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From international organizations to local governments: how foreign environmental aid reaches subnational beneficiaries in Argentina, Brazil, and Mexico

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ABSTRACT

The fight against climate change increasingly connects International Organizations (IOs), national governments, and subnational governments. How are international funds to fight climate change and environmental degradation distributed to subnational beneficiaries? We develop a novel multilevel theory that poses that tension between the preferences of the IO and national governments helps explain the subnational distribution of environmental aid – even more than pure environmental or social need. Simply put, whomever contributes more to IO-sponsored green projects determines who gets funds at the subnational level. While we understand that both actors have multiple preferences associated with green aid allocation, our theory of multilevel fund allocation expects the IO to prioritize provinces and states with low-development. Conversely, national governments will prioritize domestic electoral interests. We test this theory with a new data from the largest international donor of environmental aid, the Global Environment Facility. Empirically, we focus on Argentina, Brazil, and Mexico between 1997 and 2017.

KEYWORDS Environmental foreign aid; global environment facility; international donor; subnational politics; Latin America

I Introduction

How do international monies, destined to fight climate change and environmental degradation at the local level, reach subnational beneficiaries? In this paper we explain the subnational distribution of millions of dollars in funding from the largest international donor (IO) of environmental aid, the Global Environment Facility or GEF, to subnational governments in Argentina, Brazil, and Mexico. As with other types of foreign aid, its purpose – in this case, environmental degradation – is not always the sole or even the decisive factor that explains the territorial distribution of GEF funds within countries. Instead it can also be shaped by political and developmental

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incentives. To explain this, we propose a theory of multilevel fund allocation, whereby we unpack the preferences of the different actors involved in the distribution of green aid. We find that international donors and national governments form preferences around environmental aid based on a different set of, sometimes conflicting, interests. These varied interests, rather than just environmental ones, determine how GEF funds are allocated to subnational jurisdictions (i.e., provinces and states).[1]

When allocating monies to recipients, most international donors, such as GEF, typically request 'matching funds' from national governments. Usually, the donor and the national governments reach an agreement about how much they each bring to a project. This means that the preferences of *two* different actors play out in the allocation of funds to the final recipients. Existing analyses of the distribution of foreign aid typically do not theorize the dynamics of donors and national governments' preferences in a given project (Findley *et al.* 2011, Jablonski 2014, Briggs 2017). Nor do they leverage co-sharing schemes to gauge whose preferences wins and when. We develop a theory of multilevel fund allocation that addresses this gap and unpacks the preferences of IOs and national governments, which predicts that monies will be allocated differently to subnational executive units depending on who (IO vs national government) contributes more to each project.

We elaborate this theory drawing on two bodies of literature that have seldom come to a dialogue: the literature on foreign aid, whose focus has been on the relationship between international and national actors, and the scholarship on subnational politics, whose object of study has been the political interactions between national and subnational actors (Hicks *et al.* 2010, Miller *et al.* 2013, Miller 2014, Lewis 2003, Alcañiz 2016, Ciplet *et al.* 2013, Giraudy 2007, 2010, 2015, Samuels and Snyder 2001, Schady 2000, Gibson and Calvo 2001, Gibson *et al.* 2004, Díaz-Cayeros 2004, 2006, Wilkinson 2005, Niedzwiecki 2018). In bringing these two strands of literature together, we not only can identify the preferences of each actor, but as importantly we can explore and leverage previously omitted connections among international-national-subnational actors. In essence, we can present a multilevel level theory of fund allocation (Giraudy *et al.* 2019).

To test our theory, we create a novel dataset that identifies and systematizes the allocation of the largest matching-funds programs in environmental aid, the GEF. Concretely, we study GEF green aid to subnational government recipients over the span of 20 years (i.e., from 1997 to 2017) in the three largest federations of Latin America: Argentina, Brazil, and Mexico.[2] To our knowledge, this is the first dataset of its kind that geo-references GEF aid in municipalities and provinces in Latin American countries. As discussed in more detail below, the allocation of this green aid is determined by the negotiation between GEF priorities and countries'

national priorities, stated in the eligibility criteria of the IO.[3] We rely on a cross-sectional times series analysis to test our hypotheses of the preferences of international and national actors in the subnational distribution of environmental funds. Our empirical analysis offers strong support for our multilevel fund allocation theory demonstrating that the preferences of the majority funder of each grant determines the criteria with which GEF projects are distributed within countries.

The question of how green aid is allocated from the federal to the subnational level is critical because ultimately, all policies that aim to remediate the impact of climate change and environmental degradation must be implemented in local jurisdictions. The findings of our study carry significant implications for the future of foreign environmental aid and its impact at the local level. We find that as international donors require greater buy-in from participating countries, they will need to increase other accountability mechanisms because national governments have a hard time passing up the opportunity 'to make it rain' in competitive subnational units. Further, and perhaps more importantly, our analysis reveals that environmental need on its own is not a predictor of green funding allocation.

