Do "Environmental" Constitutions Protect the Environment? Evidence from Ecuador

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Abstract

Left-leaning populist regimes, such as Rafael Correa's government in Ecuador (2007–2016), often claim to protect the environment from the negative effects of free-market regimes. This study examines the environmental impact in Ecuador following the 2008 constitutional amendment, which was the first in the world to include rights of nature. We find no statistical evidence that Correa's constitutional initiative had any measurable effect on Ecuador's environmental outcomes.

JEL Classification: TBD
Keywords: Ecuador, environment, pollution, synthetic control, constitutional reform

1 Introduction

Climate change is at the forefront for many countries, as the external cost of emissions has been seen as a threat to society. In response, many countries have enacted policies that try to reduce the negative consequences of production. Ecuador specifically stands out in this regard, once they extended legal rights to nature in their constitution in 2008, which goes beyond the traditional path that countries addressing climate-related issues have followed.

This novel approach led legal scholars to debate the merits of this approach. In order for any law to be actionable in its intended goals, enforceability is key. Guim and Livermore (2021) argue that giving rights to non-human entities makes enforceability difficult. This led to many issues in the courts being able to implement these rights; with this comes uncertainty in planning economic activity. However, there have been cases where the courts ruled in “favor” of nature. For example, there are two specific cases: the Vilcabamba River Case of 2011 and the Aguarico River Case of 2018. In both cases, action was taken by the courts, and activities deemed harmful to these rivers ceased. Tănăsescu et al. (2024) found that courts became more successful in interpreting this law once they keyed in on ecological integrity as an actionable item.

Constitutions are “meta-rules”, or rules for the rulers. As such, constitutional provisions are more difficult to change relative to more typical policies. They also provide insight into what countries view as most important (Jeffords and Minkler, 2016). Jeffords (2013) finds that well over 60 percent (125 of 198) of national constitutions have at least one environmental right codified.

While Ecuador’s case is unique in directly giving rights to nature, previous work has looked at constitutional rulings and provisions and environmental performance. Examined constitutional environment rights and environmental outcomes. Using an instrumental variables approach, Jeffords and Minkler (2016) find that constitutional provisions tend to improve environmental outcomes, as measured by Yale’s Environmental Performance Index. Their findings point out a seemingly obvious yet important point: on its own, constitutional provisions will not impact environmental performance. Unless there is enforceability of such provisions (i.e., a high-quality legal system), then provisions become mere parchment on paper. To that point, Callais et al. (2024) find that countries with market liberalization reforms, and specifically reforms in property rights and legal systems, had somewhat better environmental performance (relative to GDP growth and post-2000).

In this paper, we directly test the environmental impact of the Ecuadorian “Rights of Nature” clauses in the constitution. Using the synthetic control method (Abadie and Gardeazabal, 2003; Abadie et al., 2015), we estimate a “counterfactual” Ecuador that did not implement this provision for nature. Our findings suggest that there was little improvement in environmental outcomes. We find some, yet non-robust, mild positive effects for forest cover. Greenhouse gas emissions increased after 2008, albeit statistically insignificantly. Similarly, renewable energy output was not drastically impacted (and if anything, decreased), and the carbon intensity of GDP was not affected.

We first discuss the constitutional amendment Ecuador implemented. Then, we present our empirical method, data, and results. We conclude by noting the importance of distinguishing symbolic and anecdotal victories from policy results at the macro level.

2 Ecuador’s Environmental Constitutional Amendment

The 2008 constitution of Ecuador is notable for its stance on environmental rights. Inspired by the principles of *Sumak Kawsay* (or “good living”), the reform goes beyond granting Ecuadorians the right to a healthy environment: it extends legal rights *to* nature itself. Chapter Seven of the Constitution is titled “Rights of Nature,” and its first article, Article 71, states (italics added):[1]

> “**Art. 71**. Nature, or Pacha Mama, where life is reproduced and realized, *has the right to* have its existence and the maintenance and regeneration of its vital cycles, structure, functions, and evolutionary processes fully respected.
>
> Any person, community, people, or nationality may *demand that public authorities enforce the rights of nature*. In applying and interpreting these rights, the principles established in the Constitution shall be observed as appropriate.
>
> The State shall encourage individuals, legal entities, and groups to protect nature and shall promote respect for all elements that comprise an ecosystem.”

