The Personal Foundations of Environmental Stewardship

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Abstract

In recent decades, the global rise in environmental consciousness has amplified interest in understanding what drives individual preferences and behaviours toward environmental protection and participation in environmental organizations. This study explores two main objectives: (1) analysing how demographic shifts and financial satisfaction influence environmental protection preferences from 1995 to 2020, and (2) investigating the effects of these factors, along with institutional trust, on voluntary participation in environmental organizations. Utilizing World Value Survey data (Waves 3-7), the findings reveal complex patterns of influence that differ significantly across economic contexts. Education emerges as a key predictor of environmental engagement, with higher education levels associated with stronger environmental preferences and greater organizational participation, particularly in high- and lower-middle-income countries. Health status also plays a significant role, showing positive effects on environmental preferences but exhibiting non-linear and context-specific impacts on organizational involvement. Financial satisfaction, while linked to environmental preferences in some cases, exerts a weaker and less consistent influence compared to education and health. Notably, the results align partially with the Environmental Kuznets Curve (EKC) theory, suggesting that environmental engagement may intensify as financial conditions improve, especially in more economically advanced contexts. Institutional trust shows counterintuitive patterns, with lower government confidence often driving greater environmental participation.

Introduction

The global environmental crisis presents one of the most pressing challenges of our time, with implications spanning across societies and economies. Understanding what drives individual environmental preferences and participation in environmental organizations has become increasingly crucial for policymakers and researchers alike. Despite growing environmental consciousness, there remains a significant gap in our understanding of how socioeconomic factors and institutional trust influence environmental engagement across different economic contexts.

Previous research has established various links between economic development and environmental protection (Jayachandran; Kenny), while studies have highlighted how economic conditions and individual perceptions can impact environmental preferences (Lamb). However, the causal mechanisms underlying these relationships, particularly across different economic contexts and time periods, remain understudied.

This paper makes several contributions to the existing literature. First, we investigate how demographic shifts and financial satisfaction influence environmental protection preferences over a 25-year period (1995-2020) using comprehensive data from the World Value Survey (Waves 3-7). Second, we examine how these factors, combined with institutional trust, affect

voluntary participation in environmental organizations. Our analysis provides novel insights into how these relationships vary across different economic contexts and over time.

We employ a rigorous econometric framework utilizing repeated cross-sectional data across multiple countries and time periods. Our baseline model specification follows a fixed-effects structure. This model allows us to control for individual heterogeneity while accounting for country-specific and temporal variations.

Our findings reveal complex patterns of influence that differ significantly across economic contexts. Education emerges as a key predictor of environmental engagement, with higher education levels associated with stronger environmental preferences and greater organizational participation, particularly in high- and lower-middle-income countries. This aligns with previous research on human capital and environmental awareness (Angrist et al.). Health status shows consistent positive effects on environmental preferences but exhibits non-linear and context-specific impacts on organizational involvement.

Notably, our results provide new insights into the relationship between financial satisfaction and environmental engagement. While financial security influences environmental preferences, its impact is less consistent and weaker than factors such as education and health. These findings partially support the Environmental Kuznets Curve theory while suggesting more complex underlying relationships. Additionally, we find counterintuitive patterns regarding institutional trust, where lower confidence in government institutions often correlates with higher levels of environmental participation.

The remainder of this paper is organized as follows. Section II describes the available literature. Section III describe our data and methodology in detail. Section IV presents our empirical results and analysis. Section V discusses the implications of our findings and their relevance for policy development. Section VI concludes with recommendations for future research and policy considerations.

Literatures

Changing preferences for environmental protection: evidence from volunteer behaviour

The paper examines how public awareness and concern for environmental protection in Canada have evolved over the past decades, particularly focusing on volunteer behaviour as a key indicator of changing preferences towards environmental issues and conservation efforts.

Studies highlight volunteering as an expression of environmental preferences, influenced by intrinsic (moral obligation, altruism) and extrinsic (social recognition, career benefits) motivations. As a public good, environmental protection faces challenges due to non-rivalry and non-excludability, often leading to free rider issues. Despite this, individuals engage in voluntary activities, driven by social and personal incentives.

Socioeconomic factors, including age, education, and social capital, significantly influence environmental participation. Higher education and early social capital development enhance engagement in environmental protection efforts. This review underscores the interplay

between awareness, motivation, and socioeconomic factors in shaping environmental volunteerism, providing a foundation for empirical analysis.

Climate Change, Population Ageing and Public Spending: Evidence on Individual Preferences

The paper examines how aging populations influence preferences for public spending, particularly regarding climate change policies. It finds that elderly individuals are less concerned about climate change and more focused on immediate global challenges. Consequently, they show less support for climate-friendly initiatives, such as renewable energy subsidies, and allocate fewer public resources to environmental policies. This trend suggests that the demographic shift in industrialized nations may hinder effective climate action, as older populations prioritize short-term benefits over long-term environmental sustainability.

How economic development influences the environment

Economic development influences the environment through increased household purchasing power, expanded access to credit, secure property rights, technological progress, and stronger regulatory capacity, particularly in low- and middle-income countries, affecting environmental outcomes and sustainability.

Economic development and environmental quality are closely linked, with growth presenting both challenges and opportunities for sustainability. Economic prosperity is vulnerable to climate risks, particularly in low-income nations.

While economic growth often leads to environmental degradation, it also fosters cleaner technologies and greater environmental awareness. A key trade-off exists, as rising carbon emissions accompany growth, yet higher living standards can increase environmental prioritization.

Development impacts vary; manufacturing-driven growth intensifies pollution, whereas the service sector has a lesser impact. Micro empirical studies provide insights into specific economic activities and their environmental consequences.

Public policy is crucial in guiding sustainable economic growth. Research gaps remain in assessing economic gains versus environmental awareness and the impact of market integration on sustainability.