The paper is organized as follows. In the following section we present our theory of multilevel fund allocation. The subsequent section offers a descriptive analysis of GEF funds, our case selection, and the dataset. We then turn to the empirical analysis by reviewing first the dependent, independent and control variables, followed by an explanation of our model, a presentation of the statistical analysis, and a discussion of the results. A conclusion summarizes the findings, contributions, and future research directions.

II A theory of multilevel fund allocation

In recent years, international donors have increased requirements to receive development aid. Citing the need to improve transparency and accountability in foreign aid transfers, international donors such as the United Nations, OECD countries, and the Sustainable Development Goals Fund, ask country recipients for matching funds.[4] Matching funds contributed by national governments vary. National contributions may be equal, greater, or even lower than the amount expended by the international actor. The main purpose of requiring matching funds is to increase the 'country ownership' of recipients over aid and ultimately, their own economic development (Martens 2005, Savedoff 2019). "Instead of posing external financial assistance as a tool to be used to force governments to adopt policies designed and motivated by external agents, country ownership was to make countries (implicitly governments) the primary agents in choosing policies and designing programs financed by foreign aid. In this sense, they should 'own' the

programs. This was accompanied by changes in language regarding foreign aid from 'donors and recipients' to 'development partners' (Savedoff 2019, pp. 1–2).

Matching-funds conditions are ubiquitous in international environmental aid agreements. Major donors of green foreign aid, such as the GEF and the UN-REDD Programme (the United Nations Collaborative Programme on Reducing Emissions from Deforestation and forest Degradation or REDD+) ask country recipients to commit funds (including nonmonetary goods and services, known as in-kind contributions) to supplement the foreign donation.[5] Moreover, in environmental aid agreements, the financial partnership between international donors and national governments, according to foreign development practitioners, should increase recipient countries' investment in environmental and climate remediation (Savedoff 2019).

A distinctive trait of matching-funds is that the preferences of at least two actors are involved in any given project – typically an international donor agency and a national government (Martens 2005). These preferences might sometimes coincide, but as we discuss and show below, there are good theoretical and empirical reasons to expect that they diverge. To the best of our knowledge, few studies of foreign aid theorize actors' divergent preferences or test how these differing preferences may affect the within-country distribution of matching funds (Findley *et al.* 2011, Jablonski 2014, Briggs 2017). We tackle this gap in the development literature and present a new theory of subnational aid distribution based on the distinct preferences of matching-funds development partners.

There is ample evidence among foreign aid scholars that international donors choose recipients based on their development need (Lewis 2003, Hicks *et al.* 2010, Ciplet *et al.* 2013, Miller *et al.* 2013, Miller 2014, Alcañiz 2016). While social exclusion is not the sole driver of development assistance, it is a significant determinant. Evidently, there are numerous factors that enter into the foreign aid calculus. For example, whether donors and recipients have existing ties, based on trade, geopolitics, or past colonial domination; all of these reasons may shape the allocation of foreign aid (Alesina and Dollar 2000, Burnside and Dollar 2000, McLean 2012). These studies contribute to a growing literature on the politics of international development aid (Buntaine 2016, Klöck *et al.* 2018, Peterson and Skovgaard 2019, Cunial 2021).

A key distinction in the literature is whether foreign aid flows from multilateral or bilateral donors, with the expectation that their preferences and behavior will differ (Alesina and Dollar 2000, Martens 2005, Hicks *et al.* 2010, McLean 2012, Briggs 2017). 'Multilateral donors are uniquely good at directing their aid to poor countries, and the WB [World Bank] and ADB [the African Development Bank] are among the most poverty sensitive of the multilateral donors. Multilateral donors likely target a larger share of their

aid to poor countries than bilateral donors because they have a mission to use aid to reduce poverty and because they have voting arrangements that prevent any one stakeholder country's government from forcing its preferences on all issues' (Briggs 2017, p. 189). Thus, multilateral donors tend to remain poverty-focused, even when they have other objectives towards the recipient (Alesina and Dollar 2000, Martens 2005, Klöck *et al.* 2018, Peterson and Skovgaard 2019). This is especially true of multilateral aid organizations, like the GEF, the IO of interest in our study (Hicks *et al.* 2010, McLean 2012). As Dollar and Levin state: 'multilateral assistance is more poverty selective than bilateral assistance' (Dollar and Levin 2006, p. 2042).

Turning to the preferences of national governments in the allocation of funds towards subnational recipients, numerous studies show that national incumbents disperse funds inside countries based on political criteria rather than need (Giraudy 2007, 2010, 2015, Samuels and Snyder 2001, Schady 2000, Gibson and Calvo 2001, Gibson *et al.* 2004, Díaz-Cayeros 2004, 2006, Wilkinson 2005, Niedzwiecki 2018, Cunial 2021, among others). Chief among the motivations for this behavior is the necessity of national incumbents and national officials to build winning political and electoral coalitions, garner legislative support in the national Congress, maintain political stability, and, also, sometimes manage security threats in districts that are strategic to national security and governability.