Pacha Mama, a Quechua term meaning “Mother Earth” for the indigenous Andean communities, is thus recognized as a living entity with legal rights. This recognition allows any individual, community, or legal entity to initiate legal action on behalf of nature, even if they are not directly affected. This legal right gave Pacha Mama her day in court during the 2011 Vilcabamba River Case. A government road construction project had deposited debris into the Vilcabamba River, increasing flood risks for nearby residents. Supported by environmental activists, local residents filed a lawsuit on behalf of the river, invoking its constitutional rights under Article 71. The court found that the river’s rights had been violated and ordered the government to restore it to its original condition.

A second prominent case, the Los Cedros Cloud Forest Case, reached Ecuador’s Constitutional Court in 2021. Environmental organizations and local communities argued that mining activities in

[1]Articles 72 to 74 deal with rights to restoration, require the State to apply preventive and protective measures, forbid alterations or appropriations of natural ecosystems, which shall be regulated by the State.

the 16,000-acre Los Cedros Forest violated its constitutional rights. The Court agreed, ruling that the mining activities infringed upon the forest's rights and consequently prohibited mining in the area.

While cases like the Vilcabamba River and Los Cedros Forest are significant and symbolically powerful, they may be more anecdotal than indicative of a widespread enforcement of nature's rights. The following section presents a broader empirical analysis to evaluate whether the 2008 constitutional reform constitutes a turning point in Ecuador's environmental quality.

3 Empirical Results

To measure the causal effect of the 2008 Ecuadorian "Rights of Nature" Constitution on environmental outcomes, we rely on the synthetic control (SC) method for comparative case studies (Abadie and Gardeazabal, 2003; Abadie et al., 2010).[2] This method involves constructing a reliable counterfactual based on a weighted average of similar "donor" countries that closely track Ecuador before the treatment assignment, but that did not undergo treatment (Abadie et al., 2010; Abadie, 2021). Our primary outcomes of interest are (a) the forest area as a percentage of total area, (b) total greenhouse gas (GHG) emissions,[3] (c) the share of total electricity output from renewable sources, (d) and carbon emissions by US$1,000 of GDP, i.e. the "carbon intensity" of GDP. Data is sourced from the World Bank Development Indicators and covers the period 1998-2018, giving ten years of pre- and post-treatment, with the exception of total energy from renewable sources, which is only available up to 2015.

To create a plausible counterfactual, our donor pool is comprised of 18 Latin America countries, exclusive of Venezuela and very small islands from the Caribbean.[4] The SC algorithm weights the countries in our pool according to their ability to predict Ecuador's outcomes over the pre-treatment period, starting in 1998, ten years before the intervention. To that end, we match on lags of each of the outcome variables, and also on other variables that can predict changes in the outcomes. These predictors include the share of population in urban areas, the share of industry and agriculture in GDP, and GDP per capita. Table 1 reports our list of donor countries and the associated donor

[2] See Callais and Mkrtchian (2024) and Cho (2025) for similar applications to constitutional and environmental issues, respectively.

[3] We focus on the three main greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4), measured as metric tons of CO_2-equivalent emissions.

[4] We exclude Venezuela because it suffered a large desindustrialization over the same period (Callais et al., 2024), and Chávez claimed to be doing similar interventions in terms of environmental protections. Small islands, such as the Bahamas and the Cayman Islands, have no large urban centers and very little industrial output, and data availability is also quite limited.

weights.

Table 1: Donor Countries and Weights: Main Results

	Country Weights			
Donor Country	Forest Cover (Panel A)	GHG Emissions (Panel B)	Renewable Energy (Panel C)	Carbon Intensity (Panel D)
Argentina	0.031	0.061	0.000	0.000
Belize	0.281	0.000	0.000	0.000
Bolivia	0.042	0.000	0.212	0.285
Brazil	0.051	0.003	0.000	0.000
Chile	0.032	0.000	0.000	0.001
Colombia	0.042	0.127	0.000	0.000
Costa Rica	0.041	0.000	0.002	0.000
El Salvador	0.037	0.000	0.000	0.000
Guatemala	0.047	0.000	0.000	0.000
Guyana	0.044	0.000	0.000	0.037
Honduras	0.042	0.810	0.294	0.000
Mexico	0.036	0.000	0.000	0.619
Nicaragua	0.091	0.000	0.000	0.000
Panama	0.043	0.000	0.211	0.000
Paraguay	0.027	0.000	0.070	0.000
Peru	0.040	0.000	0.000	0.000
Suriname	0.045	0.000	0.045	0.058
Uruguay	0.028	0.000	0.166	0.000
RMSPE	0.000	1.337	2.458	0.006

