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Does Ethical Behaviour Affect Sustainable Development? Evidence from Developed and Developing Countries

Hui Wang [1,*], Haiming Chen [2] and Vincent Tawiah [3]

[1] School of Landscape Architecture, Nanjing Forestry University, Nanjing 210037, China
[2] Zhejiang Urban and Rural Planning Design Institute, Hangzhou 310030, China; chenhaimingzjplan@126.com
[3] School of Business, Dublin University, 12700 Dublin, Ireland; vincent.tawiah@dcu.ie
* Correspondence: wanghuiurbanplan@njfu.edu.cn

Abstract: This paper examines the relationship between ethical behavior and green growth for a large sample of 109 countries, comprised of developed and developing countries. We applied panel corrected the standard error (PCSE) and system generalized moment of method (S-GMM) to achieve the set-aside objectives. We use the recent data from Organisation for Economic Co-operation and Development (OCED). Our results show that high ethical behavior is associated with an increase in green growth, suggesting that the ethical standard plays a significant role in achieving sustainable development. We also find that the relationship between ethical behavior and green growth is more pronounced in developed countries than in developing countries. This is attributed to the ethical standard laid down in most of the developed countries. The results are unaffected by alternative variable measurements and econometric estimations. Our findings highlight the need for policymakers to consider non-economic and technological factors such as ethics to achieve growth that is both environmentally and economically sustainable.

Keywords: environment; ethical behavior; green growth; sustainable development

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1. Introduction

The predominant evidence of economic development as the main cause of climate change has a widespread belief that people are only motivated to improve environmental quality if there is personal economic gain [1] This misconception had led to the overlooking of ethics as another source of human motivation, where people's action toward the environment is driven by their ethical standards but not necessarily by economic benefits [2]. Environmental sustainability or sustainable development is hinged on the moral and ethical obligation of meeting today's needs without compromising tomorrow's needs [3]. However, the quest for economic and technological solutions to environmental problems has overshadowed the significance of ethical consideration in the fight against climate change. Yet, these economic and technological measures that have been advocated over the decades have not yielded any significant results. Salamat [1], therefore, argues that we need more appealing discourse such as ethical imperative to advocate a sustainable environment.

Brown [4] also argues that environmental sustainability is grounded on the ethical commitment to seeking the well-being of future generations. Therefore, we argue that ethical countries are likely to experience an increase in green growth because they feel obligated to meet their present needs without compromising on the needs of future generations. Countries can demonstrate their ethical commitment by adopting sustainable policies that prioritize sustainability and environmental protection. Investing in renewable energy will encourage the transition from fossil fuels to renewable energy sources, which is crucial for sustainable development. Countries can also propagate ethical commitment by encouraging the reuse, recycling, and repurposing of materials and products, as well as promoting sustainable production and consumption patterns. Protecting natural resources

and biodiversity is an ethical commitment. Countries are likely to establish protected areas, enforce regulations against illegal wildlife trade and deforestation, and support initiatives that conserve ecosystems and wildlife habitats. Encouraging sustainable transport, stakeholder engagement and collaboration, education and awareness, and international cooperation are all ethical commitments that are targeted toward green growth [5–7].

Despite the fact that climate change appeals to moral consciousness and ethical principles, the effect of ethics on a sustainable environment is surprisingly understudied [8,9]. Therefore, in this study, we examine the relationship between ethical behavior and green growth. We employ robust econometric techniques such as panel corrected the standard error (PCSE) on a large panel data of 109 developed and developing countries. We use the recent data from Organisation for Economic Co-operation and Development (OCED) on environmental performance. Green growth is the headline indicator at the OECD statistics, which measures how a country's growth is becoming greener. According to OECD (2020) statistics, green growth indicates whether economic growth is becoming greener with more efficient use of natural capital. Green growth captures all areas of production, which are rarely quantified in economic models and accounting frameworks (OECD, 2020). Therefore, the green growth indicator captures more information on the environment as both an input factor and output of activity, compared to other measurements in prior studies such as emissions, which are based on the output of an activity. More so, the green growth indicator helps in monitoring progress toward a sustainable and greener economy (OECD, 2020). Ethical behavior means acting in a way that society and individuals think are good values. Ethical behavior tends to be good for the environment, by demonstrating respect for key moral principles that include fairness, equity, and dignity [10].

Given this fact, we use ethical behavior data from the Global Competitive Index hosted by the World Economic Forum, which is measured based on the feedback received for the question on how to rate corporate ethics of companies (ethical behavior in interactions with public officials, politicians, and other firms). By integrating ethical behaviour or commitment with green growth, our research offers a novel approach to encourage a modal shift from the macroeconomic approach of promoting green growth to a social approach. This unique policy design aims to not only meet the present environmental protection demand but also to direct the protection of the future generation.

We find a positive association between ethical behavior and green growth, suggesting countries with ethical standards are more environmentally sustainable. The results imply that high ethical standards can facilitate the achievement of the 2030 Agenda for Sustainable Development Goals. However, our results are sensitive to the development status of the country. We find that the positive effect of ethical behavior is more pronounced in developed countries than in developing countries. In further analysis, we find that the institutional quality of a country does not significantly change the relationship between ethical behavior and green growth.

Our study makes an incremental contribution to the existing literature threefold. First, we provide an understanding of how ethical behavior influences the journey toward a greener environment without an umpteenth analysis of carbon emissions as executed in prior studies. Second, by focusing on ethical behavior, we provide novel evidence from a non-economic or technological perspective on factors driving a sustainable environment. Hence, our findings inform policymakers about the need to appeal to the moral conscience and ethical principles to drive the agenda for greener development and growth. Third, we use relatively large sample countries, which increases the precision in the estimation and generalizability of the findings. With a large sample of 109 developed and developing countries, we are able to demonstrate how the relationship between ethical behavior and green growth differs based on a country's level of development.