Among the political variables that determine the territorial distribution of funds and public goods, studies have found that partisan identity (left vs. right parties), electoral cycles (i.e, whether it is an election year or not), levels of electoral competitiveness within subnational units, subnational regime type (democracy vs. undemocratic regimes), overrepresentation of subnational districts in the federal legislature, or national-subnational partisan alignments have shaped national governments' ranking of preferences (Giraudy 2007, 2010, 2015, Samuels and Snyder 2001, Schady 2000, Gibson and Calvo 2001, Gibson *et al.* 2004, Díaz-Cayeros 2004, 2006, Wilkinson 2005, Niedzwiecki 2018, among others). Altogether, these studies reveal that when national incumbents and officials allocate funds and public goods within countries, a political calculus tends to overweigh a need-based criterion.

Because matching-fund projects involve co-responsibility of two different types of actors – the IO and the national government – their allocation to final recipients (i.e. subnational actors) should be analyzed on the basis of the different preferences of the two parties involved. Drawing on the two bodies of literature presented above, but pushing both strands of scholarship a bit further, we expect that the criteria to allocate international matching-funds will be driven by the preferences of the actor who contributes more funds to the environmental project – what we call in this study 'the majority funder.' Given that, as existing scholarship attests, actors involved in matching-funds

distribution have different sets of preferences, we expect to observe different criteria of distribution even within the same type of donor sponsored programs. That criteria, we argue, is determined by the relative weight of the majority funder. We define and measure 'weight' as the actor who contributes the largest percentage of funds on a given project.

Funding decisions at GEF are often negotiated directly between GEF officers and country representatives. Final project approval and matching fund breakdown are decided during a series of meetings held both in the IO headquarters and national environmental agencies.[6] For all countries, the eligibility and evaluation criteria to allocate aid are somewhat broad: 'to be consistent with national priorities that support sustainable development' and to ensure 'GEF support' the aim must be to tackle 'the drivers of environmental degradation in an integrated fashion.'[7] Within these broad decision parameters, there is room for whichever partner becomes the majority funder (i.e., the GEF or the national government of the country) to push for their overall preference to decide the allocation of aid for each individual project.

Two hypotheses follow from our theory, and we formulate and test them using GEF matching-funds data in the following section. When the GEF is the majority funder (i.e., contributes with the largest percentage of funds) in a given project, we expect less-developed subnational units to receive more grants. Consequently, when deciding where to invest in development assistance, we expect international donors, like the GEF, to look for projects that include subnational beneficiaries located in areas with significant levels of social exclusion. As discussed above, many studies find that IO donors favor poorer, low capacity recipients (Lewis 2003, Hicks *et al.* 2010, Ciplet *et al.* 2013, Miller *et al.* 2013, Miller 2014, Alcañiz 2016). Given past scholarship in environmental aid, we expect the 'social need' preference by the multilateral donor – observed in other aid areas- to hold in green international donations as well (Hicks *et al.* 2010, Miller *et al.* 2013, Alcañiz 2016).

Conversely, when the national government is the majority funder, we expect political preferences to guide the territorial allocation of green aid. In particular, we anticipate that levels of local electoral competition will shape national officials' allocation of GEF projects inside countries. Drawing on the 'swing-voter' theory, we hypothesize that more electorally-competitive subnational units will receive more GEF grants. This theory, unlike the 'core-voter' theory, suggests that politicians will distribute resources in a greater proportion to constituencies of swing voters so that they can elicit their electoral support (Lindbeck and Weibull 1987). Subnational districts where there is less competition, i.e., where the same party or the same governor heavily dominate politics (both in the local executive branch and in the local legislature), and thus where constituencies are regarded as 'core' voters, should be less attractive to national governments. The reasoning being

that, if the hegemonic subnational district is affiliated with the presidents' party, additional GEF funds sent to that district would be politically 'wasted'.[8] Instead, presidents could obtain greater political pay-offs by targeting those funds to districts where their co-partisans might have a chance of winning gubernatorial elections or obtaining more seats in local legislatures. This hypothesis, which could be regarded as 'green electoralism' or 'green clientelism,' is not only in line with traditional works on distributive politics and swing voters (Dahlberg and Johansson 2002), but also with recent work on the territorial distribution of green aid to fund solar energy projects in Colombia (Cunial 2021). In other words, from a presidents' strategic calculus, international funds – even meager ones allocated to combat environmental degradation – are politically more profitable in more competitive districts in which subnational winners are not 'predetermined.' The marginal gain of sending GEF funds to a hegemonic subnational district where the winner can be easily anticipated is negligible. This logic suggests that, different from other studies, national governments will not always use funds from GEF or other foreign donors to reward subnational districts that are ruled by co-partisan governors.

Before we test the hypotheses derived from our theory of multilevel fund allocation, we offer a description of our case selection criteria and data in the next section.

