

Cofinancing in Environment and Development: Evidence from the Global Environment Facility

Matthew J. Kotchen and Neeraj Kumar Negi

Abstract

Leveraged cofinancing has emerged as a policy priority among international environment and development agencies. We study the determinants and impacts of cofinancing using a comprehensive data set from the GEF on 3,269 projects from 1991 through 2014, along with detailed ex post evaluations of more than 650 completed projects. We find that greater emphasis on cofinancing will tend to favor projects that are larger, less global in reach, focused on climate change, in countries with better governance, and led by certain multilateral development banks. A push towards more private sector involvement and loans, rather than grant financing, will tend to encourage projects with similar characteristics. Greater cofinancing results in better ex post evaluations, but projects executed by the private sector tend to achieve lower ratings. The results provide insight into how agencies can promote cofinancing and into how greater emphasis on cofinancing, private sector involvement, and nongrant instruments may implicitly shift environment and development priorities, as well as project outcomes.

JEL classification: O13, O19, Q01

Keywords: Aid, cofinancing, development, environment

I. Introduction

Among international aid agencies and donor countries, leveraged cofinancing is an increasingly important policy priority. The [International Monetary Fund \(2014\)](#) defines cofinancing as “the joint or parallel financing of programs or projects through loans or grants to developing countries provided by commercial banks, export credit agencies, other official institutions in association with other agencies or banks, or the World Bank and other multilateral financial institutions” (226). The basic rationale for promoting cofinancing is to leverage more resources from public and private sources to accomplish project, program, and development goals.¹

Matthew J. Kotchen (corresponding author) is a professor at Yale University and a research associate at the National Bureau of Economic Research (NBER); his email address is matthew.kotchen@yale.edu. Neeraj Kumar Negi is a senior evaluation officer at the GEF Independent Evaluation Office; his email address is nnegi@thegef.org. The datasets on GEF projects used for the paper were prepared by the GEF IEO and the GEF Secretariat. These were accessed after securing required permissions from the two offices. We are grateful to Andrew Foster and two anonymous referees for comments on earlier drafts that significantly improved the paper.

1 The World Bank provides a recent and prominent example as part of the International Development Association’s (IDA) 17th replenishment. Participants identified maximizing development impact as an overarching theme and agreed that

The emphasis on cofinancing is especially pronounced in multilateral funds that focus on environmental protection and climate change, where leveraging scarce resources is considered essential for providing global public goods at a meaningful scale. The Global Environment Facility (GEF), which has provided more than \$13.5 billion in grants for environmental projects, has made cofinancing central to its mission. GEF grants have leveraged an additional \$65 billion of cofinancing for projects in 165 developing countries (GEF 2014a), and recent policy reforms seek to increase cofinancing even further (GEF 2014b). Other examples are the Climate Investment Funds (CIFs) that operate in developing and middle-income countries to address climate change. Donor countries have contributed \$7.6 billion to the CIFs, which are expected to leverage an additional \$57 billion from other sources (CIFs 2014). More recently, pledges of more than \$10 billion to the Green Climate Fund (GCF) were made in 2014 with the expectation that the GCF will prioritize cofinancing when making funding decisions. Specifically, one of the GCF's guiding principles is "leveraging of other financing, including public and private financing, seeking to maximize leverage in the case of private financing" (GCF 2013, 17).

Advocates of cofinancing point to benefits beyond mobilizing more financial resources. Frequently heard arguments are that cofinancing promotes recipient country ownership of projects and programs; increases the likelihood of follow-up activities and stakeholder support; broadens the scope of what agencies can undertake; and helps insure that aid finances only the incremental costs to get projects and programs up and running. In many cases, the relevant ministries in recipient countries even find that demands for cofinancing help influence their own government priorities in beneficial ways. Within the push for greater cofinancing, there is also growing emphasis on the need to leverage the private sector, in particular, and to employ more nongrant financial instruments, such as loans, guarantees, bonds, and equity. This is considered particularly important for environment and development projects focused on global problems, where the objective is frequently to catalyze broad and transformative impacts, with climate change being the leading example (Venugopal and Srivastava 2012; Buntaine and Pizer 2014).