The remainder of the paper is as follows. The econometric methodology and data collection are presented in Section 2. In Section 3, we present and discuss the empirical results. Section 4 concludes the paper with policy implications and suggestions for future research.

2. Literature Review

The relationship between ethical behavior and green growth has been a subject of increasing interest in the fields of sustainability, and environmental studies. Numerous studies have examined the intersection of ethical behavior and green growth to understand how ethical considerations can drive environmentally sustainable economic growth. Ethical considerations can play an important role in fostering environmentally sustainable economic development by guiding decision-making, influencing policies and practices, and encouraging responsible behavior. Ethical considerations, for example, encourage a long-term perspective that considers the welfare of future generations. Ethical frameworks promote sustainable economic development that minimizes negative impacts on ecosystems and supports intergenerational equity by recognizing the finite nature of resources and the significance of environmental preservation [11,12].

Ethical considerations require responsible resource management, including the extraction and use of natural resources in a sustainable manner. Adopting practices that minimize waste, reduce pollution, promote resource efficiency, and prioritize renewable and recyclable materials is required [13–15] Ethical considerations can also highlight the significance of stakeholder participation and collaboration. In the context of environmentally sustainable economic development, this involves involving diverse constituents in decision-making processes, such as local communities, environmental organizations, indigenous groups, and affected parties. Engaging stakeholders promotes transparency, inclusiveness, and accountability, resulting in more sustainable and equitable outcomes [16].

The concept of corporate social responsibility (CSR) is centered on ethical considerations. CSR-embracing businesses incorporate social and environmental responsibilities into their business models and operations. By considering the impact of their activities on the environment and society, organizations are able to implement sustainable practices, reduce their ecological footprint, and positively impact local communities [17–19]. Increasingly, consumers base their decisions on ethical considerations. Consumers are becoming increasingly aware of the environmental and social consequences of their purchasing decisions, resulting in an increase in demand for environmentally sustainable products and services. Ethical consumerism can motivate businesses to adopt sustainable practices in order to satisfy consumer preferences and expectations [20–22].

Ethical considerations can inform the development of policies and regulations that promote environmentally sustainable economic development. Governments and regulatory bodies can incorporate ethical principles into their decision-making processes and create policies that encourage sustainable practices, such as renewable energy targets, emission reduction goals, and green investment incentives [23,24]. Environmentally sustainable economic development is fundamentally dependent on ethical leadership and governance. Leaders who prioritize ethical behavior and sustainability have the ability to influence organizational cultures, encourage responsible decision-making, and motivate others to adopt sustainable practices. Ethical leadership promotes environmental stewardship at all levels of society and facilitates the incorporation of sustainability principles into business strategies and operations.

In essence, previous studies have attempted to investigate the impact of ethical behavior on economic development and sustainability. However, the majority of these studies are country-level research, which is heterogeneous and cannot be generalized. In light of this, we are including both developed and developing economies in our research to account for heterogeneous differences in the level of development and institutional development in relation to environmental sustainability and green growth. Secondly, previous studies [25–27] focus on carbon emission reduction as an indicator of sustainability. We argue that carbon emissions cannot be generalized as the primary factor in measuring sustainability.

3. Econometric Methodology and Data Collection

3.1. Cross-Sectional Dependence Tests

Green growth is a headline indicator that implies environmental and resource productivity with interdependence between countries through foreign direct investment. It becomes imperative to consider the impact of the cross-sectional dependency on cross-country panels. Latif et al. [28] argue that cross-sectional dependence may be caused by the unobserved common shocks that add to the error terms. Hence, if not taken to account in the estimation, it's likely to lead to inconsistent standard error terms [29]. Given this fact, we test for cross-sectional dependence using a semi-parametric test developed by Friedman [30] and a parametric test developed by Pesaran [31]. It allows for various forms of cross-sectional dependence, including spatial, time, and factor structures. This flexibility makes it applicable to a wide range of panel data settings. Pesaran's [31] CD test is also advantageous over other tests because it is applicable to both large-N (a large number of individual units) and small-T (a small number of time periods) panels. The following are the two tests:

The Freidman statistic computes:

$$R = \frac{2}{N(N-1)} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} y \tag{1}$$

where y is the spearman's rank correlation coefficient between i and j expressed as:

$$y = y = \frac{\sum_{t=1}^{T}(y-(T+1/2))(y-(T+1/2))}{\sum_{t=1}^{T}(y-(T+1/2))^2} \text{ of the residuals}$$

The Pesaran statistic computes:

$$\sqrt{\frac{2T}{N(N-1)\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\right)y}} \tag{2}$$

where y is the estimate of

$$y = y = \frac{\sum_{t=1}^{T} \varepsilon it^2 \varepsilon jt^2}{\left(\sum_{t=1}^{T} \varepsilon it^2\right)^{1/2}\left(\sum_{t=1}^{T} \varepsilon jt^2\right)^{1/2}} \tag{3}$$

The null hypothesis to be tested is: y = y = corr (εit, εjt) = 0 for i ≠ j, and the alternative hypothesis to be tested is ρij = ρji ≠ 0 for some i ≠ j.

3.2. Panel Unit Root Tests

After establishing the presence of cross-sectional dependence in the panel dataset, we employ the LLC statistics of Levin et al. [32] and the CIPS statistic of Pesaran [31] to treat this effect. The LLC test estimates the null hypothesis that each cross-section in the panel holds a substantial unit root. In contrast, the alternative hypothesis expresses that stationarity holds in all cross-sections. This technique is unique because it produces reliable results for a moderate size panel and enables a researcher to apply the test when we have fixed effects, individual deterministic trends, and heterogeneous serial correlated error [33]. For instance, in a cross-sectional circumstance, the LLC test withholds some degree of cross-sectional dependence by subtracting the cross-sectional average from the data. Therefore, we eliminate the cross-section in the data by demeaning the data when running the LLC test.