III Cases and data

Case selection

Why focus on Argentina, Brazil, and Mexico? In this paper we seek to explain the distribution of international matching-fund projects of environmental aid. Our multilevel theory thus encompasses three actors in three levels: an international organization, a national government, and the final recipient, which is located at the local (subnational) level. Because of their segmented territorial regime, federal countries are particularly well suited for the study of multilevel interactions in general, and our multilevel theory in particular. Most of the premises of the theory advanced in this study assume that actors operating within each jurisdiction (international-national-subnational) are autonomous from each other. This autonomy exists, by default, in federal countries. In addition to being federal countries, Argentina, Brazil, and Mexico are among the largest countries in Latin America, and as described below, the main recipients of GEF funds in this region.

As large albeit developing economies, these three counties are top recipients of environmental foreign aid. In fact, between 1990 and 1999, Brazil and Mexico were the 3rd and 4th largest recipients of environmental aid in the world (surpassed only by China and India), and Argentina was number 8

(Hicks *et al*. 2010). In addition, several reasons make these three countries of interest to international donors. As the country with most of the world's greatest rainforest and river basin, Brazil and its Amazon region is likely one of the most prominent targets of environmental aid in the Global South. While much smaller, Argentina is home to the world's fifth largest river basin and South America's second largest forest, the Gran Chaco. Mexico has some of the worst air and water pollution in the world. All three countries are of great biodiversity-interest. Finally, they are global agricultural producers. This, coupled with growing populations and the recent commodity boom, exacerbate the degradation and depletion of their natural resources.[9]

GEF data

Foreign environmental aid has two key missions. One, it serves as a financial mechanism for multilateral environmental treaties, specifically supporting the climate and environmental commitments of developing countries (Hicks *et al*. 2010). Second, it supplements or even replaces domestic environmental spending, which is always insufficient, in the form of project funding (Alcañiz 2016).

Over the past 25 years, national governments, international country donors, and inter-governmental organizations have increased exponentially the amount of money they dedicate to environmental aid. Between 1997 and 2017, for example, Brazil has received US$866,195,248, Mexico US $697,076,773, and Argentina US$280,175,351 for GEF funded projects that are implemented at the subnational level. In addition, these countries have disbursed approximately US$ 11 billion in co-financing, much of it in-kind – as nonmonetary goods and services.[10] Table 1 disaggregates the total amount of dollars matched (or co-financed) by the GEF and the national governments for each of the three countries studied in this article between the years 1997 and 2017. The projects presented in Table 1 and analyzed in this paper, encompass the totality of projects that were allocated to subnational jurisdictions in Argentina, Brazil, and Mexico. That is, our analysis excludes GEF funded projects that are allocated solely to national level governments and only includes those grants disbursed at the subnational level. The

Table 1. Total number and amount of GEF projects distributed subnationally per country between 1997 and 2017.

	Total # of GEF projects		Total amount of USD GEF & Country $ combined
Argentina	50	$	1,045,640,621.00
Brazil	105	$	5,778,721,650.00
Mexico	103	$	6,140,167,988.00
Total	258	$	12,964,530,259.00

subnational recipient is the provincial or state government, often the governor's environmental office, who implements the project (i.e., spends the money) at the local level. As seen in Table 1, Brazil and Mexico have received a similar number of projects and overall amount of GEF funds, while Argentina – a country with a significantly smaller population – has gotten fewer projects and less GEF funding.

If we include all environmental aid (i.e., national and subnational) distributed across the entire Global South for the same time period, it exceeds 50 billion dollars, mostly from the GEF, with co-financing by each participating country (Alcañiz 2016). This extraordinary amount of funding is not surprising, given that environmental problems have increased in magnitude and complexity at extreme rates in recent years. Sustained investment is needed for both mitigation activities – i.e., to prevent the worsening of the environmental degradation – and adaptation – i.e., to adjust to the changing and degrading natural world. GEF's target areas of investment are climate change, biodiversity, international waters, land degradation, forests, and chemicals and waste (persistent organic pollutants).[11]

In Figure 1 below, we show how GEF grants, co-funded through matching funds between the IO and the national governments of Argentina, Brazil, and Mexico, distribute across environmental issues over 20 years. This distribution also unpacks GEFs' environmental areas of interest for the three countries. Looking at Figure 1, we can quickly see that half (or almost) of GEF grants have gone to the area of biodiversity in Brazil and Mexico. In Argentina, over a quarter of GEF grants go to biodiversity. Examples of biodiversity projects include management and conservation of wetlands

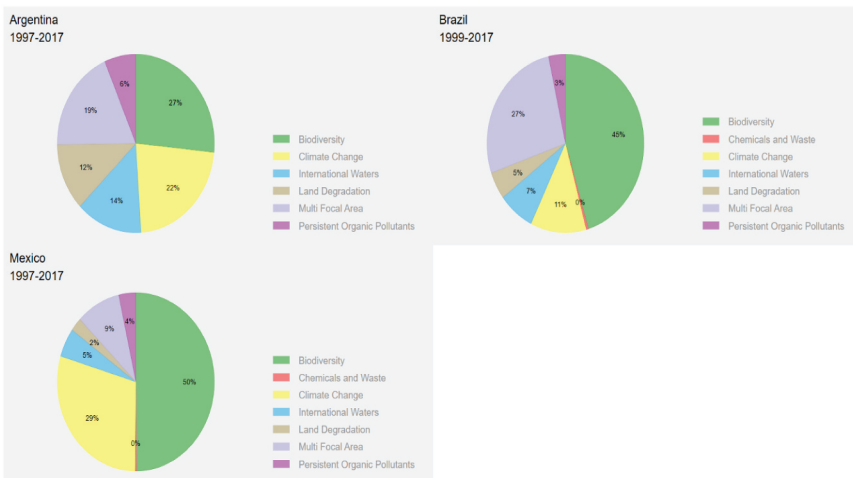

Figure 1. Type of Global Environment Facility (GEF) projects by country, 1997–2017.