Note: Donor weights associated with 1. Percentages may not sum to one due to rounding.

To assess the significance of our results, we conduct an iterative placebo test that entails constructing a synthetic control for each control unit, *as if* they had received treatment, and comparing the resulting gaps to the actual treated unit’s gap. We standardize these p-values by accounting for the quality of pre-treatment fit. Intuitively, if these placebo effects are just as large as the estimated treatment effect for Ecuador, we would be less confident that the gaps were not caused by chance alone; likewise, we want to put greater confidence in the placebo tests that have better pre-treatment fits (Galiani and Quistorff, 2017).

Figure 1 reports the results. Panels A through D respectively report the estimated causal effects on forest cover, total greenhouse gas emissions, renewable energy output, and the carbon intensity of GDP. In each case, our synthetic counterfactual closely tracks the performance of Ecuador on each of these indicators. A small exception is in a temporary spike in 2001 in Panel D, but even

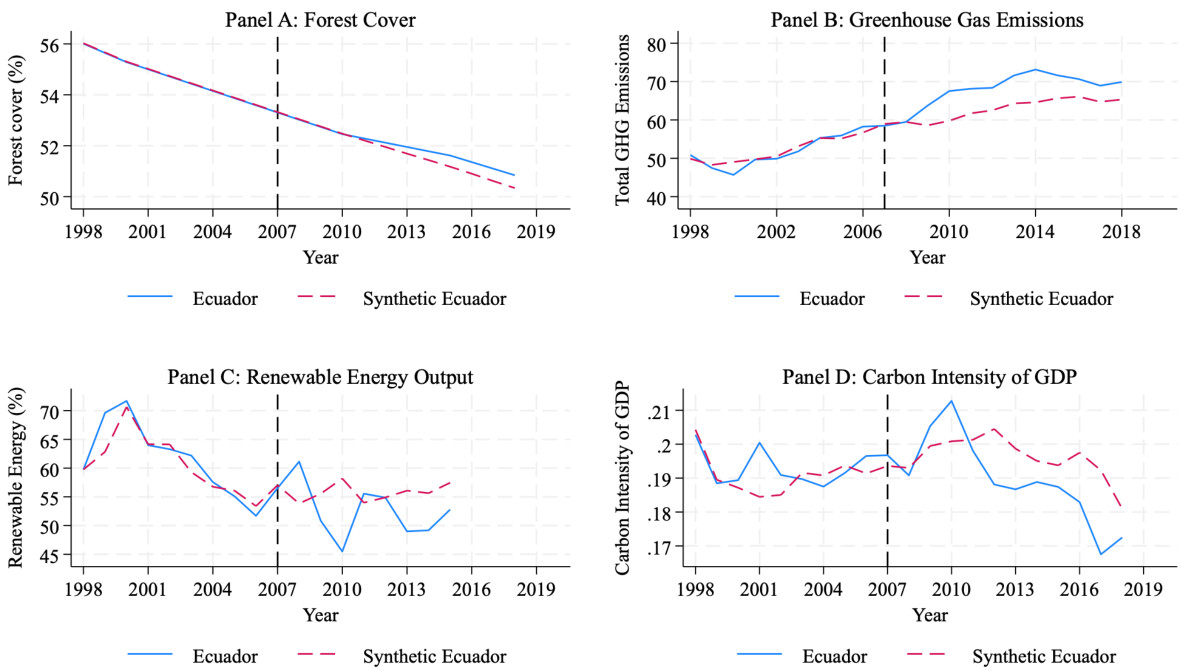

Figure 1: Main Results: The Effect of the Constitution on Environmental Outcomes

Notes: Panel A: Forest cover as a % of total area. Panel B: Total greenhouse gas emissions (in metric tons of CO_2 equivalent). Panel C: Renewable energy output as a % of total energy output. Panel D: Carbon intensity of GDP (kg of CO_2 per 2021 PPP USD).

then, the overall root mean square prediction error (RMPSE) is very low, around 0.006.