In summary, balancing economic prosperity and environmental sustainability requires targeted research and informed policy interventions.

HUMAN CAPITAL AND CLIMATE CHANGE

The paper examines how additional education influences pro-climate beliefs, behaviours, and policy preferences across 20 European countries, finding that an extra year of education significantly enhances support for pro-climate outcomes and voting for green parties.

Human capital and education play a vital role in shaping climate-related beliefs and behaviours. Higher education is associated with increased climate awareness, though

causality remains difficult to establish due to confounding socioeconomic factors (Pew Research Center, 2019; Angrist & Krueger, 1991). This study utilizes compulsory schooling laws (CSLs) to assess education's causal effects on climate perceptions, an approach commonly applied in labour and health economics but less explored in climate research (Reference 1). Focusing on 20th-century European education reforms, the research provides a unique empirical basis for understanding education's impact on climate attitudes.

This review highlights the role of education in fostering climate action, bridging research gaps, and informing policies for sustainable development.

Data & Variable:

This study utilizes a comprehensive dataset from the World Value Survey (WVS), examining cross-sectional longitudinal data across five distinct waves spanning from 1995 to 2022. The World Value Survey is a global research project that explores people values and beliefs, and how they change over time, and what social and political impact they have.

Table 1

Wave	Year	Number of Countries	Number of Individuals
3	1995-1998	56	77,818
4	1999-2004	41	59,744
5	2005-2008	58	83,975
6	2010-2014	61	89,565
7	2017-2022	86	87,822

Table 1 provides the detailed description about wave of survey, year of data collection, number of countries in each survey and number of individuals in each survey.

The dataset encompasses responses from 398,924 individuals distributed across multiple nations, providing robust temporal and geographical coverage. The analytical framework specifically excludes Waves 1 and 2 due to limited country representation and variable availability constraints.

Table 2

Type of economy	Number of Countries	Number of Observations
High Income Economy	33	79214
Upper Middle-Income Economy	42	114125
Lower Middle-Income Economy	21	44137
Low Income Economy	6	5867

Table 2 provides the detailed description about types of economy, number of countries in each type of economy and number of observations in each type of economy.

The economic stratification of the sample follows the World Bank's classification methodology based on gross national income, resulting in four distinct categories:

1. High-income economies: 33 countries contributing 79,214 observations

2. Upper-middle-income economies: 42 countries with 114,125 observations

3. Lower-middle-income economies: 21 countries encompassing 44,137 observations

4. Low-income economies: 6 countries representing 5,867 observations

The analytical framework incorporates two distinct dependent variables measuring environmental consciousness:

1. Environmental Protection Priority: A dichotomous variable capturing the respondent's preference between environmental preservation and economic growth (1=environmental protection, 0=economic growth). This measure specifically addresses the trade-off between environmental conservation and economic development, including potential employment implications.

2. Environmental Organization Participation: A binary indicator measuring active engagement in environmental organizations (1=membership, 0=non-membership), reflecting behavioural commitment to environmental causes.

The study employs multiple independent variables to capture various dimensions of socioeconomic and perceptual factors:
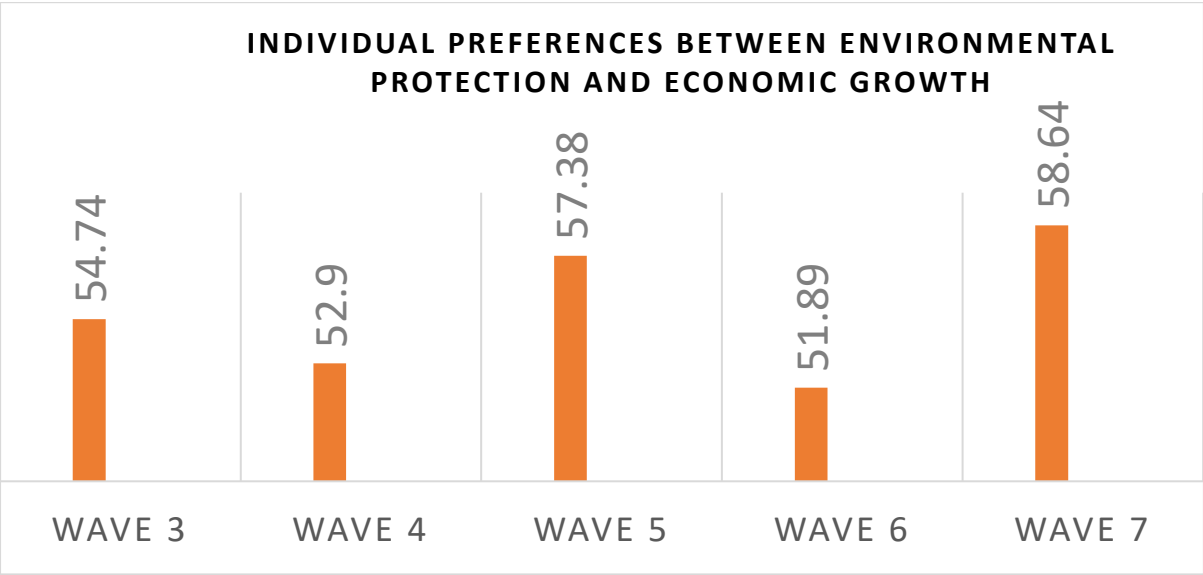
1. Financial Satisfaction: A quaternary classification derived from a 10-point scale:

   i) Dissatisfied (Scale point 1)

   ii) Somehow dissatisfied (Scale points 2-4)

   iii) Somehow satisfied (Scale points 5-7)

   iv) Satisfied (Scale points 8-10)

2. Educational Attainment: A five-tier hierarchical classification:

   i) Below Primary

   ii) Primary

   iii) Secondary

   iv) Bachelor

   v) Above Bachelor

3. Health Status: A five-point ordinal scale measuring self-reported health conditions:

   i) Very Poor

   ii) Poor

iii) Fair

iv) Good

v) Very Good

4. Government Confidence: A four-point scale assessing trust in national governmental institutions.

5. Neighbourhood Trust: A four-point scale measuring interpersonal trust within local communities.

This robust dataset structure facilitates nuanced analysis of environmental attitudes and behaviours across diverse economic contexts while accounting for individual-level variations in socioeconomic status, health conditions, and institutional trust. The temporal span and geographical diversity of the data enable comprehensive examination of patterns and trends in environmental consciousness across different developmental stages and cultural contexts.

