
Regulation	Hungary, Slovenia, Greece, Kazakhstan, Tajikistan, Moldova, Kyrgyzstan, Ukraine, Bosnia and Herzegovina, Turkey, Belarus, Russia, Azerbaijan	Albania, Iceland, Croatia, Bulgaria, Romania, Slovakia, Italy, Poland, Portugal, Armenia, Serbia, Spain	Czech Republic, United Kingdom, Austria, Netherlands, Lithuania, Latvia, Georgia, Malta, France, Germany, Belgium, Cyprus, Norway, North Macedonia	New Zealand, Sweden, Ireland, Montenegro, Luxembourg, Estonia, Switzerland, Australia, Denmark, Canada, USA, Finland

The analysis of variance reveals significant variations in the Environmental Performance Index (EPI) across different quartiles of economic freedom, size of government, legal system and property rights, sound money, freedom to trade internationally, and regulation. As Figure 3 demonstrates, the "Least Free" quartile consistently exhibits a substantially lower environmental performance compared to the other quartiles in each category, signifying poorer environmental performance in regions with lower economic freedom, larger government involvement, weaker legal systems, unsound monetary policies, restricted international trade, and more stringent regulations.

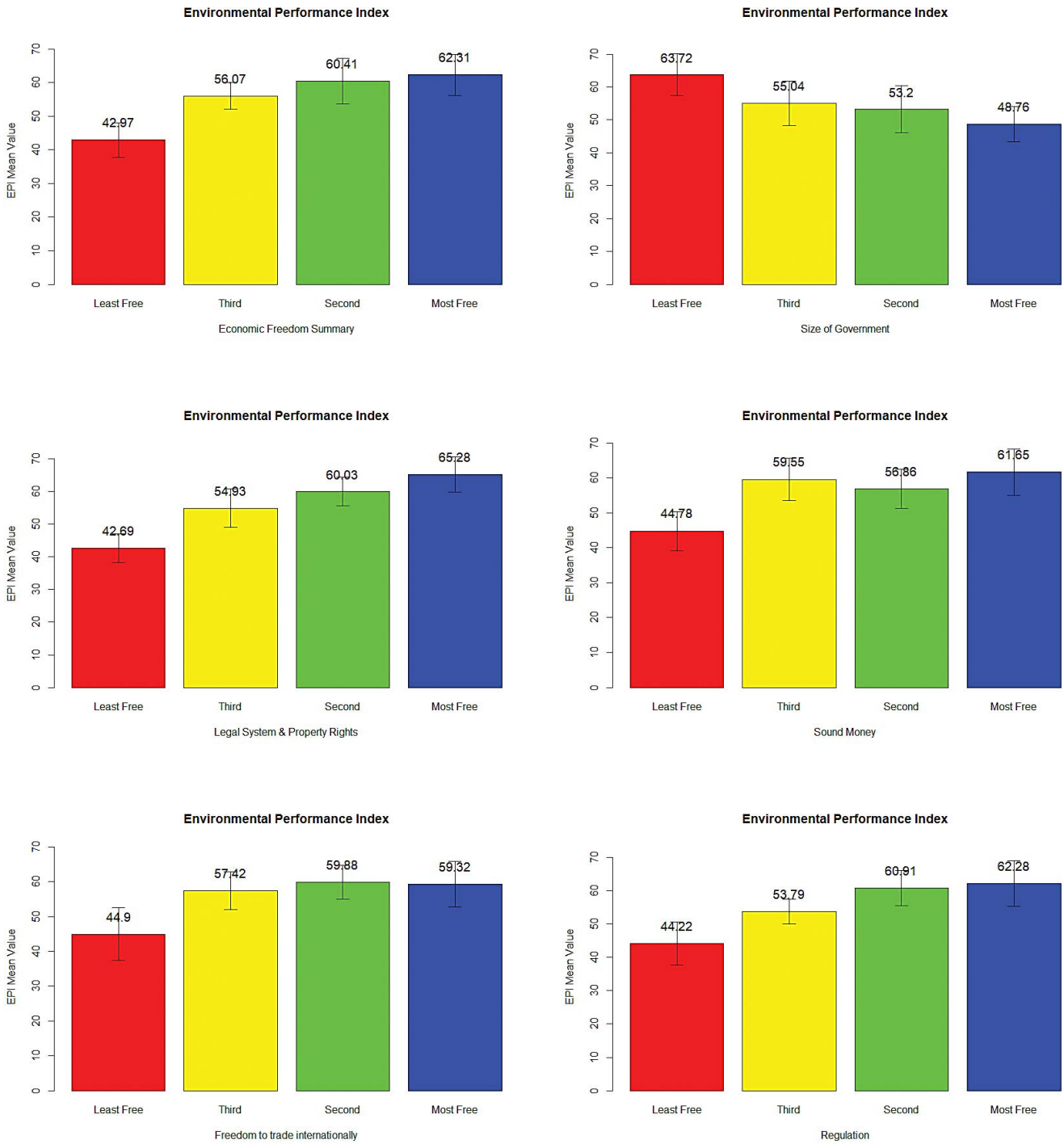
The Legal System and Property Rights is the economic freedom area which demonstrates the strongest correlation with better environmental performance. This result aligns with the empirical literature findings we reviewed earlier, that a more robust rule of law framework with well protected property rights is conducive to better environmental protection. Sound Money has the weakest positive relationship with better environmental performance, given that sound monetary policies are difficult to have any direct impact on the environment. In this relationship we can also see that the third quartile has a marginally better EPI average than the second, indicating the weak linear association.