Figure 2 reports the associated placebo tests. We find little to no evidence of consistent improvements in environmental performance. Our estimated effects are within the range of placebo effects from countries that did not implement any environmental constitutional reform; this means that we cannot distinguish the estimated effects from mere statistical noise. While the results of Panel A of Figure 1 are statistically significant, they are not robust to further robustness checks, which we discuss below and detail in the online appendix (see Table A1).

3.1 Robustness Checks

We briefly discuss the results of our robustness checks here and provide further details in the appendix.

3.1.1 Alternative donor pools

Empirical applications of the synthetic control aim to construct a donor pool from similar donor units. Because levels of institutional and economic characteristics are usually clustered at the regional level, neighbors or institutionally related countries often make very good donors.[5] However, some of our variables are highly dependent on geography and may result from very specific policy choices. Thus, it is not obvious that geographical neighbors will provide comparable units.[6] In the appendix, we replicate our results using alternative donor pools, in which we select donors through a completely data-driven approach (see Section A1). The estimates using this new pool are reported in Figure A1. Table A1 also shows that although roughly comparable in magnitude, results with this alternative donor pool are not significant for any of the outcomes.

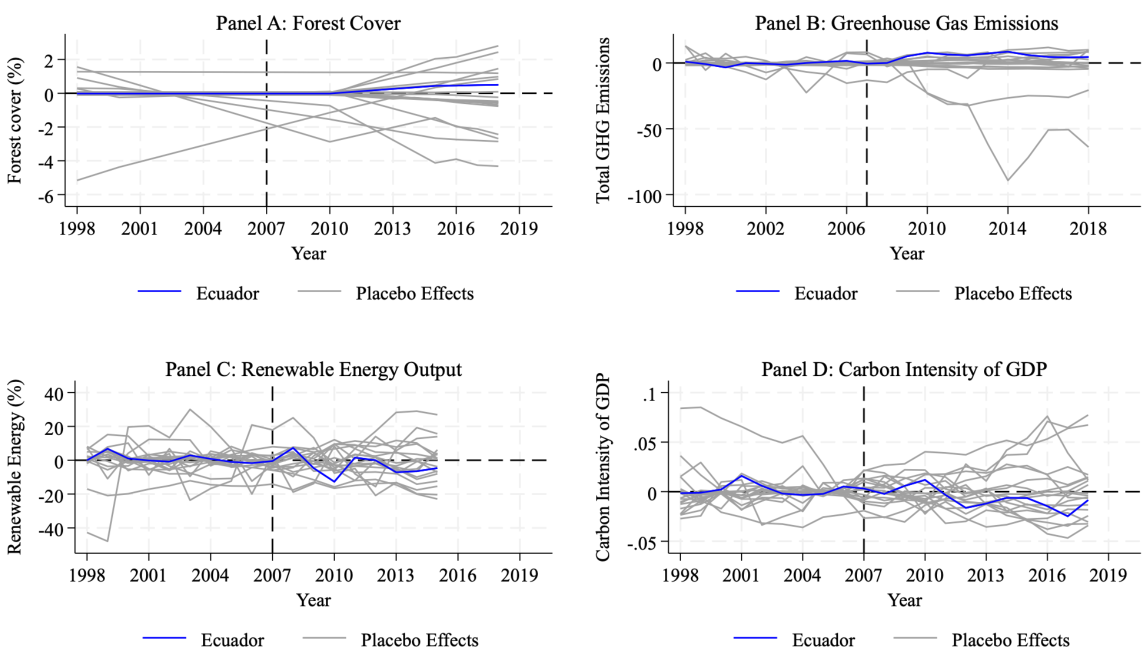

Figure 2: Placebo Effects
Notes: Panel A: Forest cover as a % of total area. Panel B: Total greenhouse gas emissions (in metric tons of CO_2 equivalent). Panel C: Renewable energy output as a % of total energy output. Panel D: Carbon intensity of GDP (kg of CO_2 per 2021 PPP USD).