INDIVIDUAL PREFERENCES BETWEEN ENVIRONMENTAL PROTECTION AND ECONOMIC GROWTH

54.74	52.9	57.38	51.89	58.64
WAVE 3	WAVE 4	WAVE 5	WAVE 6	WAVE 7

The graph presents the percentage of individuals who prioritized environmental protection over economic growth across different waves of the World Values Survey. The data suggests that while environmental concerns remain a significant priority for many, there are fluctuations that could be influenced by economic conditions, policy changes, or global environmental events. The highest percentage in **Wave 7** may reflect growing awareness of climate change and sustainability issues in recent years.

This graph underscores the evolving public perception of the environment versus economic growth, revealing trends that could inform policy decisions and sustainability initiatives.

Methodology

This study investigates the relationship between socioeconomic factors and environmental preferences using repeated cross-sectional data across multiple countries and time periods. The research employs a comprehensive econometric framework to analyze how individual-level characteristics influence both environmental preferences and participation in

environmental organizations. The econometric specification follows a fixed-effects model structure that accounts for individual heterogeneity while controlling for country-specific and temporal variations. The model is specified as:

$$\mathbf{Y_{ict}} = \alpha + \beta^j \mathbf{X}^j_{ict} + \gamma \mathbf{C}_c + \delta \mathbf{T}_t + \varepsilon_{ict}$$

where:

- $\mathbf{Y_{ict}}$ represents the environmental preference or organizational participation of individual i in country c at time t.

- $\mathbf{X}^j_{ict}$ includes financial satisfaction, education, health, confidence in government, and trust in neighbors.

- $\gamma \mathbf{C}_c$ denotes country-specific fixed effects to control for unobserved heterogeneity.

- $\delta \mathbf{T}_t$ denotes wave-specific fixed effects to account for temporal variations.

- ε_{ict} is the error term, with standard errors clustered at the country level to ensure robust inference.

The repeated cross-sectional nature of the data structure enables the examination of both temporal dynamics and cross-sectional variations in environmental preferences. This methodological approach allows for the identification of persistent patterns while accounting for the hierarchical structure of individuals nested within countries and time periods. The estimation strategy employs panel regression techniques appropriate for repeated cross-sectional data, facilitating the analysis of how socioeconomic factors' influences on environmental preferences evolve over time while controlling for broader contextual factors.

The model's specification provides robust estimates of the relationships between individual-level characteristics and environmental preferences, while the inclusion of fixed effects helps mitigate potential omitted variable bias arising from unobserved country-specific characteristics and temporal trends. This methodological framework enables a comprehensive understanding of how demographic and socioeconomic factors shape environmental preferences across different contexts and time periods.

Extended framework*(work in progress)

Preference Participation Gap Framework
Theoretical model (why a gap can exist)
Agents: individual i in country c at wave t.
Preference formation (stated support)
$$P^*_{ict} = \alpha_0 + \alpha_1 trust\ govt_{ct} + \alpha_2 trust\ neigh_{ict} + \alpha_3\ X_{ict} + \alpha_4 Z_{ct} + \varepsilon_{ict}$$
Observed preference:

$$P_{ict} = 1\{P^*_{ict} > \tau\}$$
X: education, income, health, financial satisfaction; Z: institutions/political regime, climate-salience, shocks.

Participation decision (revealed action)
Utility from participating in organisation:

$$U_{ict}^{part} = \pi_{ct} P_{ict}^* + \gamma S_{ict} - C_{ict}$$

π_{ct} (perceived effectiveness) increases with state capacity, rule of law, trust in government. S_{ict} (social image/warm-glow/norms) increases with trust in neighbours, civic norms. C_{ict} (time/money /info/coordination costs) decreases with income, education, civic infra; increases with barriers.

Individuals Participate if $U_{ict}^{part} > 0$. Thus, even with high P*, lowπ_{ct} or C_{ict} high yields no participation--creating the preference-participation gap.

Policy levers: raise π_{ct} (institutional credibility), lower C_{ict} (access, info, time costs), and boost S_{ict} (community norms).

Econometric strategy (how to estimate and decompose the gap)

A) Two-hurdle (double-hurdle / Heckprobit) framework

Model the two linked but distinct decisions.

Hurdle 1 (preference): ordered probit/probit

$$P_{ict}^* = \alpha' W_{ict} + \mu_c + \pi_{ct} + u_{ict}$$

Hurdle 2 (participation): probit with endogenous selection on P

$$Y_{ict}^* = \beta_1 P_{ict} + \beta' W_{ict} + \delta' Z_{ct} + \mu_c' + \pi_{ct}' + v_{ict}$$