But greater demands for cofinancing raise concerns as well. Critics argue that accounting for cofinancing in project development and approval can shift funding priorities from true environment and development needs to ones that simply have greater cofinancing potential. This can result in "mission creep." There are also measurement and implementation challenges, where definitions are not always clear, and the mobilization and verification of leveraged finance takes additional staff time and resources. Recipient countries also raise concerns about how greater demands for cofinancing may promote indebtedness of poor countries rather than provide a means of more effective aid.

Despite the increasing demands for cofinancing among environment and development agencies, along with disagreement about its potential value, there is surprisingly little research on the subject. In this paper, we study the determinants and impacts of cofinancing for accomplishing environmental and development goals. We take advantage of a comprehensive data set from the GEF on 3,269 projects from 1991 through 2014, along with detailed ex post evaluations of more than 650 completed projects.

Our first objective is to examine how greater emphasis on cofinancing, private sector involvement, and loan rather than grant financing is likely to influence GEF priorities and ways of doing business. We find that greater emphasis on cofinancing will tend to favor projects that are larger, have less global reach, and are focused on climate change rather than other environmental problems (e.g., biodiversity conservation). We also find evidence that greater emphasis on cofinancing will favor projects supported by multilateral development banks (MDBs) rather than other agency types, and projects that take place in countries with better "government effectiveness" and "regulatory quality." The increasing priority given to loan cofinancing and private sector involvement will also favor larger projects focused on climate change,

"IDA17 could not be business as usual, and welcomed the focus on leveraging private investment, public resources, and knowledge" (13). Many specific recommendations were made about how the World Bank should seek to leverage greater private and public resources through cofinancing.

where investments in renewable energy are common, in addition to those focused on reducing ozone and organic pollutants.

Our second objective is to evaluate whether greater emphasis on cofinancing and private sector involvement is justified based on actual project outcomes to date. We find evidence that greater cofinancing results in better projects as measured by ex post evaluations for both the overall project outcome and the likelihood of sustained impacts. However, despite increasing emphasis on private sector involvement, projects executed by the private sector tend to achieve lower ratings for both project outcome and sustained impacts. The latter result raises a note of caution amidst the push to increase private sector involvement in GEF programs and projects, with potential lessons for other agencies currently seeking to do the same.

II. Related Literature

We are aware of only one other study that examines the determinants of cofinancing in development projects. [Miller and Yu \(2012\)](#) use GEF data to study cofinancing ratios, and they find that cofinancing ratios depend on whether the financing is foreign or domestic, based on grants or loans, and provided by an MDB or a United Nations (UN) agency. While [Miller and Yu's \(2012\)](#) analysis is similar to the first part of ours, they employ only a subset of the data that we use here, and the specifics of our econometric methods and findings differ in ways that we discuss later in the paper. Two important differences, however, are that our preferred results are based on fixed-effects models, and [Miller and Yu \(2012\)](#) do not investigate the determinants of nongrant and private sector cofinancing or the respective effects on project outcomes.

We are not aware of any study that investigates the project-level determinants of nongrant cofinancing or involvement of the private sector. While we focus on environmentally related projects, the question is, to the best of our knowledge, unstudied more generally in development economics.² The closest paper, by [Buntaine and Pizer \(2014\)](#), considers whether aid directed at renewable energy facilities catalyzes private investment in clean energy. They find that aid targets countries that already have substantial private investment in renewable energy and that greater amounts of aid do not spur additional private investment. Accordingly, [Buntaine and Pizer \(2014\)](#) raise questions about whether aid can effectively leverage the private sector to mitigate greenhouse-gas emissions through the promotion of renewable energy. Our approach is different in that we examine factors that influence private sector cofinancing alongside aid on a project-by-project basis, including projects focused on climate change and other environmental issues.