The CIPS test works with the cross-sectional average and the transformed versions of the dataset to remove the impact of cross-sectional dependence. The assumption is that the null hypothesis says that stationarity does not hold among the series, while the alternative

hypothesis postulates that stationarity occurs among the series. The CIPS test is specifically designed to address cross-sectional dependence in panel data. It takes into account the potential presence of common factors or spatial dependencies among the individual units in the panel. This robustness to cross-sectional dependence makes the CIPS test more suitable for panel data analysis compared to traditional unit-root tests that assume independence across observations. The asymptotic of CIPS is non-standard, and the critical values are provided for both N and T.

3.3. Panel Analysis

This study draws inspiration from previous studies such as [34,35], who narrated the connection between ethical behavior and green growth. Having established the stationarity of the dataset, we follow Poveda [36]; Abbate et al. [37,38]; Costa and Matias, [39]; Lee [40]; Shakeel and Ahmed [41]; Fujii and Managi [42]; Zhang and Jiang [43] and Li et al. [33], and employ panel corrected standard errors model to examine the role of ethics (i.e., ethical behavior) on green growth. We estimate the panel corrected standard errors model of the form:

$$Green\ growth = \beta_0 + \beta_1 Ethical\ behaviour_{it} + \beta_2 Control\ variables_{it} + \varepsilon_{it} \quad (4)$$

The control variables are population, economic growth, energy use, CO_2 emissions, and foreign direct investment. The β measure the estimated coefficients of all the variables (ethical behavior, population, economic growth, energy use, CO_2 emissions, and foreign direct investment), the subscripts e_i refers to the error term, while each country's fixed effects; that is, the countries and the time is shown by the subscripts i ($i = 1, \bar{N}$) t ($t = 1, \bar{T}$), respectively.

We use a sample of 109 developed and developing countries (see Appendix A) spanning the period of 2007–2017 to estimate the role of ethics on green growth based on data availability. Our data comprise ethics behavior, ethics and corruption, green growth, energy consumption, economic growth, population, and FDI (see Table 1 for details).

Table 1. Variables description and sources.

Variable	Description	Sources
Green growth	A headline indicator that measures the environmental and resources productivity	OECD Statistics
Ethical behaviour	Measure the rate of companies' corporate ethics (ethical behavior in interactions with public officials, politicians, and other firms). It is measured on a scale of 1 to 7.	World Economic Forum (2014)
Energy Consumption	Energy use (kg of oil equivalent) per $1000 GDP	World Development Indicators
Economic growth	Gross domestic product annual percentage growth	World Development Indicators
Population	Total population	World Development Indicators
Foreign direct investment	The total level of direct investment as a percentage of GDP	World Development Indicators

4. Results and Discussion

4.1. Pre-Regression Analysis

We present the descriptive statistics of the variables in Table 2. The mean green growth is 5.991, with a higher standard error deviation (3.422), indicating large variations among the sample countries, while the largest variation is in developed countries (1.962) over developing countries (1.497). The average ethical behavior (5.07) in developed countries is higher than the average ethical behavior (3.854) in developing countries, indicating that developed countries are more ethical in their firms than developing countries. This is also reflected in Figures 1 and 2, with higher ethical behavior and green growth in developed countries over developing countries. The average mean of economic growth has surged in developing countries (3.965) over the developed countries (1.973); this may be caused by the average population growth in developing countries (67,400,000), which is about 50% higher than in developed countries (3,500,000). While the average mean of CO_2 emissions in developed countries (10.316) is higher than in developing countries (3.696), an indication that developed consume more energy than developing countries. The low average means of FDI in developing countries (0.724) over the developed countries (10.318) show that developed countries have implemented trade liberalization policies.

Table 2. Descriptive Statistics.

Variables	Obs	Mean	1 Percentile	Std. Dev.	99 Percentile
		Full sample			
Green growth	1199	5.991	1.521	3.422	16.599
Ethical behaviour	1199	4.233	0	1.152	6.594
Population	1199	56,800,000	311,566	1.790×10^8	1.325×10^9
Economic growth	1199	3.344	–7.548	3.935	14.047
Energy use	1199	2195.202	0	3047.72	16,353.831
CO_2 emissions	1199	5.761	0	7.104	35.126
Foreign direct investment	1199	3.717	–18.841	20.883	70.375
		Developed countries			
Green growth	374	5.425	1.962	2.556	13.809
Ethical behaviour	374	5.07	0	1.164	6.705
Population	374	33,500,000	388,646	60,300,000	3.183×10^8
Economic growth	374	1.973	–7.800	3.778	17.664
Energy use	374	3996.142	0	3185.432	17,266.132
CO_2 emissions	374	10.316	0	8.22	42.86
Foreign direct investment	374	10.318	–3.656	31.783	223.696
		Developing countries			
Green growth	825	6.248	1.497	3.722	17.298
Ethical behaviour	825	3.854	0	0.924	6.184
Population	825	67,400,000	71,183	2.120×10^8	1.338×10^9
Economic growth	825	3.965	–7.3	3.848	13.7
Energy use	825	1378.776	0	2602.274	15,108.653
CO_2 emissions	825	3.696	0	5.394	33.755
Foreign direct investment	825	0.724	–29.252	12.167	17.259

We check for the cross-sectional dependence or independence (using Friedman and Pesaran cross-sectional dependence test) among the variable green growth, ethical behavior, population, economic growth, energy use, CO_2 emission, and foreign direct investment, and the results are reported in Table 4. The results indicate rejection of the null hypothesis of no presence of cross-sectional dependence at 1%, 5%, and 10%, suggesting the presence of cross-sections among the datasets. Given this fact, we estimate for LLC test and CIPS test, and the results are reported in Tables 5–7. The results show that the ethical behavior, energy use, and CO_2 emission are not stationary in the level form with an intercept and a

trend for the global panel, except the ethical behavior and energy use that show stationary at intercept and a trend. In the same vein, the CIPS test shows that green growth, ethical behavior, population, economic growth, and CO_2 emissions are non-stationary in the level form with intercept and a trend. However, all the variables are stationary in the first difference, suggesting that all the variables are good for panel-corrected standard error analysis.