In contrast, when it comes to the Size of Government quartiles, the analysis indicates that the "Least Free" group tends to have a significantly higher EPI compared to the other groups in this category. This implies that regions with bigger government involvement, as reflected in the "Least Free" quartile, tend to exhibit better environmental performance. This relationship may partly be attributed to the fact that government expenditure on environmental protection in advanced economies is one of the most common budget expenditures.[37] Therefore, countries with bigger governments tend to allocate a vast number of resources in environmental protection compared to countries with smaller governments.

The findings suggest that once a certain threshold of economic freedom is reached, sustainability performance tends to improve, and there are no significant differences observed. However, the group of countries with the least economic freedom faces challenges in achieving better sustainability performance. This relationship is certainly influenced by various economic and social factors, in addition to the level of economic freedom. The effect should be partly attributed to the overall level of political and economic institutions, in particular income, which drive socio-economic development overall.

37 Fan, W., Yan, L., Chen, B., Ding, W., & Wang, P. (2022). Environmental governance effects of local environmental protection expenditure in China. *Resources policy*, *77*, 102760. https://doi.org/10.1016/j.resourpol.2022.102760

Figure 3. Average of Environmental Performance Index per economic freedom quartile.



Economic freedom and sustainability: the case of Greece

In the previous section, we examined the overall relationship between economic freedom and sustainability. However, when it comes to Greece, it is essential to closely compare the country's performance to the EU and OECD averages. This comparison will help us determine whether there is potential for reforms that can lead to improved outcomes in both economic freedom and environmental performance.

Greece is a laggard on sustainability performance compared to other developed countries (Figure 4). Greece has low environmental performance[38] holding the 47th place in 180 countries worldwide,[39] despite the fact that it has one of the biggest sizes of government in the world, ranked 158th among 165 countries worldwide (2021). More specifically, the state of Fisheries in Greece ranks at 91st place, indicating that the country faces encounter difficulties in maintaining sustainable practices in its fisheries. In Acidification Greece ranks at the 68th place. This rank implies a moderate level of acidification in Greece's environment, which can have adverse effects on aquatic ecosystems and biodiversity. Sanitation Drinking Water, Wastewater Treatment and Air Quality are quite good, ranked 12th, 19th and 31st respectively. On Heavy Metals Greece ranks at 40th place, which suggests a moderate level of heavy metal pollution. It underscores the importance of continued monitoring and efforts to reduce heavy metal contamination in Greece's environment.

As illustrated in Figure 5, Greece falls behind the EU and OECD averages in both environmental performance and economic freedom. Specifically, Greece has an Environmental Performance Index score of 5.62, which is lower than both the EU (6.18) and OECD (6.16) averages. Furthermore, Greece's economic freedom summary score is 6.94, which is also lower than both the EU (7.63) and OECD (7.77) averages. Greece's rating for the size of its government stands at 4.79, placing it below the averages of both the EU (5.75) and OECD (5.75). Greece's scores in the various sub-categories of economic freedom are lower than the EU and OECD averages, except for freedom in trade, where Greece is below both averages.

38 For example, in private sector the level of environmental reporting among Greek corporations is limited. Over 65% of the population does not provide information on the implementation of Environmental Management Systems (EMS) or other environmental initiatives. Only 20% of Athens Stock Exchange market corporations offer only minimal details concerning environmental matters. Notably, larger capitalization corporations are more likely to report on environmental issues than their mid and small capitalization counterparts. However, there was no significant difference in the extent of environmental reporting between capitalization categories and sectors within ASE. Papaspyropoulos, K.G., Blioumis, V. and Christodoulou, A.S. (2010), "Environmental reporting in Greece: the Athens stock exchange", African Journal of Business Management, Vol. 4 No. 13, pp. 2693-2704.