[5]For instance, Cachanosky et al. (2025) and Absher et al. (2020) use other Latin American countries as donor for Ecuador’s institutions and income per capita, respectively. Abadie et al. (2015) uses other OCDE countries as donor for Germany’s GDP.

[6]As an example of this feature for energy production, consider the Nordic countries. The share of energy coming from hydropower can range from 0.03% in Denmark, to 18.9% in Finland, 39.7 in Sweden and 88.5% in Norway (Energy Institute, 2024).

3.1.2 Specification search

As a final robustness check, we tackle the risk of potential bias generated by predictor variables through specification search (Ferman et al., 2020). To address this potential issue, we adopt the "cherry-picking" test proposed by Ferman et al. (2020), which relies exclusively on the complete set of pre-treatment outcome lags, omitting other covariates. By including all lags, covariates become asymptotically irrelevant, thereby reducing the potential for bias arising from specification choices.[7] The results of this procedure are reported in Figure A2, with associated p-values in Figure A3 and donor weights in Table A2. Importantly, they are nearly identical to our main results, increasing our confidence in these findings are not driven by a specific specification choice.

4 Conclusions

Environmental protection has received increasing attention from policymakers and activists alike. Yet, it remains unclear whether broad constitutional provisions such as "environmental rights" can effectively drive improvements in environmental quality. This paper addresses this question by evaluating the impact of Ecuador's 2008 constitution, which granted legal rights to nature, on several environmental outcomes. Using the synthetic control method, we construct counterfactual scenarios for a series of environmental outcomes. Our findings suggest that there is little to no evidence that the constitutional reform led to significant improvements across these indicators. While forest cover shows mild gains in some specifications, these effects are not robust to alternative specifications. The remaining indicators remained statistically indistinguishable from the counterfactual.

Our results contribute to the broader debate on the role of constitutional provisions in achieving environmental goals. In line with prior literature, we emphasize that legal recognition alone is insufficient without institutional enforcement. Symbolic victories in the courts, such as the Vilcabamba and Los Cedros cases, appear to be isolated rather than indicative of systematic change. Our findings cast doubts on whether environmental protection can be effectively dealt by aspirational approaches characteristic of Latin American constitutional tradition (Gargarella, 2010).

[7] For further discussion, see Kaul et al. (2015), Botosaru and Ferman (2019), and Ferman and Pinto (2021).

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Appendix

A.1 Alternative Donor Pool

We select an alternative donor pool of countries that are quite similar to Ecuador in the outcome variable, using a completely data-driven approach. We get the mean value and its standard deviation for each outcome for Ecuador over the pre-treatment period. For instance, Ecuador’s mean forest coverage is 54.6%, with a standard deviation of 0.893 between 1997 and 2007. We then included any country whose mean forest coverage area was between 51.9 and 57.3.[8] As a result, donors have a mean forest coverage area of 54.2%, with a minimum of 52.1 and a maximum 56.1%. In contrast, the Latin America sample had a mean of 50.2%, ranging from 8.3% (Uruguay) and 95.5% (Suriname). Results are reported in Figure A1; Table A1 compares the effect sizes and their significance between to those of Figure 1.