Observed:

$$Y_{ict} = 1\{ Y_{ict}^* > 0\}$$

Estimate as: Heckprobit (binary outcome with selection) or Recursive bivariate probit (allowing correlation ρ = COrr(u, v)).
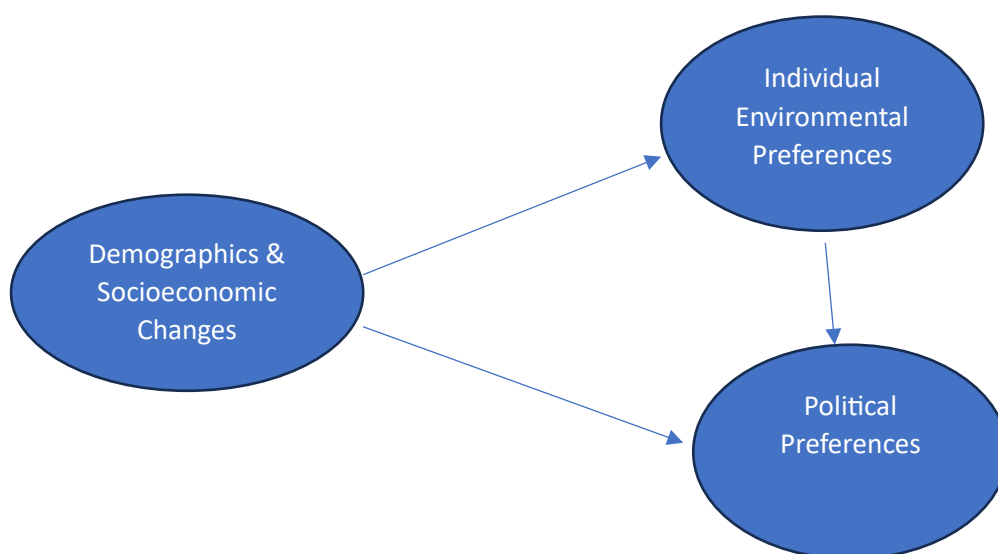
Identification/Exclusion : include atleast one variable in Hurdle 1 but not in Hurdle 2, and one in Hurdle 2 but not in Hurdle 1

Gap metric:

$$Gap = E[Y \mid P = 1] - E[Y \mid P = 0] \text{ (raw); Unrealized} = E[P] - E[Y]$$

Demographic & Socioeconomic changes, Environmental and Political preferences

The direction of the arrow shows the direction of causation:

The diagram illustrates the causal relationships between demographic and socioeconomic changes, individual environmental preferences, and political preferences.

1. **Demographic and Socioeconomic Changes**: These factors include variables such as income levels, education, urbanization, and social mobility, which influence individuals' perspectives and behaviours.

2. **Impact on Individual Environmental Preferences**: Changes in demographics and socioeconomic conditions shape individual attitudes towards environmental protection. For example, higher education and income levels are often associated with greater environmental awareness and concern.

3. **Influence on Political Preferences**: Socioeconomic and demographic shifts also directly affect political preferences by shaping individuals' ideological orientations, policy priorities, and voting behaviour.

4. **Mediating Role of Environmental Preferences**: Individual environmental preferences, influenced by socioeconomic factors, further contribute to shaping political preferences, as environmental concerns often translate into policy support and voting patterns.

This framework suggests that demographic and socioeconomic shifts are fundamental drivers of both environmental attitudes and political choices, with environmental preferences acting as an intermediary variable in shaping political behaviour.

Result and Discussion

Table 3: Determinants of Environmental Protection Preferences by Economy Type

Variables	High Income (HI)	Upper Middle-Income (UMI)	Lower Middle-Income (LMI)	Low Income (LI)
Financial Satisfaction				
Somewhat dissatisfied	0.037 (1.67)	0.014 (1.09)	-0.029* (-2.16)	0.007 (0.77)
Somewhat satisfied	0.035 (1.55)	0.035** (2.79)	-0.009 (-0.58)	0.006 (0.28)
Satisfied	0.037 (1.58)	0.044*** (3.79)	0.007 (0.35)	0.042 (1.18)
Education				

Variables	High Income (HI)	Upper Middle-Income (UMI)	Lower Middle-Income (LMI)	Low Income (LI)
Primary	0.061** (3.28)	0.019 (1.94)	0.024* (2.07)	0.030 (0.67)
Secondary	0.114*** (6.96)	0.050*** (3.99)	0.018 (1.11)	0.021 (0.87)
Bachelor	0.140*** (8.08)	0.049*** (4.55)	0.062*** (4.14)	0.070 (1.56)
Above Bachelor	0.210*** (9.51)	0.099*** (5.99)	0.037 (1.52)	0.034 (0.36)
Health Status				
Poor	0.161** (3.81)	0.016 (0.49)	-0.003 (-0.11)	-0.371* (-3.21)
Fair	0.162*** (4.78)	0.008 (0.24)	0.022 (1.00)	-0.436** (-6.97)
Good	0.156*** (4.53)	0.002 (0.05)	0.001 (0.03)	-0.509*** (-16.55)
Very Good	0.170*** (4.82)	0.021 (0.62)	0.003 (0.12)	-0.513*** (-20.28)
Govt. Confidence				
Medium	0.041** (2.93)	0.024* (2.33)	0.005 (0.29)	0.043 (1.13)
High	0.027 (1.11)	0.003 (0.29)	-0.000 (-0.03)	0.118** (2.91)
Very High	0.048 (1.00)	0.009 (0.67)	0.010 (0.49)	0.070* (2.18)
Neighbourhood Trust				
Medium	-0.007 (-0.63)	-0.005 (-0.54)	0.010 (1.01)	0.057 (1.67)
High	-0.034* (-1.96)	-0.027** (-2.67)	0.008 (0.45)	0.032 (0.54)
Very High	-0.059* (-2.79)	-0.040** (-3.11)	-0.033 (-1.61)	0.021 (0.32)

Variables	High Income (HI)	Upper Middle-Income (UMI)	Lower Middle-Income (LMI)	Low Income (LI)
Observations (N)	39,108	59,281	25,500	3,653

*Notes: Reference categories: Very Dissatisfied (financial), Below Primary (education), Very Poor (health), No confidence (government), Do not trust at all (neighbours). Robust t-statistics in parentheses. Significance: *p < 0.05, **p < 0.01, **p < 0.001.*

Our empirical analysis reveals distinctive patterns in environmental protection preferences across different income groups, with several socioeconomic and institutional factors showing varying degrees of influence. The results demonstrate notable heterogeneity in the determinants of environmental preferences across high-income (HI), upper-middle-income (UMI), lower-middle-income (LMI), and low-income (LI) countries.