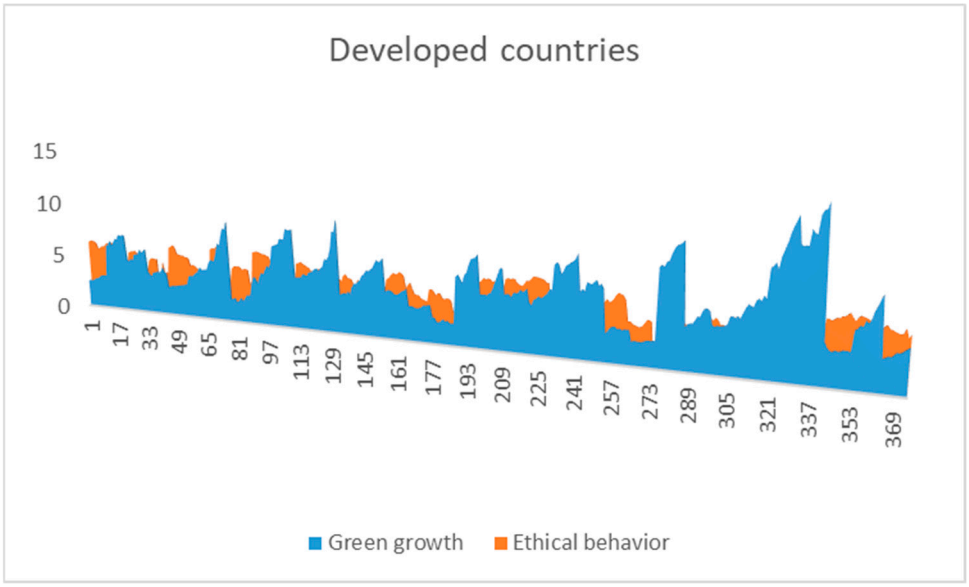

Figure 1. The intersection between ethical behaviour and green growth.

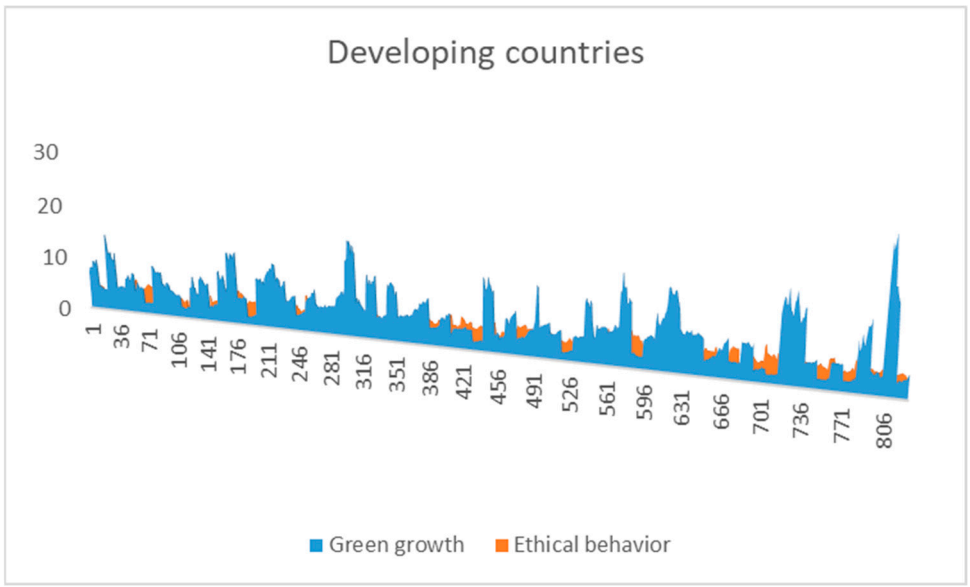

Figure 2. The intersection between ethical behavior and green growth.

The results for the Pearson Pairwise correlation are presented in Table 3. All variables' coefficient is below the threshold of 0.8 for multi-collinearity issues [44,45].

Table 3. Pairwise Correlation.

	(1)	(2)	(3)	(4)	(5)	(6)
Green growth	1					
Population	–0.1265	1				
Economic growth	0.1922	0.1591	1			
Energy use	–0.2767	–0.078	–0.0945	1		
CO_2 emissions	–0.4486	–0.0598	–0.0833	0.7655	1	
Foreign direct investment	–0.0528	–0.037	–0.0585	0.0571	0.0807	1

Table 4. Cross-sectional independence.

	Global Panel		Developed Countries		Developing Countries	
Test Statistics	**Friedman**	**Pesaran**	**Friedman**	**Pesaran**	**Friedman**	**Pesaran**
Green growth	130.042 *	29.004 ***	97.909 ***	20.810 ***	44.019 ***	9.113 ***
	(0.0731)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Ethic and corruption	263.103 ***	126.281 ***	133.235 ***	48.298 ***	187.726 ***	75.090 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Ethical behaviour	53.181 ***	9.694 ***	15.107 ***	0.552 ***	50.058 ***	11.150 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Population	232.372 ***	49.939 ***	50.952 *	18.478 ***	189.675 ***	41.051 ***
	(0.0000)	(0.0000)	(0.0238)	(0.0000)	(0.0000)	(0.0000)
Economic growth	246.399 ***	84.113 ***	156.642 ***	43.897 ***	138.742 ***	46.174 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Energy use	267.384 ***	110.385 ***	164.818 ***	45.223 ***	175.135 ***	75.879 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
CO_2 emissions	354.542 ***	143.254 ***	136.144 ***	52.923 ***	238.878 ***	92.228 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Foreign direct investment	69.510 ***	17.896 ***	78.118 ***	20.002 ***	65.935 ***	15.555 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

The *p*-values are in parentheses and reject the independence null hypothesis. * Shows significance at the 10% level of significance. *** Shows significance at the 1% level of significance.