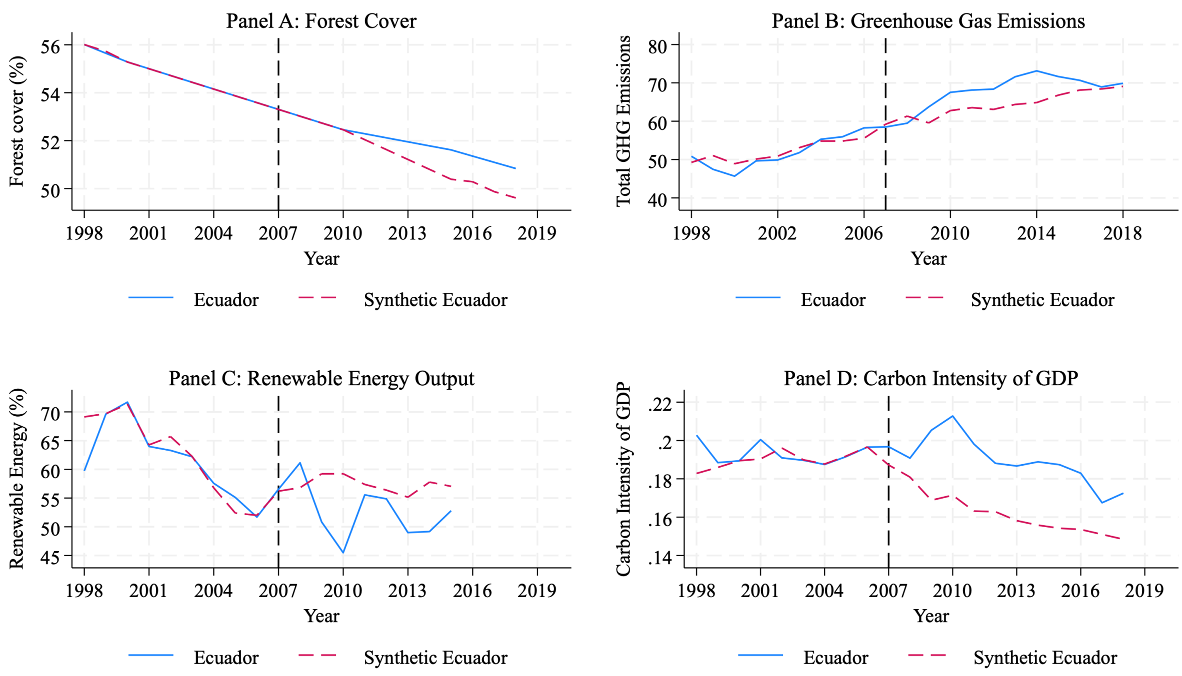

Figure A1: Robustness Check: Data-Driven Donor Pool

Notes: Panel A: Forest cover as a % of total area. Panel B: Total greenhouse gas emissions (in metric tons of CO_2 equivalent). Panel C: Renewable energy output as a % of total energy output. Panel D: Carbon intensity of GDP (kg of CO_2 per 2021 PPP USD).

[8]More generally, we set the search as $\bar{Y}_i \in \bar{Y}_{Ecuador} \pm 3 \times SD_{Ecuador}$. We chose $3 \times SD$ because this bandwidth yields roughly between 10 and 30 donors.

Table A1: Donor Countries and Weights: Main Results

	Forest Cover (Panel A)		GHG emissions (Panel B)		% Renewable Energy (Panel C)		Carbon Intensity (Panel D)	
Year	LatAm	DD	LatAm	DD	LatAm	DD	LatAm	DD
2008	-0.017	0.001	0.019	-1.836	7.299	4.328	-0.002	0.010
	(0.056)	(0.889)	(1.000)	(0.727)	(0.000)	(0.281)	(0.778)	(0.480)
2009	-0.017	0.001	5.161	4.178	-4.698	-8.376	0.006	0.037
	(0.056)	(1.000)	(0.222)	(0.364)	(0.111)	(0.250)	(0.500)	(0.120)
2010	-0.017	0.001	7.769	4.768	-12.701	-13.745	0.012	0.041
	(0.056)	(1.000)	(0.222)	(0.364)	(0.000)	(0.063)	(0.278)	(0.080)
2011	0.076	0.246	6.409	4.597	1.570	-1.820	-0.003	0.035
	(0.056)	(0.222)	(0.278)	(0.455)	(0.778)	(0.719)	(0.722)	(0.160)
2012	0.169	0.491	5.849	5.278	-0.031	-1.521	-0.016	0.025
	(0.000)	(0.222)	(0.389)	(0.455)	(1.000)	(0.875)	(0.167)	(0.240)
2013	0.262	0.735	7.262	7.208	-7.093	-6.165	-0.012	0.029
	(0.000)	(0.222)	(0.278)	(0.455)	(0.167)	(0.531)	(0.222)	(0.160)
2014	0.348	0.980	8.559	8.277	-6.466	-8.603	-0.006	0.033
	(0.000)	(0.111)	(0.278)	(0.455)	(0.278)	(0.406)	(0.722)	(0.080)
2015	0.441	1.225	6.019	4.862	-4.668	-4.243	-0.006	0.033
	(0.000)	(0.111)	(0.333)	(0.636)	(0.278)	(0.688)	(0.722)	(0.160)
2016	0.454	1.071	4.592	2.529			-0.015	0.029
	(0.000)	(0.222)	(0.444)	(0.818)			(0.444)	(0.240)
2017	0.484	1.223	4.211	0.515			-0.025	0.017
	(0.000)	(0.333)	(0.500)	(1.000)			(0.167)	(0.520)
2018	0.502	1.226	4.554	0.808			-0.008	0.024
	(0.000)	(0.333)	(0.556)	(1.000)			(0.500)	(0.320)
Joint p-val	(0.000)	(0.222)	(0.389)	(0.636)	(0.167)	(0.469)	(0.389)	(0.160)
RMSPE	0.000	0.026	1.337	1.941	2.458	3.173	0.006	0.008
Number of Donors	18	9	18	11	18	32	18	25