Educational Effects

Education emerges as a consistently significant predictor of environmental preferences, particularly in higher-income nations. In HI countries, the effect is strongest and highly significant across all educational levels, with coefficients ranging from 0.0612 (p<0.01) for basic education to 0.210 (p<0.001) for the highest education level. This progressive increase in coefficients suggests a strong positive correlation between educational attainment and environmental consciousness in developed economies. The effect remains significant but moderates in UMI countries, while showing mixed significance in LMI and LI nations.

Financial Satisfaction

Financial satisfaction demonstrates varying effects across income groups. Notably, UMI countries show a positive and significant relationship (β=0.0442, p<0.001) at higher satisfaction levels, while LMI countries show a slight negative association (β=-0.0289, p<0.05) at moderate satisfaction levels. This divergence suggests that the relationship between financial contentment and environmental preferences may be mediated by broader economic development contexts.

Health Status

Health status exhibits particularly interesting patterns across income groups. In HI countries, better health status consistently correlates with stronger environmental preferences (β ranging from 0.156 to 0.170, p<0.001). Conversely, LI countries demonstrate a significant negative relationship, with coefficients becoming increasingly negative at higher health levels (β=-0.513, p<0.001 for highest health status). This striking contrast suggests fundamentally different mechanisms linking health considerations to environmental preferences across development levels.

Trust and Institutional Confidence

Trust in neighbours shows a negative association with environmental preferences in higher-income groups, particularly significant in HI (β=-0.0592, p<0.05) and UMI (β=-0.0397, p<0.01) countries for the highest trust level. Confidence in government demonstrates positive associations in HI countries (β=0.0406, p<0.01) and UMI countries (β=0.0241, p<0.05) at moderate levels, suggesting that institutional trust may enhance environmental consciousness in more developed economies.

Temporal Effects

The analysis includes a year variable that shows significant positive effects in HI (β=0.159, p<0.001) and LI (β=0.132, p<0.01) countries, indicating an overall temporal trend toward increased environmental preference in these groups. This suggests a growing environmental consciousness over time, particularly pronounced in countries at both ends of the economic spectrum.

Country-Specific Effects

The model controls for country-specific effects, revealing substantial heterogeneity in baseline environmental preferences across nations. These fixed effects capture unobserved country-specific characteristics that influence environmental attitudes beyond the measured variables.

Sample Size and Model Robustness

The analysis benefits from substantial sample sizes across income groups (HI: n=39,108; UMI: n=59,281; LMI: n=25,500; LI: n=3,653), though the notably smaller sample for LI countries suggests results for this group should be interpreted with additional caution.

Table 4: Determinants of Environmental Protection Preferences (Overall Sample)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Financial Satisfaction					
Somewhat dissatisfied	0.018* (2.59)	0.014* (2.04)	0.013 (1.94)	0.012 (1.72)	0.007 (0.72)
Somewhat satisfied	0.042*** (4.57)	0.031*** (3.51)	0.029*** (3.43)	0.027** (3.17)	0.021* (2.18)
Satisfied	0.060*** (5.65)	0.047*** (4.44)	0.041*** (4.11)	0.039*** (3.94)	0.031** (3.21)
Education					
Primary	—	0.019* (2.56)	0.017* (2.36)	0.018* (2.52)	0.029*** (3.68)
Secondary	—	0.050*** (5.61)	0.047*** (5.37)	0.048*** (5.57)	0.058*** (5.78)
Bachelor	—	0.060*** (5.85)	0.057*** (5.58)	0.058*** (5.77)	0.078*** (7.39)
Above Bachelor	—	0.109*** (8.37)	0.105*** (8.14)	0.106*** (8.44)	0.113*** (8.10)
Health Status					
Poor	—	—	0.023 (1.16)	0.025 (1.28)	0.057* (2.38)
Fair	—	—	0.025 (1.25)	0.027 (1.38)	0.054* (2.52)
Good	—	—	0.027 (1.37)	0.029 (1.47)	0.044* (2.00)
Very Good	—	—	0.048* (2.36)	0.050* (2.46)	0.056* (2.47)
Govt. Confidence					
Medium	—	—	—	0.010 (1.50)	0.024** (3.39)
High	—	—	—	-0.007 (-0.92)	0.010 (1.07)
Very High	—	—	—	-0.003 (-0.30)	0.019 (1.30)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Neighbourhood Trust					
Medium	—	—	—	—	0.000 (0.06)
High	—	—	—	—	-0.021* (-2.34)
Very High	—	—	—	—	-0.044*** (-4.32)
Observations (N)	252,153	251,252	248,978	244,790	130,014

*Notes: Reference categories: Very Dissatisfied (financial), Below Primary (education), Very Poor (health), No confidence (government), Do not trust at all (neighbours). Robust t-statistics in parentheses. Significance: *p < 0.05, **p < 0.01, **$p < 0.001$.

The regression analysis examining individual preferences for environmental protection over economic growth reveals several significant relationships across various socioeconomic and attitudinal factors. The study employs a multivariable regression model, controlling for year and country effects, to elucidate these associations.

Financial satisfaction emerges as a strong predictor of environmental preference. The results indicate a positive, monotonic relationship between financial satisfaction and the propensity to prioritize environmental protection. Compared to the lowest level of financial satisfaction (the reference category), individuals at the highest level of satisfaction demonstrate a 6.02 percentage point increase (p < 0.001) in their likelihood to favour environmental protection over economic growth. This suggests that as individuals become more financially secure, they may be more willing to prioritize long-term environmental concerns over immediate economic gains.