Table 6 shows the panel unit root test for developed countries. The LLC results show that green growth, ethical behavior, energy use, and CO_2 emissions are non-stationary in their level form at intercept and a trend except for the ethical behavior and energy use, which happen to be stationary in a trend. Similarly, the CIPS estimation shows that ethical behavior, population, economic growth, and CO_2 emissions are not stationary at intercept and a trend. However, when transformed, all the variables become stationary. Table 7 reports the panel unit-root test for developing countries. LLC results suggest that ethical behavior, energy use, and CO_2 emissions are not stationary in their level form without trend but stationary with a trend except for CO_2 emission. As for CIPS, the results show that with the exceptions of energy use and foreign direct investment, all the variables are non-stationary in their level form at intercept and a trend but become stationary after the first difference. Our results suggest that green growth, ethical behavior, population, economic growth, energy use, CO_2 emission, and foreign direct investment are good for implementing panel-corrected standard error analysis after taking the first difference

4.2. Main Results

We have investigated the impact of ethical behavior on green growth using the global sample, including developed and developing countries. The results in Table 8 show that the coefficient of ethics (ethical behavior) (0.276 ***) is positive and significant at 1%, indicating that ethical behavior matters in improving green growth. This follows the presumption that environmental attitude counts a lot to decide environmental quality and economic growth. The more ethical a firm become in dealing with natural resources, the more likely

environmental degradation will be reduced. That means green growth will increase by 0.053 points (0.276 × 1.152)/5.991.

Table 5. Panel unit root analysis for the global panel.

Variables	In Level				In 1st Difference			
	Constant	*p*-Value	Constant and Trend	*p*-Value	Constant	*p*-Value	Constant and Trend	*p*-Value
The LLC unit root test on the demeaned series								
Green growth	–2.4439 **	0.0073	–17.9703 ***	0.0000	–19.6482 ***	0.0000	–24.4703 ***	0.0000
Ethic and corruption	–10.0919 ***	0.0000	–13.1460 ***	0.0000	–14.2684 ***	0.0000	–7.9019 ***	0.0000
Ethical behavior	0.9911	0.8392	–7.4624 ***	0.0000	–8.5140 ***	0.0000	–11.8981 ***	0.0000
Population	–3.5874 ***	0.0002	–9.5554 ***	0.0000	–10.2326 ***	0.0000	–47.2617 ***	0.0000
Economic growth	–20.6453 ***	0.0000	–40.2016 ***	0.0000	–59.3811 ***	0.0000	–68.9396 ***	0.0000
Energy use	11.1503	1.0000	–3.9466 ***	0.0000	–6.1994 ***	0.0000	–5.1478 ***	0.0000
CO_2 emissions	34.2711	1.0000	38.4840	1.0000	–54.0904 ***	0.0000	–25.1803 ***	0.0000
Foreign direct investment	–15.2159 ***	0.0000	–16.2346 ***	0.0000	–20.3522 ***	0.0000	–23.7967 ***	0.0000
The CIPS unit root test								
Green growth	–2.127		–2.500		–2.924 ***		–3.040 ***	
Ethics and corruption	–1.443		–1.711		–2.717 ***		–3.676 ***	
Ethical behavior	–1.696		–1.378		–2.469 **		–3.586 ***	
Population	–1.475		–1.753		–1.738 ***		–2.769 *	
Economic growth	–1.962		–2.556		–3.209 ***		–3.254 **	
Energy use	–5.367 ***		–6.088 ***		–5.971 ***		–6.205 ***	
CO_2 emissions	–1.422		–1.911		–2.487 **		–2.780 *	
Foreign direct investment	–2.583 ***		–3.054 ***		–3.728 ***		–3.697 ***	

The *p*-values are in parentheses and reject the independence null hypothesis. * Shows significance at the 10% level of significance. ** Shows significance at the 5% level of significance. *** Shows significance at the 1% level of significance.

Table 6. Panel unit root analysis for the developed countries.

Variables	In Level				In 1st Difference			
	Constant	*p*-Value	Constant and Trend	*p*-Value	Constant	*p*-Value	Constant and Trend	*p*-Value
The LLC unit root test on the demeaned series								
Green growth	0.3063	0.6203	–9.6278 ***	0.0000	–9.6278 ***	0.0000	–16.0112 ***	0.0000
Ethic and corruption	–10.0919 ***	0.0000	–13.1460 ***	0.0000	–14.2684 ***	0.0000	–7.9019 ***	0.0000
Ethical behavior	0.9911	0.8392	–7.4624 ***	0.0000	–8.5140 ***	0.0000	–11.8981 ***	0.0000
Population	–3.5874 ***	0.0002	–9.5554 ***	0.0000	–10.2326 ***	0.0000	–47.2617 ***	0.0000
Economic growth	–20.6453 ***	0.0000	–40.2016 ***	0.0000	–59.3811 ***	0.0000	–68.9396 ***	0.0000
Energy use	11.1503	1.0000	–3.9466 ***	0.0000	–6.1994 ***	0.0000	–5.1478 ***	0.0000
CO_2 emissions	34.2711	1.0000	38.4840	1.0000	–54.0904 ***	0.0000	–25.1803 ***	0.0000
Foreign direct investment	–15.2159 ***	0.0000	–16.2346 ***	0.0000	–20.3522 ***	0.0000	–23.7967 ***	0.0000
The CIPS unit root test								
Green growth	–2.237 *		–2.237		–2.738 ***		–3.618 ***	
Ethics and corruption	–1.443		–1.711		–2.717 ***		–3.676 ***	
Ethical behavior	–1.696		–1.378		–2.378 **		–3.586 ***	
Population	–1.475		–1.753		–2.753 ***		–3.569 ***	
Economic growth	–1.962		–2.556		–3.209 ***		–3.254 ***	
Energy use	–5.367 ***		–6.088		–5.971 ***		–6.205 ***	
CO_2 emissions	–1.422		–1.911		–2.487 **		–3.580 ***	
Foreign direct investment	–2.583 ***		–3.054 ***		–3.728 ***		–3.697 ***	

The *p*-values are in parentheses and reject the independence null hypothesis. * Shows significance at the 10% level of significance. ** Shows significance at the 5% level of significance. *** Shows significance at the 1% level of significance.