Table 2. Description of variables and data sources.

	Description	Source
Dependent Variable		
GEF Share	Share of grant money disbursed by GEF transferred to subnational units in Argentina (provinces), Brazil, and Mexico (states) per year.	Alcañiz (2016, own calculation for subsequent years)
Independent Variables		
Infant Mortality	Subnational Infant Mortality rates	Argentina/Brazil: Niedzwiecki (2018); Mexico: INEGI
Subnational HDI	Degree of development measured along 3 dimensions (education, health and standard of living)	Global Data Lab (https://globaldatalab.org/shdi/shdi/)
ENPL	Number of effective parties competing in subnational legislative elections	Argentina/Mexico: Giraudy (2015); Brazil: Calvo & Ventura (2020)
Level of Competitiveness	Margin of victory between the winner and the runner-up in gubernatorial elections	Argentina/Mexico: Giraudy (2015; own calculation for subsequent years); Brazil: Calvo & Ventura (2020)
Alignment Fed. Government	Dummy variable, coded as 0 if governor fully aligned with president; coded as 1 if governors opposed to the president	Niedzwiecki (2018); Cherny *et al*. (2015). Base de Datos de Alineación Política Subnacional, Argentina 2003–2015. Instituto de Investigaciones Gino Germani, Universidad de Buenos Aires.
Amazon and Chaco Forest	Dummy variable, coded 1 when the state or province has jurisdiction over one of these two forests	Authors Own Calculation
Municipalities	Number of municipalities in a state or province	Argentina: Giraudy (2015; own calculation for subsequent years); Brazil: Niedzwiecki (2018); Mexico: INEGI
Population (logged)	Size of the population	Argentina/Mexico: Giraudy (2015; own calculation for subsequent years); Brazil: Calvo & Ventura (2020)
Time	Cumulative number of awarded grants over time	Authors Own Calculation

biodiversity in Argentina; promotion of sustainability in the Amazonian state of Mato Grosso in Brazil; and promotion of innovation among environmental funds in Mexico. This is one of GEF's main priorities for the Latin American giants and consistent with the importance and vulnerability of the region's biodiversity. A second area of priority is climate change. Given the three countries' rapid deforestation and industrialization rates and the size of their economies, this priority makes sense. Projects under this category

include energy efficiency programs; renewable energy in social housing; green buses for urban transportation; and assessment of existing wind and solar grids. Another area of interest is international waters, especially in Argentina, with 14% of GEF grants prioritizing that area. Finally, we should note that a large percentage of GEF grants fall under the category of 'multi-focal' which is the label for projects that target more than one environmental issue.

Multilevel dataset

GEF data is not disaggregated at the subnational level. To test our theory of multilevel fund allocation we put together an original database of GEF projects by province/state for each of the countries studied. To do this, we drew from GEF's online database of country grants to get all available information on GEF-funded projects.[12] This includes the number of grants, years, environmental area, total dollar amount, the breakdown of donor-country matching funds, and subnational recipients for Argentina, Brazil, and Mexico. Most of these data are available from GEF to download. However, our dependent variable – the share of GEF and national government environmental funds that is allocated to subnational recipients – is not available in the downloadable data that GEF provides. Rather, this data was recorded in the mandatory project evaluations (including terminal evaluations) of participating countries, which are uploaded to the GEF website. Subnational beneficiaries (in our data, always the subnational government) were documented in uneven and differing ways across projects and countries; consequently, this information was not susceptible of web scraping techniques. Thus, subnational recipients had to be coded manually by reading all the documentation each country presented for each project over 20 years.[13] We did this with the critical help of several research assistants, providing them with clear coding guidelines for state and province participation. The authors then checked a random sample of projects to confirm coding was done correctly.

Finally, to further check the validity of our data, we conducted fieldwork in Argentina in 2018. In our fieldwork we interviewed representatives of the IO, government officials, and NGO leaders with experience in managing GEF projects. These interviews helped verify that our subnational classification of projects had been done correctly. In addition, and as demonstrated empirically in the next section, interviewees confirmed that international monies were allocated subnationally through a process of negotiation between the IO and the country, with the national government ultimately deciding the receiving state or provincial government and the donor holding the administration accountable for the use of funds.