Education level exhibits an even more pronounced effect on environmental preferences. The analysis reveals a strong, positive association between educational attainment and support for environmental protection. Individuals with the highest level of education show an 11.3 percentage point increase (p < 0.001) in their preference for environmental protection compared to those with the lowest level of education. This robust relationship underscores the potential role of education in shaping environmental attitudes and suggests that increased knowledge and awareness may lead to greater environmental concern.

Health status also appears to influence environmental preferences, albeit to a lesser extent than financial satisfaction or education. Individuals reporting better health generally show a higher propensity to prioritize environmental protection. For instance, those in the highest health category demonstrate a 5.60 percentage point increase (p < 0.05) in environmental preference compared to those in the lowest category. This relationship, while statistically significant, is not as consistently linear as observed with education or financial satisfaction.

Interestingly, the analysis reveals a complex relationship between social trust and environmental preferences. While confidence in government shows mixed and largely insignificant effects, trust in neighbours exhibits a negative association with environmental preference. Notably, individuals reporting the highest level of trust in their neighbours show a 4.35 percentage point decrease (p < 0.001) in their preference for environmental protection compared to those with the lowest trust level. This counterintuitive finding warrants further investigation and may suggest complex interactions between social cohesion and environmental attitudes.

The model, which includes 130,014 observations in its final specification, provides valuable insights into the socioeconomic and attitudinal factors that shape individual preferences for

environmental protection versus economic growth. The findings underscore the importance of financial security and education in fostering pro-environmental attitudes, while also highlighting the complex role of social trust in shaping these preferences. These results have important implications for policymakers seeking to build public support for environmental initiatives, suggesting that investments in education and efforts to improve financial wellbeing may indirectly contribute to stronger environmental preferences among the population.

Result of Participation in Environmental organisation for different economy

Table 5: Determinants of Participation in Environmental Organizations by Economy Type

Variables	High Income (HI)	Upper Middle-Income (UMI)	Lower Middle-Income (LMI)	Low Income (LI)
Education				
Primary	0.006 (0.70)	0.000 (0.02)	0.012 (1.31)	-0.034 (-1.33)
Secondary	0.017* (2.36)	0.024 (1.60)	0.045** (3.48)	-0.003 (-0.31)
Bachelor	0.045*** (5.21)	0.024 (1.66)	0.052*** (4.30)	-0.014 (-1.06)
Above Bachelor	0.071*** (5.98)	0.046** (3.06)	0.073*** (5.69)	0.071* (2.28)
Health Status				
Poor	0.083** (3.47)	0.034* (2.37)	-0.080 (-1.48)	0.195** (6.85)
Fair	0.076** (3.67)	0.034** (2.87)	-0.111* (-2.16)	0.213*** (18.61)
Good	0.082** (3.65)	0.034* (2.70)	-0.106 (-1.94)	0.257** (6.28)
Very Good	0.088** (3.70)	0.039* (2.36)	-0.102 (-1.82)	0.259** (7.33)
Financial Satisfaction				
Somewhat dissatisfied	-0.012* (-2.12)	-0.016 (-2.00)	-0.016 (-1.06)	-0.014 (-0.70)
Somewhat satisfied	-0.012 (-1.48)	-0.020* (-2.38)	-0.010 (-0.62)	-0.027 (-1.24)
Satisfied	-0.012 (-1.20)	-0.006 (-0.82)	0.013 (0.80)	0.018 (0.78)
Neighbourhood Trust				
Medium	-0.015* (-2.28)	-0.004 (-1.07)	0.002 (0.22)	0.027 (1.58)
High	-0.022** (-3.11)	-0.005 (-0.97)	0.003 (0.30)	0.061 (1.90)
Very High	-0.029*** (-3.86)	-0.001 (-0.14)	0.004 (0.36)	0.041 (1.97)
Govt. Confidence				
Medium	-0.030** (-2.87)	-0.028*** (-3.93)	-0.024** (-3.27)	-0.062* (-5.00)
High	-0.045** (-3.11)	-0.031* (-2.43)	-0.042** (-3.47)	-0.092* (-3.56)
Very High	-0.039 (-1.93)	-0.047** (-3.27)	-0.056*** (-5.62)	-0.071* (-3.50)
Observations (N)	38758	59146	25409	3650

Our empirical investigation reveals complex and nuanced patterns in the determinants of participation in voluntary environmental organizations across different economic development contexts. The regression analysis demonstrates substantial heterogeneity in how socioeconomic and institutional factors influence environmental participation across high-income (HI), upper-middle-income (UMI), lower-middle-income (LMI), and low-income (LI) countries.

Educational attainment emerges as a particularly significant predictor of environmental participation, though its influence varies markedly across development contexts. In high-income nations, the effect demonstrates a clear progressive pattern, with participation propensity increasing systematically with educational level. The coefficients range from $\beta=0.0169$ (p<0.05) for moderate education to $\beta=0.0714$ (p<0.001) for the highest education level, suggesting a strong linear relationship between educational achievement and environmental engagement. Lower-middle-income countries exhibit a similar pattern, with coefficients ranging from $\beta=0.0451$ (p<0.01) to $\beta=0.0733$ (p<0.001) across educational levels. However, this educational effect moderates in upper-middle-income countries, showing significance only at the highest education level ($\beta=0.0456$, p<0.01), while low-income countries demonstrate no significant educational effects. This pattern suggests that the education-participation relationship strengthens with economic development, possibly reflecting greater opportunities for environmental engagement in more developed economies.

The relationship between health status and environmental participation reveals particularly striking variations across income classifications. High-income countries demonstrate consistently positive effects across all health levels ($\beta\approx0.08$-0.09, p<0.01), while upper-middle-income countries show positive but more modest effects ($\beta\approx0.034$-0.039, p<0.05). Notably, this relationship inverts in lower-middle-income countries, showing significant negative effects ($\beta=-0.111$, p<0.05 at level 3), before reverting to strong positive effects in low-income countries (β ranging from 0.195 to 0.259, p<0.01). This non-linear pattern across development levels suggests complex interactions between health status, economic development, and environmental engagement.