Note: Percentages may not sum to one due to rounding.

A.2 Specification Search Test

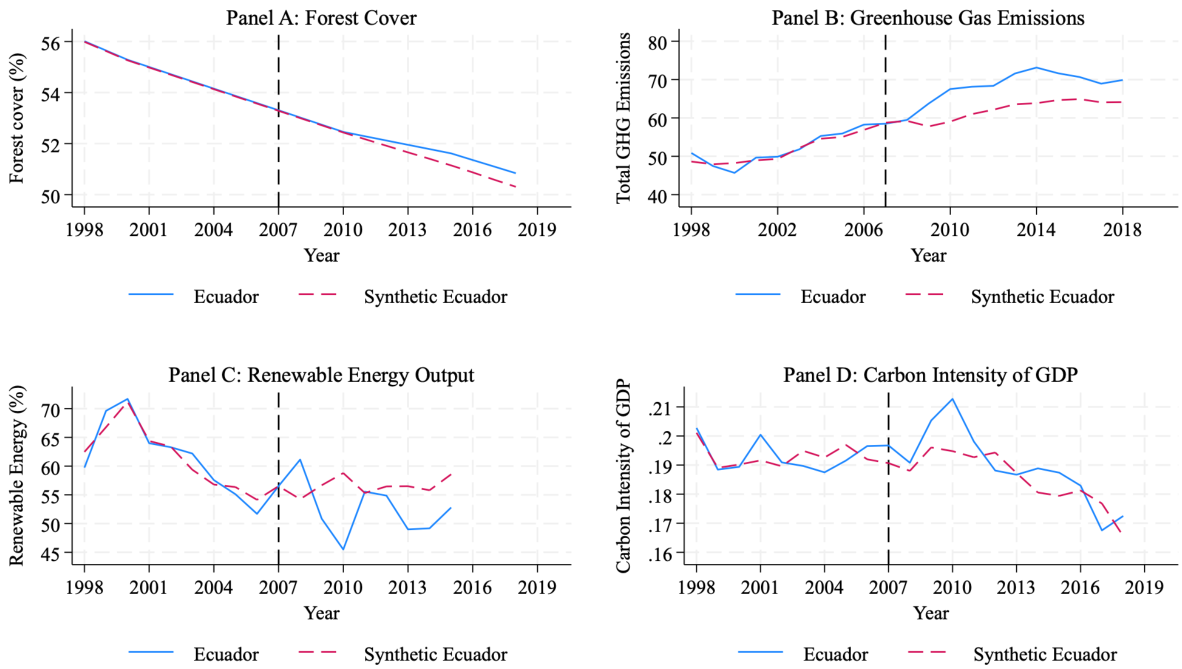

Figure A2: Robustness Check: “Cherry-picking” test

Notes: The “cherry-picking” test involves estimating a specification including all lags of the outcome variable and no predictor variables (Ferman et al., 2020). Panel A: Forest cover as a % of total area. Panel B: Total greenhouse gas emissions (in metric tons of CO_2 equivalent). Panel C: Renewable energy output as a % of total energy output. Panel D: Carbon intensity of GDP (kg of CO_2 per 2021 PPP USD).