Table 7. Panel unit root analysis for the developing countries.

Variables	In Level				In 1st Difference			
	Constant	*p*-Value	Constant and Trend	*p*-Value	Constant	*p*-Value	Constant and Trend	*p*-Value
The LLC unit root test on the demeaned series								
Green growth	–3.6217 ***	0.0001	–15.1890 ***	0.0000	–16.2994 ***	0.0000	–18.7934 ***	0.0000
Ethic and corruption	–10.0919 ***	0.0000	–13.1460 ***	0.0000	–14.2684 ***	0.0000	–7.9019 ***	0.0000
Ethical behavior	0.9911	0.8392	–7.4624 ***	0.0000	–8.5140 ***	0.0000	–11.8981 ***	0.0000
Population	–3.5874 ***	0.0002	–9.5554 ***	0.0000	–10.2326 ***	0.0000	–47.2617 ***	0.0000
Economic growth	–20.6453 ***	0.0000	–40.2016 ***	0.0000	–59.3811 ***	0.0000	–68.9396 ***	0.0000
Energy use	11.1503	1.0000	–3.9466 ***	0.0000	–6.1994 ***	0.0000	–5.1478 ***	0.0000
CO_2 emissions	34.2711	1.0000	38.4840	1.0000	–54.0904 ***	0.0000	–25.1803 ***	0.0000
Foreign direct investment	–15.2159 ***	0.0000	–16.2346 ***	0.0000	–20.3522 ***	0.0000	–23.7967 ***	0.0000
The CIPS unit root test								
Green growth	–1.057		–1.902		–2.542 ***		–3.637 ***	
Ethics and corruption	–1.443		–1.711		–2.717 ***		–3.676 ***	
Ethical behavior	–1.696		–1.378		–2.469 **		–3.586 ***	
Population	–1.475		–1.753		–2.738 ***		–3.569 ***	
Economic growth	–1.962		–2.556		–3.209 ***		–3.254 ***	
Energy use	–5.367 ***		–6.088 ***		–5.971 ***		–6.205 ***	
CO_2 emissions	–1.422		–1.911		–2.487 **		–3.580 ***	
Foreign direct investment	–2.583 ***		–3.054 ***		–3.728 ***		–3.697 ***	

The *p*-values are in parentheses and reject the independence null hypothesis. ** Shows significance at the 5% level of significance. *** Shows significance at the 1% level of significance.

Table 8. Main results.

	Global Sample	Developed Countries	Developing Countries
Variables	Green growth	Green growth	Green growth
Ethical behaviour	0.276 ***	0.496 ***	–0.0608
	(0.0884)	(0.114)	(0.135)
Population	-3.52×10^{-9} ***	-7.46×10^{-9} ***	-3.35×10^{-9} ***
	(1.64×10^{-10})	(5.61×10^{-10})	(2.08×10^{-10})
Economic growth	0.205 ***	0.0919 ***	0.231 ***
	(0.0401)	(0.0346)	(0.0493)
Energy use	0.000192 ***	0.000237 **	0.000235 ***
	(5.78×10^{-5})	(9.83×10^{-5})	(5.82×10^{-5})
CO_2 emissions	–0.298 ***	–0.242 ***	–0.394 ***
	(0.0316)	(0.0375)	(0.0368)
Foreign direct investment	–0.00217	–0.00267	–0.0112 *
	(0.00237)	(0.00169)	(0.00622)
Fixed year effects	Yes	Yes	Yes
Constant	4.898 ***	3.711 ***	6.281 ***
	(0.518)	(0.619)	(0.493)
Observations	1199	374	825
R-squared	0.296	0.414	0.311
Number of ID	109	34	75

The *p*-values are in parentheses and reject the independence null hypothesis. * Shows significance at the 10% level of significance. ** Shows significance at the 5% level of significance. *** Shows significance at the 1% level of significance.

Given that our sample size is large, it is likely that our results could be driven by a particular set of countries, especially developed or developing countries. The level of environmental pollution differs between developed and developing. Whereas developing countries have a high pollution rate, developed countries are the largest contributors to CO_2 emissions but decreasing [46]. Furthermore, developed countries have high economic development but slow economic growth compared to the high economic growth but low

economic development of developing countries. Moreover, our large sample size contains 75 developing countries and 34 developed countries; hence, developing countries can drive our main results. Consequently, in this section, we use sub-sampling estimation techniques to check whether the role of ethics on green growth differs between developed and developing countries.

Column 2 shows the role of ethics (ethical behavior) on green growth in developed countries. The results are consistent with the main results in column 1; that is, ethical behavior improves green growth. This is possible because there is tight regulation in virtually all sectors of the economy in developed countries. As such, every sector must work in line with the policy of the government. As a routine, policies on environmental protection are put in place and enforced. Hence, such countries are likely to achieve green growth.

Contrarily to the developed countries, the result of the developing countries shows that ethical behavior is not significant in driving green growth. One possible reason is that most developing countries solemnly depend on natural resources for revenue and foreign exchange [47]. Hence, the economies of these countries are engineered by the fund accrued from the exploitation of these natural resources, leading to the indiscriminate exploitation of natural resources, in which ethics are put aside. Most of these countries avoid environmental guideline for operating businesses due to inadequate regulation of the activities of the companies and firms.

The results of most control variables meet the standard assumption. For example, the population and CO_2 emissions are associated with a decrease in green growth. In contrast, countries with large economic growth and energy use experience green growth. The large and consistent R-squared across all the models signals how well the selected variables explain green growth variations.