IV Empirical analysis: variables[14]

Dependent variable

Our theory seeks to test whether the preferences of the majority funder determine the distribution of funds within countries. This requires us to break down the contributions between the international donor and the national government. Our *Dependent Variable (DV)* is the share of grant money disbursed by GEF transferred to subnational governmental units in Argentina (provinces), Brazil, and Mexico (states) per year. The variable **GEF share** includes all GEF projects allocated to states and provinces in the three countries between 1997 and 2017, where the IO's share of funds is larger than the share of the national government's share.[15]

Independent variables and controls

The main *Independent Variables (IVs)* seek to test standard preferences in resource allocation of international donors and national governments, as derived from our theory and its related hypotheses. All of our IVs and controls are coded at the state or provincial level to capture differences and variation across subnational units in each country. We include variables that tap into the preferences of each majority funder per project. Regarding the international donor preferences that prioritize development needs, we include **Subnational Infant Mortality** and the **Subnational Human Development Index** (**IDH**) to test our hypothesis that international donors seek to get a bigger 'bang for their development buck.'

To test the hypothesis that national governments cannot pass up the opportunity to advance their electoral interests by attracting the support of swing voters, even when disbursing environmental aid, we include three key subnational political variables. **Effective Number of Legislative Parties** (**ENLP**) competing in gubernatorial elections; **Level of Competitiveness** measured as the margin of victory between the winner and the runner-up in gubernatorial elections; and **Party Alignment**, a dummy variable coded as 0 if a governor fully aligned with president and 1 if a governor is opposed to the president.

We include a number of variables to control for variation in subnational environmental need. First, for provinces and states with the most vulnerable and salient rainforests in the region, we have two dichotomous variables coded a 1 if the subnational unit contains part of the **Amazon** or the **Chaco Forest**, and a 0 if not. Furthermore, to capture demographic pressures, a chief concern of international and domestic conservationists, we have two variables: **Municipalities** and the total **Population** of the subnational unit. The former is the number of municipalities that each province and state

have for all three countries. The latter is the logged size of the population of all provinces and states for all three countries.

Critically, in consideration of any learning curve and to account for the capacity of a state or province in securing GEF grants, we have included a variable that counts the number of awarded grants over **Time** by subnational unit, as technical capacity and know how regarding the management of a grant accumulates over time.

V Models and results

As described above, the *Dependent Variable* of the analysis is the share of grant money disbursed by GEF transferred to subnational units in Argentina (provinces), Brazil, and Mexico (states) per year. The log-odds transformation ensures that the distribution of the variable is normal. Therefore, coefficients may be readily interpreted as units of change in the log-odds ratio of the dependent variable, as in the standard logistic model. Given that the data is organized by year and province/state, Table 3 provides a standard random effect OLS model in (1) and more conservative estimates with fixed effects by province in (2). All variables that do not vary by province or state, consequently, are only captured in the first model (1). Because both models estimate changes in the relative contribution of GEF, the natural interpretation of the results is that a statistically significant and positive coefficient accounts for an increase in the mean contribution of GEF to an environmental project and, at the same time, a decline in the relative contribution of the national government. In other words, the coefficients can be thought of as a mirror image of one another.

We can see right away that, as our theory predicted, provinces and states with higher infant mortality rates and lower human development scores receive more funds when the GEF is the majority funder of environmental aid projects.[16] We interpret this as strong evidence that social need is a significant preference for this IO in its investments in Latin America's largest countries and federations, even when its primary mission is environmental and climate remediation. The coefficients are significant and in the expected direction (positive for infant mortality and negative for human development) in both the fixed effects and random effects models, providing support for our expectation that IO green investments target vulnerable populations.

While lower human development and higher infant mortality are important correlates for the share that GEF contributes, political variables that describe heightened competition, such as the effective number of legislative parties (ENLP) and the level of competitiveness, reduce the share of GEF. The results support the expectation that governments will finance districts where political gains among swing voters can be made.

Table 3. Share (log-odds) of projects funded by GEF.

	(1) Share GEF $ln\left(\frac{s}{1-s}\right)$	(2) Share GEF $ln\left(\frac{s}{1-s}\right)$
Infant Mortality	.020**	.028***
	(.01)	(.009)
Human Development	−3.58***	−3.94***
	(.89)	(.69)
Municipalities (LN)	.018	
	(.048)	
Population (LN)	.136**	.138**
	(.064)	(.059)
ENCP (LN)	−.36**	−.462***
	(.143)	(.153)
Electoral Competitiveness	−.007**	−.009**
	(.003)	(.004)
Amazon	−.311	−.24
	(.269)	(.34)
Chaco Forest	−.132	.087
	(.166)	(.27)
Time	−.122***	−.034***
	(.04)	(.006)
Time^2	.002**	
	(.001)	
Alignment Fed. Government	−.075	.117
	(.171)	(.111)
Brazil	−.004	
	(.259)	
Mexico	.092	
	(.236)	
Alignment*Brazil	.251	
	(.335)	
Alignment*Mexico	.141	
	(.188)	
Constant	.853	.92
	(.973)	(1.02)
Fixed Effects Province/State	No	Yes
Clusters	Yes	No
Observations	732	648
R-squared	.19	.153