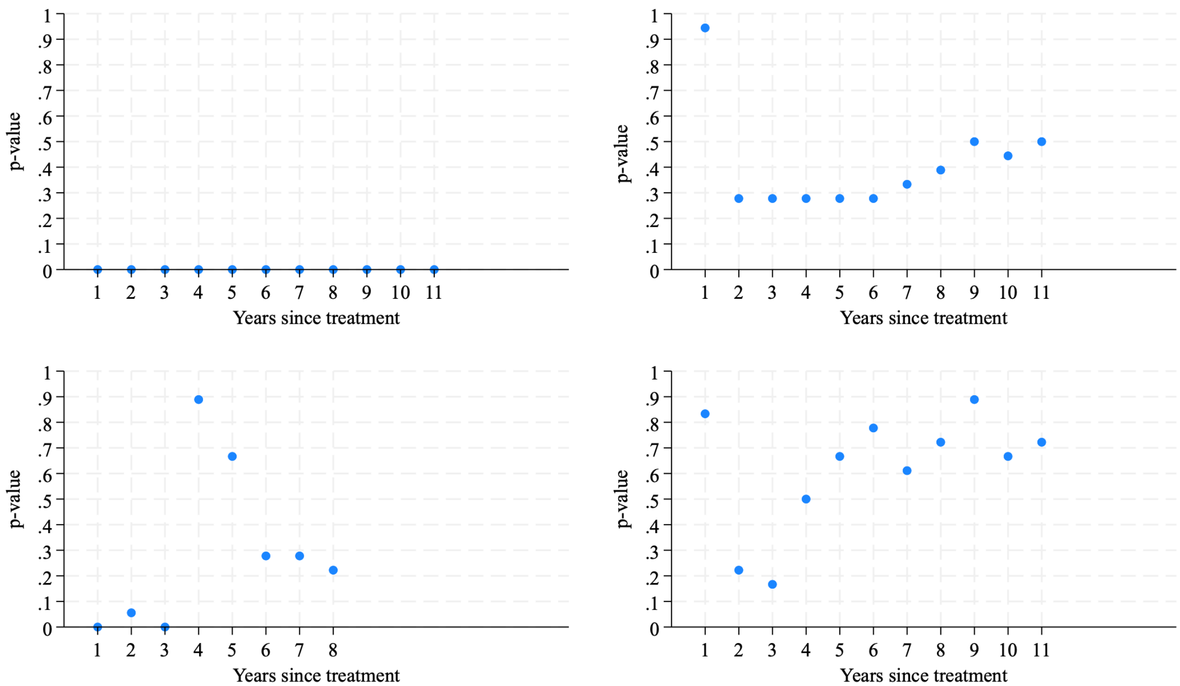

Figure A3: Robustness Check: “Cherry-picking” test, standardized p-values

Notes: Standardized p-values associated with Figure A2. See Figure A2 for details.

Table A2: Donor Countries and Weights: All Outcome Lags

	Country Weights			
Donor Country	Forest Cover (Panel A)	GHG Emissions (Panel B)	Renewable Energy (Panel C)	Carbon Intensity (Panel D)
Argentina	0.031	0.087	0.000	0.000
Belize	0.280	0.000	0.000	0.000
Bolivia	0.042	0.000	0.187	0.021
Brazil	0.053	0.005	0.000	0.000
Chile	0.032	0.000	0.000	0.025
Colombia	0.042	0.062	0.000	0.000
Costa Rica	0.041	0.000	0.147	0.000
El Salvador	0.037	0.000	0.000	0.000
Guatemala	0.047	0.000	0.000	0.000
Guyana	0.044	0.000	0.000	0.055
Honduras	0.042	0.560	0.355	0.000
Mexico	0.036	0.000	0.000	0.745
Nicaragua	0.092	0.000	0.000	0.000
Panama	0.044	0.285	0.172	0.118
Paraguay	0.025	0.000	0.000	0.000
Peru	0.040	0.000	0.000	0.000
Suriname	0.044	0.000	0.014	0.035
Uruguay	0.028	0.000	0.125	0.000
RMSPE	0.000	1.232	1.788	0.005

Note: Donor weights associated with Figure A2. Percentages may not sum to one due to rounding.