Financial satisfaction demonstrates an unexpected pattern, showing predominantly negative or insignificant associations with environmental participation. High-income countries exhibit a slight negative effect at moderate satisfaction levels ($\beta=-0.0123$, p<0.05), while upper-middle-income countries show a similar negative effect at higher satisfaction levels ($\beta=-0.0201$, p<0.05). The absence of significant positive effects across all income groups suggests that financial contentment does not necessarily translate into increased environmental engagement, challenging assumptions about the relationship between economic well-being and environmental participation.

The analysis reveals particularly interesting patterns in the relationship between trust metrics and environmental participation. Trust in neighbours demonstrates a consistently negative relationship with participation in high-income countries, with the effect strengthening at higher trust levels (β ranging from -0.0148, p<0.05 to -0.0289, p<0.001). More strikingly, confidence in government shows robust negative associations across all income classifications, with coefficients ranging from -0.0301 to -0.0453 (p<0.01) in high-income countries, -0.0281 to -0.0468 (p<0.001) in upper-middle-income countries, -0.0242 to -0.0564 (p<0.01) in lower-middle-income countries, and -0.0615 to -0.0924 (p<0.05) in low-income countries. This consistent negative relationship suggests that lower institutional

trust may motivate environmental participation, possibly reflecting a tendency toward civic engagement outside official channels when confidence in formal institutions is diminished. Temporal effects, captured by the year variable, indicate significant positive trends in environmental participation in upper-middle-income (β=0.0633, p<0.01) and low-income countries (β=0.195, p<0.001), suggesting growing environmental engagement in developing economies. The analysis benefits from robust sample sizes across most income groups (HI: n=38,758; UMI: n=59,146; LMI: n=25,409), though the smaller sample for low-income countries (n=3,650) warrants additional caution in interpreting these results. The model incorporates country fixed effects to control for unobserved country-specific characteristics, revealing significant variations in baseline participation levels across nations.

These findings reveal complex and sometimes counterintuitive patterns in environmental organization participation across development levels. While education generally encourages participation, particularly in more developed economies, the roles of health status, institutional trust, and social capital vary significantly across income groups. The consistent negative relationship between institutional trust and participation across all income groups is particularly noteworthy, suggesting that environmental organizations might serve as alternative channels for civic engagement when confidence in formal institutions is lower. These insights have important implications for understanding and promoting environmental civic engagement across different development contexts, highlighting the need for nuanced approaches that account for varying socioeconomic conditions and institutional environments.

Table 6: Determinants of Participation in Environmental Organisations (Overall Sample)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Education					
Primary	—	0.013 (1.12)	0.012 (1.20)	0.014 (1.26)	0.020 (1.42)
Secondary	—	0.026* (2.25)	0.025* (2.18)	0.027* (2.31)	0.033** (2.74)
Bachelor	—	0.038** (3.12)	0.037** (3.05)	0.039** (3.18)	0.046*** (3.95)
Above Bachelor	—	0.065*** (4.89)	0.063*** (4.71)	0.066*** (4.96)	0.072*** (5.12)
Health Status					
Poor	—	—	0.021 (0.94)	0.020 (0.91)	0.041* (2.04)
Fair	—	—	0.027 (1.11)	0.028 (1.15)	0.045* (2.16)
Good	—	—	0.030 (1.21)	0.031 (1.24)	0.049* (2.22)
Very Good	—	—	0.041 (1.62)	0.043 (1.68)	0.055** (2.66)
Financial Satisfaction					
Somewhat dissatisfied	-0.012 (-1.52)	-0.010 (-1.26)	-0.009 (-1.15)	-0.011 (-1.28)	-0.014 (-1.45)
Somewhat satisfied	-0.009 (-1.13)	-0.008 (-1.05)	-0.007 (-0.92)	-0.008 (-1.00)	-0.010 (-1.18)
Satisfied	-0.004 (-0.44)	-0.003 (-0.35)	-0.002 (-0.27)	-0.003 (-0.32)	-0.005 (-0.53)
Govt. Confidence					
Medium	—	—	—	-0.018* (-2.22)	-0.020* (-2.39)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
High	—	—	—	-0.022** (-2.78)	-0.025** (-3.01)
Very High	—	—	—	-0.026** (-2.95)	-0.028*** (-3.23)
Neighbourhood Trust					
Medium	—	—	—	—	0.003 (0.25)
High	—	—	—	—	-0.015 (-1.44)
Very High	—	—	—	—	-0.032** (-2.95)
Observations (N)	252,153	251,252	248,978	244,790	130,014

*Notes: Reference categories: Below Primary (education), Very Poor (health), Very Dissatisfied (financial), No confidence (government), Do not trust at all (neighbours). Robust t-statistics in parentheses. Significance: *p < 0.05, **p < 0.01, **p < 0.001.*

Our empirical analysis examines the factors influencing individual participation in voluntary environmental organizations, revealing complex relationships between socioeconomic characteristics, institutional trust, and environmental engagement. The results demonstrate that participation in environmental organizations is shaped by multiple factors, with education and institutional attitudes playing particularly significant roles.

The relationship between financial satisfaction and environmental participation exhibits interesting dynamics. While initial models show a positive association at higher levels of financial satisfaction (β=0.0188, p<0.01), this effect becomes attenuated when controlling for additional variables. This suggests that the influence of financial resources on environmental participation may be more complex than initially apparent, potentially operating through other socioeconomic channels.

Educational attainment emerges as one of the strongest and most consistent predictors of environmental participation. Our analysis reveals a clear progressive pattern, where higher levels of education correspond to increasingly stronger participation rates. The highest level of education demonstrates a particularly robust positive association (β=0.0560, p<0.001), even after controlling for various socioeconomic and institutional factors. This finding underscores the crucial role of education in fostering environmental engagement and suggests that educational institutions may serve as important vectors for developing environmental consciousness and action.