39 Environmental Performance Index (EPI), Greece score card.

Figure 4. Greece ranks among 180 countries worldwide, in EPI indicators.

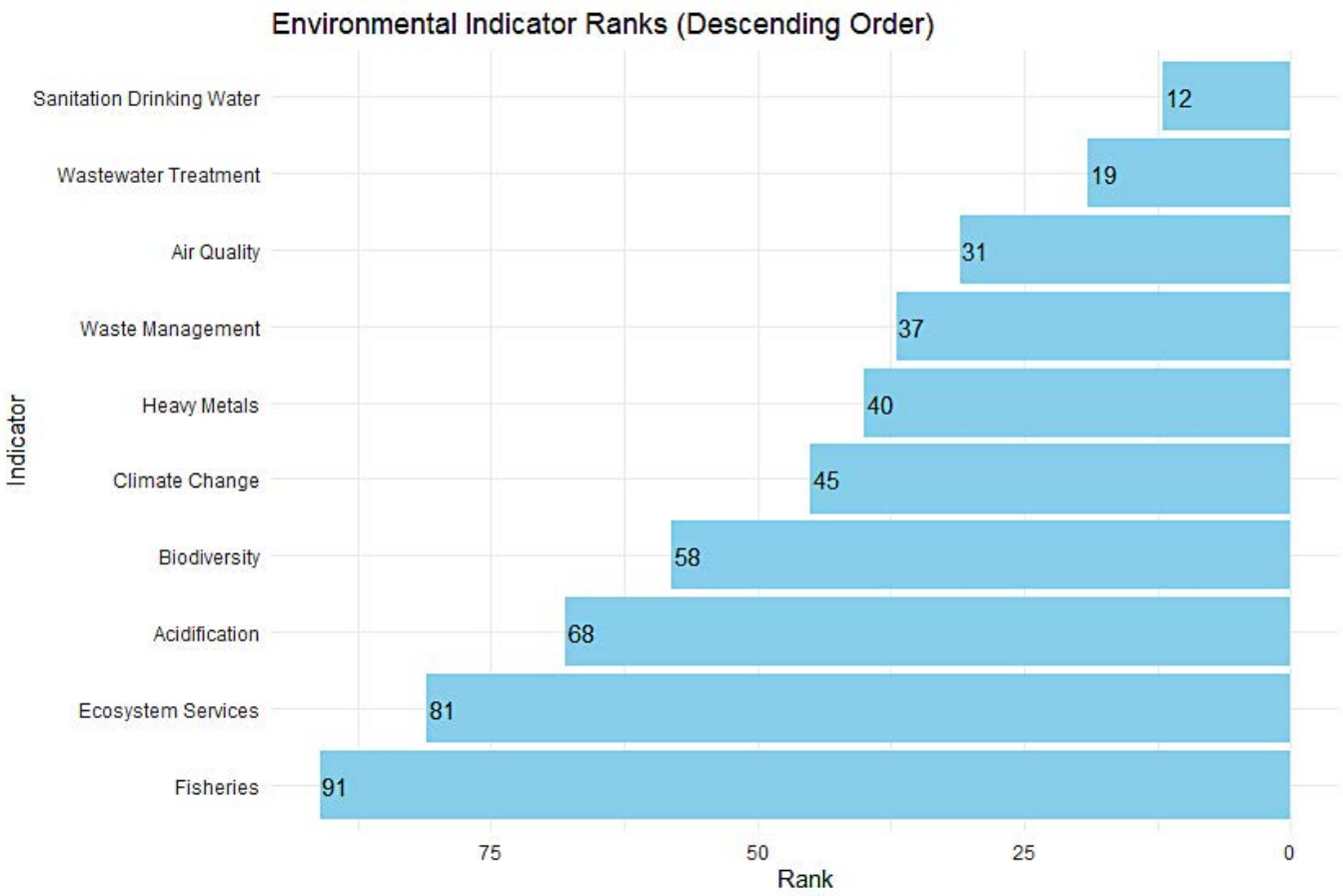
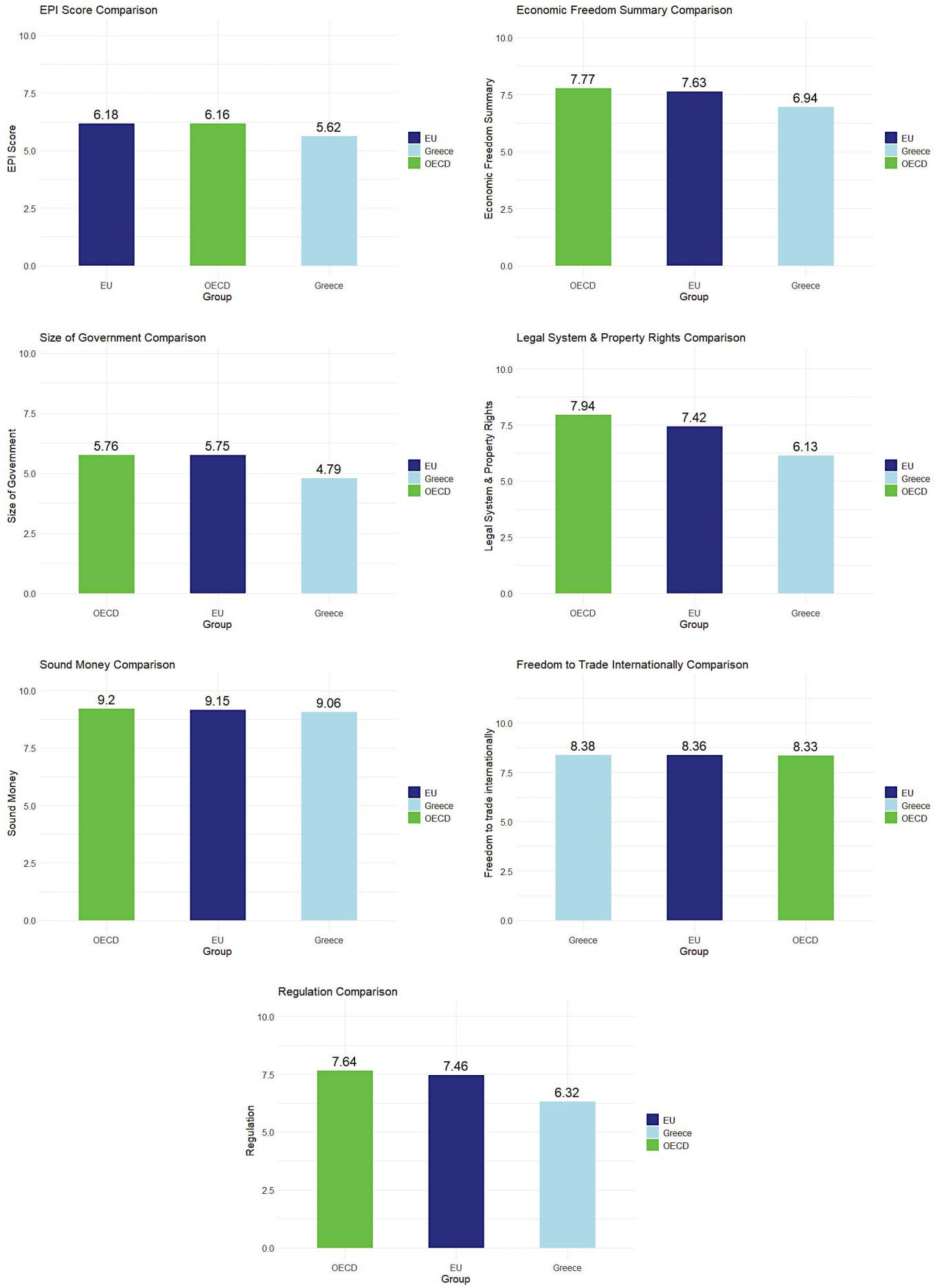