The third part of our analysis considers how realized levels of cofinancing and private sector involvement explain differences in ex post project evaluations. While we are unaware of research that is directly focused on these questions, there is a literature on project evaluation. Many of the existing studies use country-level economic, political, and social indicators to explain project rates of return (e.g., [Isham et al. 1997](#); [Isham and Kaufmann 1999](#)) or terminal evaluations (e.g., [Dollar and Levin 2005](#); [Guillaumont and Laajaj 2006](#); [Chauvet, Collier, and Fuster 2006](#)). Other studies look more specifically at how project characteristics, agency involvement, and local conditions affect project outcomes ([Deininger et al. 1998](#); [Kilby 2000](#); [Khwaja 2009](#); [Assefa et al. 2014](#)). Importantly, [Denizer et al. \(2013\)](#) find that variation in the success of projects is greater within countries than between countries and that inclusion of both macro and micro variables is important for explaining differences. This is the approach we take here, and we relate our specific findings to those in other studies when discussing the empirical results.

Finally, in a complementary study, [Buntaine and Parks \(2013\)](#) describe how there is very little evidence on the outcome of environmental projects in developing countries beyond case studies, and they conduct an analysis of 157 environmental projects at the World Bank. Some of their main findings are that projects are more successful when countries have a stronger public sector, when the World Bank provides a greater

2 There is a large literature that looks at how foreign aid affects private investment at a macro level, and the results are generally inconsistent (e.g., [Papanek 1973](#); [Harms and Lutz 2006](#); [Herzer and Grimm 2012](#); [Selaya and Sunesen 2012](#)).

proportion of concessional finance, and when the focus is on local benefits rather than global public goods. Several of our results are related to theirs, as we will discuss, but our analysis differs in several important ways: We study the effects of cofinancing, both the amounts promised *ex ante* and realized *ex post*; we consider two different outcome measures, one for project outcome and one for the likelihood of sustained impacts; and our data set on project terminal evaluations is significantly larger and includes observations across many agencies.

III. Institutional Background on the GEF

The GEF is a multilateral fund that provides grants and concessional funding to cover the incremental costs of transforming development projects into ones that provide global environmental benefits. The GEF was established in 1991 and serves as the official financial mechanism for many international conventions.³ The GEF has several environmental focal areas: biodiversity, climate change, persistent organic pollutants, international waters, land degradation, and ozone-depleting substances. To date, the GEF has disbursed \$13.5 billion that has leveraged \$65 billion in cofinancing for more than 3,900 projects in 165 developing countries.

The GEF operates through a partnership with accredited agencies that are responsible for proposing and managing GEF projects. All project proposals must first be endorsed by recipient countries, and agencies usually provide assistance to governments in developing countries or NGOs that develop and implement projects.⁴ Most GEF projects are one of three types—full-size projects (FSPs), medium-sized projects (MSPs), and enabling activities (EAs)—and the approval process differs by project type. FSPs are those with requests of more than \$2 million, MSPs are those with requests up to \$2 million, and EAs are projects that assist countries with reporting requirements of UN Conventions and/or with information to facilitate policy and strategic decision making. Preparation grants are also available to aid in the development of projects.

After projects begin implementation, they undergo a monitoring process that culminates with a terminal evaluation at project completion. The lead agency charged with implementing the project is responsible for completing the terminal evaluation. There are specific guidelines for reporting on progress throughout and on whether the project achieved its intended results (GEF 2008). The GEF Independent Evaluation Office (GEF-IEO) reviews the terminal evaluations to validate the findings and aggregate the results across projects for lessons learned, many of which are reported in the GEF's Annual Outcome Reports.⁵

Every four years, as part of a replenishment process, the GEF reviews and revises its funding and strategic priorities. Policies are set about the resource allocation among focal areas and other specific programs, in addition to the allocation among recipient, developing countries. Currently, 57 percent of GEF resources are provided through country allocations to specific focal areas, and the remainder is allocated on a first-come, first-serve basis within other programmatic areas. Country allocations are based on a formulaic approach that accounts for each country's potential for global environmental benefits, outcome and capacity to deliver the benefits, and equity weights based on national income.⁶

3 These are the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, the Stockholm Convention on Persistent Organic Pollutants, the United Nations Convention to Combat Desertification, and the Minamata Convention on Mercury. The GEF also supports implementation of the Montreal Protocol on Substances that Deplete the Ozone Layer for countries with economies in transition.