*Standard errors are in parentheses. *** p < .01, ** p < .05, * p < .1*

As expected, both ENLP and electoral competitiveness are highly significant in models 1 and 2 of Table 3. To interpret these results in a more substantive way, consider the following example of a low competitiveness province like Santiago del Estero in Argentina. In the 2009 election of governor in this province, the margin of victory was approximately 80%. Per model (1) of Table 3, the province is expected to receive 36% of total financing from GEF and 64% from the Argentine national government, holding all other variables at their means. In contrast, a highly competitive province such as Río Negro in 1997, where the margin of victory was less than 1%, is expected to receive only 25% from GEF and 75% from the Argentine national government. Therefore, as the margin of victory narrows,

financing provided by the national government increases. It is important to highlight that the average contribution by GEF to projects in Argentina, Brazil, and Mexico was 28% and that half of the observations fall in the range of 16% to 47%. Therefore, a decline of 11 points (from 36% to 28%) is substantively important.x

Let us now consider party competition instead of the margin of victory. If we consider a two-party election (ENLP = 2), the model predicts a 33% contribution by GEF and a 67% from the national government, holding all other variables at their means. In contrast, a highly competitive and fragmented province with 8 political parties, which is not uncommon in Argentina or Brazil, is expected to receive only 19.5% from GEF and 80.5% from the national government. As the number of parties increases, we see significant decline in GEF financing. The decline of 13.5 points is again highly relevant, almost half a standard deviation away from each other.

Interestingly, not all political variables are statistically significant in shaping national governments' preferences. For instance, the partisan alignment between national and subnational executives does not figure prominently in national officials' criteria of GEF projects' territorial allocation. The variable Alignment Federal Government and the interactions between this variable and Brazil and Mexico (Argentina is the baseline) in the random effects model are all statistically non-significant. Models (1) and (2) seem to lend credence to our expectation that presidents do not reward co-partisans with environmental aid. Consistent with our prediction regarding swing voters, presidents seem to be more interested in funneling green aid to districts where more non-core-voters reside rather than where governors from their own party rule.

The models in Table 3 also include a number of controls, a few of which are not statistically significant. Particularly interesting is the lack of significance of some controls associated with environmentally relevant subnational units such as the states in the Amazon Rainforest and the provinces in the Argentine Gran Chaco forest. In contrast, the control variables capturing the time elapsed since the GEF program was created and the size of the population are statistically significant. The negative correlation of the number of times a subnational unit has participated in GEF grants tells us that the IO does not reward prior participation, whereas the national government does.[17]

Population has a positive and statistically significant association, which can be expected as provinces and states with larger and growing populations will have greater demographic pressures on natural resources. However, it is interesting to note the modest elasticities of 0.136 and 0.138 in models (1) and (2) with regards to this variable. As we are using logged variables, the natural interpretation is that is that a 1% increase in population leads to a 0.136% increase in GEF financing, which indicates that the IO's marginal investment in these projects is not keeping up with population growth. This

could be the result of economies of scale whereby the required level of investment by GEF in high population areas is less attractive.

VI Conclusion

This paper asks and answers the question of how environmental aid reaches subnational recipients in Argentina, Brazil, and Mexico. The question of how international environmental aid is distributed locally by federal governments is key because the frontline of the fight against climate change and environmental degradation is local. Developing countries, even upper middle income ones, such as the ones analyzed here, have scarce resources to invest in environmental protection. Consequently, green foreign aid by international donors like the GEF, offers much needed additional funding to shore up state capacity in order to deliver environmental goods and services.

In this article we present a theory of multilevel fund allocation. To our knowledge, this theory unpacks, for the first time, the preferences of the two actors involved (i.e., GEF and national government) in the distribution of green aid, and how these preferences, in turn, shape the destination of green funds. We test the theory by analyzing the share of green funding from the GEF and the national government that reached provincial and state executive governments in Argentina, Brazil, and Mexico between 1997 and 2017. We find strong empirical evidence that when GEF is the majority funder, grants go to Brazilian and Mexican states and Argentine provinces with low development and low state capacity. When the national government is the main funder to the grant, we find a green electoral logic whereby resources go to subnational units with tight political competition where the payoff of eliciting swing (rather than core) voters is higher. We interpret these findings as a function of the preferences of the two key actors. When deciding where to invest, international donors prioritize social need and poverty, and national governments prioritize competitive subnational electoral politics.

Our analysis reveals a more dynamic interaction of preferences between the IO and the national government than the foreign aid literature has previously noted. One of the implications of our research is the paradox that greater country ownership, which is known to increase accountability, also increases the political and electoral manipulation of green grants. However, it should be noted that this politicization occurs in environmentally disadvantaged locations. Indeed, all countries in Latin America face significant challenges in climate change and the degradation of natural resources. The environmental, climate, and adaptation needs of *all* provinces and states of the three countries of interest considerably outnumber the available GEF grants and any other existing funding. Furthermore, as the environmental justice literature has shown empirically, environmental degradation and climate disasters disproportionately affect impoverished

communities. Thus, the dynamic nature of how preferences interact with subnational fund allocation also means that low-development areas will be prioritized as well.