Figure 5. Average of Environmental Performance Index and Economic Freedom for Greece, OECD, and EU averages.



Conclusions and policy recommendations

In this policy paper we examined the relationship between economic freedom on sustainability. First, we presented the empirical finding on the the impact of economic freedom on sustainability, which seems to vary depending on specific contexts. Some studies reveal a positive correlation between greater economic freedom and improved environmental outcomes, especially in countries that prioritize a business-friendly environment, possess robust property rights, and promote trade freedom. In such cases, economic freedom appears to contribute positively to environmental sustainability and reduced emissions. Conversely, economic freedom may have adverse effects on environmental conditions, particularly in developing and emerging economies. Factors such as the size of government and limited regulatory control have been associated with environmental degradation. Unsustainable economic growth, expansion of trade, and reliance on non-renewable energy sources can also contribute to environmental harm.

Then, our comparative analysis brings to light a consistent relationship between environmental performance, as gauged by the EPI Index, and economic freedom and its various components. Across a spectrum of economic freedom indicators, encompassing factors like the size of government, the legal system, property rights, the stability of currency, freedom in international trade, and regulatory frameworks, a higher level of economic freedom is generally linked with improved environmental performance. This trend holds true across the board, with one intriguing exception being the size of government, where counterintuitively, greater government involvement appears to correspond with better environmental outcomes. The analysis of average scores in environmental performance across different quartiles of economic freedom and its subcategories revealed certain differences. The quartile characterized as the "Least Free" consistently demonstrates markedly lower environmental performance when compared to the other quartiles within each category. This finding implies that regions with diminished economic freedom, less robust legal systems, restricted international trade, and more stringent regulations tend to exhibit poorer environmental performance. However, when examining the Size of Government area, a different pattern emerges. Regions with limited government involvement have, on average, a lower sustainability performance compared to the "Least Free" quartile, which tend to showcase superior environmental outcomes. This suggests that bigger government influence may contribute to more favorable environmental outcomes.

Nonetheless, it is essential to consider that the current methodological approach and its outcomes should be approached with caution, as we must acknowledge certain limitations. The most important limitation is that our methodology does not intend to establish any causal relationship and the associations identified are subject to a series of confounding factors which could drive the relationships the results shown. The role of institutions and income cannot be neglected in a more nuanced explanation of the above relationships. Another major limitation is that we analyze composite indicators, which have certain advantages and disadvantages. Although composite indicators manage to summarize complex concepts, they also face, among others, conceptualization challenges, such as theoretical robustness, and measurement errors (selection of indicators, weighting schemes, and aggregation methods).[40] Nonetheless, composite indicators still remain useful policy tools to analyze overall trends, and the ones we used seem to be the most prevalent in the academic literature.

Shifting our focus to Greece, it becomes obvious that the country lags behind both the European Union and the OECD averages in terms of both environmental performance and economic freedom. Greece's EPI score, its overall economic freedom rating, and its scores across various economic freedom sub-categories all fall short of the EU and OECD averages. The only exception to this trend is Greece's score in the freedom to trade, which is marginally better. The analysis reveals that there exists room for reforms within Greece that could enhance economic freedom and environmental performance.

In summary, the analysis indicates that economic freedom and sustainability are not incompatible, but specific challenges must be addressed to enhance both simultaneously. There is no one-size-fits-all solution due to varying socioeconomic circumstances in different countries or regions. Developed nations with strong institutional frameworks can prioritize sustainability, while developing countries would focus on policies that reduce socioeconomic disparities globally. Nevertheless, policy makers should ensure that sustainability doesn't come at the expense of social progress achieved or can be achieved, and economic growth should not harm the ecosystem. Therefore, based on the findings of our analysis and adhering to the principles of economic freedom and sustainability, we suggest the following policy recommendations that can promote both in Greece:

40 Kešeljević, A. (2007). Indexes of economic freedom – An outline and open issues. Zbornik Radova Ekonomskog Fakultet au Rijeci, 25, 223-243. Munck, G. L., & Verkuilen, J. (2002). Conceptualising and Measuring Democracy: Evaluating Alternative Indices. Comparative Political Studies, 35(1), 5-34.

Enhance the Rule of Law and Legal System: The greatest distance of Greece from EU average is in Legal System & Property Rights, which also seems to have the strongest positive relationship with sustainability performance. Therefore, Greece's reform efforts should be directed toward enhancing legal frameworks and property rights protection, which could boost both economic freedom and sustainability performance.

Address the Size of Government: Although Greece has one of the biggest sizes of government in the world, its corresponding score in sustainability performance is not the one expected given the relationship identified between the two. Thus, there is a need Greece to carefully evaluate the role of the government in the country's economic and environmental landscape. On the one hand, Greece should reduce subsidies and top marginal tax rates, while one the other hand, could reallocate a small amount of these government resources towards environmental protection.

Promote International Trade on EU level: While Greece lags in economic freedom overall, it performs relatively better in the freedom to trade compared to the EU and OECD averages. Given that free trade for EU countries is a mixed competence, Greece can build on this strength by further promoting international trade agreements and reducing trade barriers on EU level. However, it should be noted that free trade can only go forward with countries which foster international cooperation on mutually agreed sustainability and environmental standards, following the example of advanced economies that have enforced carbon reduction policies in economic activity.

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