4.3. Accounting for Institutional Quality

Prior studies suggest that improving environmental quality largely depends on the soundness and quality of environmental policies. However, without quality institutions, legislation may not be effective and efficient to reduce the menace of environmental degradation and improve green growth [48–50]. Hence, our results may pose biased findings if the effects of institutional quality are not considered. Therefore, we are motivated to evaluate the impact of a country's institutional quality in shaping the outcome of the nexus of ethics (ethics and corruption, and ethical behavior) and green growth.

Following prior studies [51–53], we use Principal Component Analysis to develop an institutional quality index from the six Worldwide Governance Indicators. Next, we interact with the institutional quality variable with each of the proxies for firms' ethical behavior to create a moderating term. As presented in Table 9, we begin by including an alternative indicator for ethics (ethics and corruption) to establish the relationship between ethics and green growth. The results for the global sample and developed countries show that the two indicators for ethics (ethical behavior; and ethics and corruption) have a positive effect on green growth, while in developing countries, ethics and corruption show a negative effect on green growth, without any relationship confirms with the ethical behavior of firms. The coefficient of moderating terms (ethics and corruption $\times$ institutional quality and ethical behavior $\times$ institutional quality) shows no correlation in all the panels except for firms' ethical behavior, which shows a positive relationship. Overall, our results show that the relationship between two proxies for ethics with green growth in all three panels is the same, as in the main result in Table 8, suggesting that the country's institutional quality does not drive our main results. Specifically, the level of institutional quality does not shape how ethics affect green growth in the global panel, developed countries, and developing countries.

Table 9. Accounting for institutional quality.

Variables	Full Sample		Developed Countries		Developing Countries	
	Ethics and Corruption	Ethical Behavior of Firms	Ethics and Corruption	Ethical Behavior of Firms	Ethics and Corruption	Ethical Behavior of Firms
Ethics and corruption	0.144 **		0.243 *		–0.222 **	
	(0.0671)		(0.125)		(0.0993)	
Ethical behavior		0.276 ***		0.726 ***		–0.0484
		(0.0879)		(0.147)		(0.144)
Institutional quality	0.0788	–0.00138	–0.131	–0.513 **	0.0801	–0.0411
	(0.0645)	(0.100)	(0.135)	(0.227)	(0.108)	(0.217)
Ethics and corruption × Institutional quality	–0.0192		0.0267		–0.0224	
	(0.0202)		(0.0337)		(0.0367)	
Ethical behavior × Institutional quality		0.00368		0.0937**		0.0158
		(0.0228)		(0.0463)		(0.0569)
Population	-3.51×10^{-9} ***	-3.52×10^{-9} ***	-4.97×10^{-9} **	-2.95×10^{-9}	-1.26×10^{-9} ***	-1.19×10^{-9} ***
	(1.63×10^{-10})	(1.65×10^{-10})	(2.27×10^{-9})	(2.44×10^{-9})	(2.90×10^{-10})	(2.93×10^{-10})
Economic growth	0.200 ***	0.204 ***	0.0398	0.0493	0.266 ***	0.262 ***
	(0.0392)	(0.0403)	(0.0340)	(0.0332)	(0.0544)	(0.0532)
Energy use	0.000215 ***	0.000192 ***	–0.000296 ***	–0.000329 ***	–0.000303 ***	–0.000325 ***
	(5.94×10^{-5})	(5.77×10^{-5})	(6.92×10^{-5})	(7.75×10^{-5})	(4.77×10^{-5})	(5.14×10^{-5})
CO_2 emissions	–0.301 ***	–0.298 ***	-2.49×10^{-7}	-3.57×10^{-7} **	-5.92×10^{-7} ***	-6.07×10^{-7} ***
	(0.0329)	(0.0316)	(1.66×10^{-7})	(1.71×10^{-7})	(8.95×10^{-8})	(9.28×10^{-8})
Foreign direct investment	–0.00192	–0.00211	–0.00457 **	–0.00430 **	–0.0135 *	–0.0140 *
	(0.00245)	(0.00240)	(0.00221)	(0.00175)	(0.00718)	(0.00729)
Fixed year effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	5.582 ***	4.902 ***	5.828 ***	2.677 ***	5.811 ***	5.435 ***
	(0.405)	(0.519)	(0.360)	(0.512)	(0.306)	(0.563)
Observations	1199	1199	374	374	825	825
R-squared	0.292	0.296	0.175	0.255	0.165	0.161
Number of ID	109	109	34	34	75	75

The *p*-values are in parentheses and reject the independence null hypothesis. * Shows significance at the 10% level of significance. ** Shows significance at the 5% level of significance. *** Shows significance at the 1% level of significance.

4.4. Robustness Check

In this section, we use the System Generalized Method of Moment (S-GMM) to test the robustness of the results to potential endogeneity problems. The S-GMM estimator can control for the presence of unobserved country-specific effects. The S-GMM estimation technique also has the advantage of controlling for a simultaneity bias caused by the potential endogeneity of the explanatory variables [54].

The results of the S-GMM estimations are presented in Table 10. The results are qualitatively similar to those in the main result of Table 8; hence our results are not sensitive to potential endogeneity problems.

Table 10. Robustness—SGMM.

	Global Sample		Developed Countries		Developing Countries	
Variables	**Green Growth**	**Green Growth**	**Green Growth**	**Green Growth**	**Green Growth**	**Green Growth**
Ethics and corruption		0.0590 ***		0.0270 ***		−0.0179
		(0.0167)		(0.0202)		(0.0262)
Ethical behavior	0.124 ***		0.00401 **		−0.0545	
	(0.0174)		(0.0171)		(0.0317)	
Lag Green growth	0.514 ***	0.482 ***	1.023 ***	1.090 ***	0.957 ***	0.633 ***
	(0.0207)	(0.0209)	(0.00857)	(0.0135)	(0.00772)	(0.0191)
Population	-1.63×10^{-9} ***	-7.53×10^{-10} ***	−0.0116	-2.08×10^{-10}	−0.0379 **	-4.96×10^{-10} ***
	(1.10×10^{-10})	(1.41×10^{-10})	(0.0107)	(7.29×10^{-10})	(0.0149)	(1.78×10^{-10})