Matching funds schemes in development aid allow for a promising empirical strategy to test for the preference effects of the majority funder. We hope future researchers will test whether the findings of this study are generalizable to other federal countries that are large recipients of GEF funds, like India. As the second largest recipient of GEF resources, India could be a particular valuable country to test our multilevel theory of fund allocation, because it would elucidate its applicability to parliamentary federal systems. Our theory so far has only been tested in presidential federations, where national executives and their own political party, rather than coalitional governments, are the sole actors involved in the interaction with GEF officials and programs. In non-presidential federations we could expect the greater number of national level actors involved in the allocation of green funds to politicize their distribution even further.

This study has tested the multilevel theory of fund allocation in federal countries. We also hope to see future research take up this strategy of matching funds schemes to examine preference effects in unitary countries, in particular those that are highly decentralized, such as Colombia and Peru. We expect that this theory will very likely explain that the allocation of matching green funds is also dictated by the preferences of the predominant actor (i.e., national government vs. GEF).

Finally, as noted before, matching-funds conditions are ubiquitous in international environmental aid agreements. Beyond GEF, other major donors of development aid ask country recipients to commit funds (including nonmonetary goods and services, known as in-kind contributions) to supplement the foreign donation. We hope that our theory of multilevel fund allocation, which so far has been tested on green aid, helps evaluate the distribution of other foreign aid programs and in other policy areas. We believe that much can be learned by unpacking the dynamics of donors and national governments' preferences in the allocation of any given project. For future researchers trying to uncover the politicization of development aid we see two types of useful strategies they can follow. One, a large-N study of the kind we have presented here, which allows for patterns of politicization to emerge and reveal themselves over years in the distinct preferences of international aid donors and national co-funders. The other, in-depth ethnographies that ask involved actors about their preferences and values while examining the institutional constraints and incentives they face.

Notes

1. Subnational jurisdictions in Argentina are called provinces and in Brazil and Mexico, states.
2. The fourth and final Latin American federal state is Venezuela, but we exclude it from our study given the extent of its political crisis.
3. See https://www.thegef.org/projects-operations/how-projects-work. Also, (Alcañiz 2016).
4. See https://www.sdgfund.org/ for a description of the United Nations matching funds requirement under the Sustainable Development Goals Fund, which is 'an international multi-donor and multi-agency development mechanism created in 2014 by the United Nations to support sustainable development activities and . . . bring together UN agencies, national governments, academia, civil society and business to address the challenges of poverty, promote the 2030 Agenda for Sustainable Development and achieve Sustainable Development Goals.'
5. By in-kind contributions, UN-REDD Programme means indirect budgetary allocations, which may include but would not be limited to professional services, machinery, office space, and materials. This definition of in-kind contributions is standard in transgovernmental cooperation. See https://www.un-redd.org/ for a description of how REDD+ funds are disbursed, as an example of in-kind contributions.
6. See https://www.thegef.org/sites/default/files/events/2_OFP%20Roles.pdf; https://www.thegef.org/sites/default/files/2021-12/GEF_Council_Decisions_2021.pdf; and https://www.thegef.org/projects-operations/how-projects-work. Also, (Young 2002) and (Alcañiz 2016).
7. See https://www.thegef.org/projects-operations/how-projects-work. Also, (Alcañiz 2016).
8. Hegemonic refers to the overwhelming domination of one party over the rest. This hegemony is typically seen in both the executive and legislative branches.
9. We are not attempting to explain why a country is a high profile recipient of environmental aid. Rather, our goal is to explain how funds are distributed subnationally once a donation is made to a country.
10. See https://www.thegef.org/about/funding as well as footnote 5 of this article.
11. See https://www.thegef.org/our-work.
12. See http://www.thegef.org/projects.
13. If a project is conducted in more than one subnational jurisdiction, we simultaneously assign the project to each of these jurisdictions.
14. Table 2 at the end of this section presents variables' descriptions and sources.
15. We use the log-odds transformation of the variable 'share', s, so that this transformation ensures that the range of the variable is normal, unbounded [-inf,inf], and that results may be interpreted as in a logistic model.
16. For the empirical analysis, we kept infant mortality and human development in their original scale and direction to ensure the direction of the variable coincides with its real life effect. That is, for subnational units, high infant mortality is bad and high human development is good. This explains the opposite signs in the regression models. While we understand that human development and infant mortality coefficients in the same direction may simplify readers' intuitive understanding of the results, this would require us to explain readers that high infant mortality is not a good thing. Thus, we believe maintaining the

original scale (high infant mortality is an undesirable outcome and high human development is a desirable outcome) is more adequate.

17. The linear and quadratic specifications are similar. The quadratic specification does indicate that the negative effect is stronger shortly after receiving a grant, and less relevant over time.

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No potential conflict of interest was reported by the author(s).

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