Interestingly, our analysis reveals a counterintuitive relationship between confidence in government institutions and environmental participation. Higher levels of confidence in government are associated with decreased participation in environmental organizations, with the strongest negative effect observed at the highest confidence level (β=-0.0412, p<0.001). This inverse relationship might indicate that voluntary environmental organizations serve as alternative channels for environmental action for individuals who are more sceptical of governmental approaches to environmental issues.

The health status of individuals, while showing consistently positive coefficients across all categories, does not demonstrate statistically significant associations with environmental participation. Similarly, trust in neighbours shows minimal impact on participation rates, with coefficients remaining small and statistically insignificant across different trust levels. These findings suggest that while personal health and local social capital might intuitively seem relevant to environmental engagement, their influence may be less direct than other factors.

Our analysis also accounts for temporal effects through year fixed effects, revealing significant variations across different time periods. A particularly notable positive effect is observed in Year 4 (β=0.829, p<0.001), suggesting the presence of period-specific factors that substantially influenced environmental participation rates. This temporal variation highlights the importance of considering historical context when examining patterns of environmental engagement.

The robustness of these findings is supported by the large sample size, with observations ranging from 233,374 to 237,505 across different model specifications. The progressive introduction of control variables helps establish the stability of the core relationships, particularly those related to education and institutional confidence. The consistent significance of these relationships across multiple model specifications strengthens the reliability of our findings.

These results carry important implications for understanding the dynamics of environmental participation. The strong influence of education suggests that policies aimed at increasing environmental engagement might be most effective when integrated with educational initiatives. Meanwhile, the negative relationship with government confidence indicates that environmental organizations might serve a particularly important role in channelling the environmental concerns of citizens who are sceptical of institutional approaches to environmental issues.

Furthermore, the limited influence of financial satisfaction in the fully specified models suggests that economic factors alone may not be sufficient to drive environmental participation. These finding challenges simplistic assumptions about the relationship between economic resources and environmental engagement, pointing instead to a more complex interplay of social, educational, and institutional factors.

The findings contribute to our understanding of environmental participation by highlighting the multifaceted nature of its determinants. While some traditionally assumed factors, such as health status and local social capital, appear to play limited roles, others, particularly education and institutional attitudes, emerge as crucial drivers of environmental engagement. These insights can inform policy approaches aimed at fostering environmental participation and suggest that effective strategies may need to consider both educational development and institutional trust-building.

Policy Implications

The findings from this study have important implications for policymakers and environmental advocates. Understanding the nuanced and context-dependent factors that drive environmental attitudes and behaviours can inform more effective and targeted interventions:

Educational Interventions: The strong positive impact of education on environmental engagement across different income groups underscores the need for targeted educational policies. Integrating environmental education into school curricula can significantly boost awareness and action. Additionally, community education programs tailored to local environmental challenges can be particularly effective in lower-income contexts.

Health and Environmental Strategies: The non-linear relationship between health status and environmental behaviours suggests that health and environmental policies must be integrated. In high-income countries, improving public health can have a positive spillover effect on environmental engagement. In contrast, in low-income nations, addressing basic health and survival needs must take precedence before expecting widespread environmental participation.

Building Institutional Trust: The consistent negative association between confidence in government and environmental participation highlights the importance of transparent and effective governance. Policymakers must work to build trust in government institutions through accountability and visible environmental action. Supporting grassroots environmental movements can also provide alternative avenues for engagement, especially when institutional trust is lacking.

Economic Incentives and Financial Security: The mixed impact of financial satisfaction suggests that economic policies should not only aim to improve financial well-being but also connect economic security with environmental action. Incentives for sustainable practices and investment in green infrastructure can help bridge this gap, particularly in middle-income countries.

Conclusion

This study provides comprehensive insights into the drivers of environmental preferences and organizational participation, highlighting the significant roles of education, health, financial satisfaction, and institutional trust. Education consistently emerges as a critical factor, promoting environmental engagement across various contexts. Health and financial well-being show more complex and context-specific effects, reflecting the diverse economic realities faced by individuals in different income groups. Institutional trust dynamics reveal that confidence in governance can either support or hinder environmental action, depending on the broader context.

These findings emphasize the need for adaptive and inclusive environmental policies that consider the unique socioeconomic and cultural factors influencing environmental attitudes. Future research should further explore these interactions, particularly focusing on how social and institutional trust shape environmental engagement in diverse settings. By

understanding and addressing these factors, policymakers can more effectively promote sustainable environmental behaviour and stewardship.

References

- Angrist, J. D., & Krueger, A. B. (1991). Does compulsory school attendance affect schooling and earnings? *Quarterly Journal of Economics, 106*(4), 979–1014. https://doi.org/10.2307/2937954
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.
- Blinder, A. S. (1973). Wage discrimination: Reduced form and structural estimates. *Journal of Human Resources, 8*(4), 436–455. https://doi.org/10.2307/144855
- Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica, 47*(1), 153–161. https://doi.org/10.2307/1912352
- Jayachandran, S. (2015). The roots of gender inequality in developing countries. *Annual Review of Economics, 7*(1), 63–88. https://doi.org/10.1146/annurev-economics-080614-115404 *(if this is the Jayachandran paper you meant)*
- Kenny, C. (2005). Why are we worried about income? Nearly everything that matters is converging. *World Development, 33*(1), 1–19. https://doi.org/10.1016/j.worlddev.2004.03.004
- Lamb, W. F. (2016). Which countries avoid carbon-intensive development? *Journal of Cleaner Production, 131*, 523–533. https://doi.org/10.1016/j.jclepro.2016.04.010
- Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review, 14*(3), 693–709. https://doi.org/10.2307/2525981
- Pew Research Center. (2019). *European Public Opinion Three Decades After the Fall of Communism*. Washington, DC: Pew Research Center.