Table 10. *Cont.*

	Global Sample		Developed Countries		Developing Countries	
Variables	**Green Growth**	**Green Growth**	**Green Growth**	**Green Growth**	**Green Growth**	**Green Growth**
Economic growth	0.0718 *** (0.00616)	0.0743 *** (0.00600)	0.0421 *** (0.00654)	0.0377 *** (0.00678)	0.0233 *** (0.00869)	0.0660 *** (0.00823)
Energy use	1.42×10^{-5} (1.08×10^{-5})	−0.000140 *** (8.92×10^{-6})	-2.48×10^{-5} ** (1.23×10^{-5})	-2.60×10^{-5} *** (9.27×10^{-6})	1.02×10^{-5} (1.60×10^{-5})	−0.000107 *** (1.17×10^{-5})
CO_2 emissions	−0.106 *** (0.00615)	-2.27×10^{-7} *** (2.77×10^{-8})	−0.00505 (0.00480)	5.81×10^{-8} (5.14×10^{-8})	−0.0200 ** (0.00807)	-1.69×10^{-7} *** (3.84×10^{-8})
Foreign direct investment	−0.00218 ** (0.000926)	−0.00316 *** (0.000899)	−0.000764 (0.000608)	−0.000404 (0.000614)	−0.00765 *** (0.00260)	−0.00958 *** (0.00231)
Fixed year effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.236 *** (0.173)	3.506 *** (0.171)	1.432 *** (0.354)	−0.414 *** (0.114)	2.425 *** (0.432)	2.235 (0.126)
Observations	1090	1090	340	340	750	750
Number of ID	109	109	34	34	75	75

The *p*-values are in parentheses and reject the independence null hypothesis. ** Shows significance at the 5% level of significance. *** Shows significance at the 1% level of significance.

5. Conclusions and Policy Implication

Ethics is a major phenomenon that shapes our lives, not just because it affects our lives, but also affects those around us [55]. Given these facts, prior studies have investigated the impact of ethics on various aspects of life [56–58]. However, little has been executed on the relationship between ethics and green growth. Therefore, this paper has used a large panel of 109 developed and developing countries over 10 years to highlight the significant role of ethics in promoting green growth. We employ robust econometric estimation techniques such as panel-corrected standard error and S-GMM for robustness. Our results show that the effect of ethical behavior on green growth is positive, indicating that ethical behavior is instrumental in improving the world's green growth. However, the findings differ significantly between developed and developing countries. The impact of ethical behavior on green growth is more pronounced in developed countries than in developing countries. Hence, there is a need for different policy tools for achieving sustainable green growth. The individual efforts help specific countries to shape their national environmental regulations for achieving sustainable development goals. The results from developed countries show that ethical behavior matters in the judicious use of natural resources, which is likely to improve green growth.

As far as developing countries are concerned, ethical behavior is not significantly associated with green growth. Simply because developing countries solemnly depend on natural resources for revenue and foreign exchange. Hence, the economies of these countries are engineered by the fund accrued from the exploitation of these natural resources. Leading to the indiscriminate exploitation of natural resources, in which ethics are put aside. Most of these countries do not adhere to the environmental guideline for operating businesses, resulting from inadequate regulation. We must also not be quick to forget that developing countries contribute less to environmental deterioration than industrializing countries. Hence, ethics as individuals do not hold in these countries, and therefore, people's lifestyles were not controlled toward environmental use. Thus, instilling ethical value about the importance of safeguarding the environment in the form of policies will greatly help the participating developing countries create a sustained environment and improve green growth.

Our moderating analysis indicates that the level of institutional quality does not shape how ethics affect green growth in the world. In conclusion, this study provides novel evidence from a non-economic or technological perspective on factors driving a sustainable environment. Further, provide an understanding of how ethical behavior influences the

journey toward a greener environment without an umpteenth analysis of carbon emissions as executed in prior studies.

Whilst we acknowledge our sample size may be small, it does not represent a major limitation, given that the nexus between ethics and green growth is relatively new. Therefore, we consider our current sample size appropriate for providing insights into non-economic and technological ways of improving green growth. We believe future studies could use large data to examine how other behavioral factors affect the environment in different countries and consider another moderating effect.

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Appendix A

Developed Countries	Developing Countries	
Australia	Albania	Kenya
Austria	Algeria	Kyrgyz Republic
Belgium	Angola	Latvia
Brunei Darussalam	Argentina	Malaysia
Canada	Armenia	Malta
Cyprus	Azerbaijan	Mauritius
Denmark	Bahrain	Mexico
Estonia	Bangladesh	Mongolia
Finland	Benin	Morocco
France	Bolivia	Mozambique
Germany	Bosnia and Herzegovina	Namibia
Ireland	Botswana	Nicaragua
Israel	Brazil	Nigeria
Italy	Bulgaria	Oman
Japan	Cambodia	Pakistan
Korea, Rep.	Cameroon	Panama
Kuwait	Chile	Paraguay
Lithuania	China	Peru
Luxembourg	Colombia	Philippines
Netherlands	Costa Rica	Poland
New Zealand	Cote d'Ivoire	Romania
Norway	Croatia	Saudi Arabia
Portugal	Czech Republic	Senegal
Qatar	Dominica	Serbia
Russian Federation	Ecuador	South Africa
Singapore	Egypt, Arab Rep.	Sri Lanka
Slovak Republic	El Salvador	Tanzania
Slovenia	Ethiopia	Thailand
Spain	Georgia	Trinidad and Tobago
Sweden	Ghana	Tunisia
Switzerland	Greece	Ukraine
United Arab Emirates	Guatemala	Uruguay
United Kingdom	Honduras	Vietnam
United States	Hungary	Zambia
	Iceland	Zimbabwe
	India	
	Indonesia	
	Jamaica	
	Jordan	
	Kazakhstan	

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