4 There are currently 14 accredited agencies, including UN agencies, MDBs, and NGOs. The specific agencies with projects included in the data set are listed in the next section.

5 These are available online at <http://www.thegef.org/gef/APRs>.

6 The most recent allocations are reported in GEF (2014d). The GEF's allocation mechanism operates much like the outcome-based allocation system for each country's funding envelope in the International Development Association (IDA).

As part of the most recent replenishment process, which concluded in May 2014, the GEF made specific policy recommendations seeking higher levels of cofinancing (GEF 2014b) and subsequently revised its cofinancing policy (GEF 2014c). The GEF defines cofinancing as “resources that are additional to the GEF grant and that are provided by the GEF Partner Agency itself and/or by other non-GEF sources that support the implementation of the GEF-financed project and the achievement of its objectives” (3). The GEF seeks to reach a cofinancing ratio of at least 6:1 for its overall portfolio, with expectations of greater cofinancing from upper-middle income countries. While the GEF does not impose minimum thresholds or require specific sources of cofinancing in the review of projects, it does engage with countries and agencies to develop strategies for achieving greater cofinancing and private sector involvement. The aim is to “(a) enhance the effectiveness and sustainability of the GEF in achieving global environmental benefits; and (b) strengthen partnerships with recipient country governments, multilateral and bilateral financing entities, the private sector, and civil society.” (3).

IV. Data Sources and Summary Statistics

A. Project Characteristics

Our primary source of data is the GEF’s Project Management Information System (PMIS). The PMIS includes information on all GEF projects from the initial proposal stage through project completion and evaluation. We use the PMIS data as of March 2014.⁷ We consider only projects that received Secretariat approval and were not part of an interrelated programmatic approach. This means that all observations can be treated as an independent GEF project ready to receive funding. The data set consists of 3,269 projects spanning the GEF Pilot Phase through five replenishment periods (denoted GEF-1 through GEF-5), with approval dates ranging from 1991 into 2014. Figure 1 shows the number of projects by year of approval, along with an indicator for the associated GEF phase.

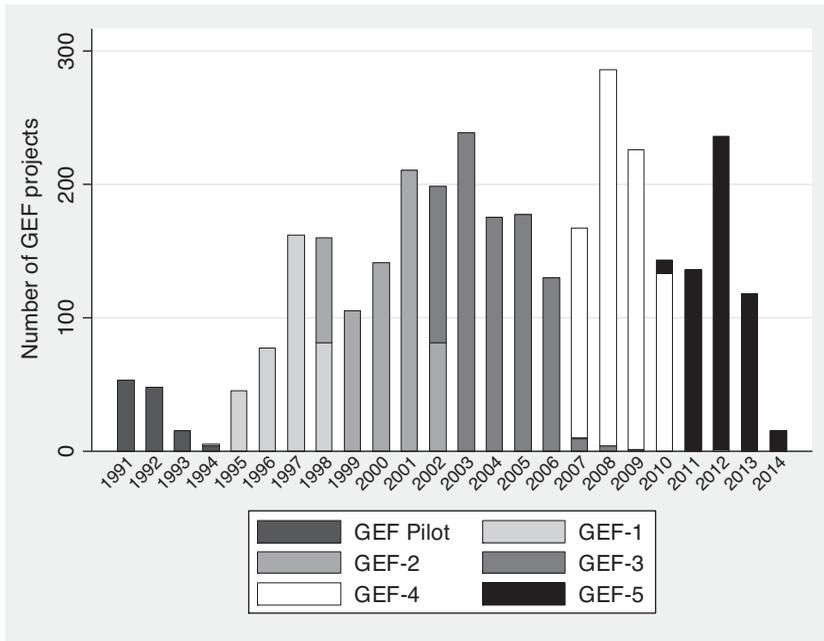
Central to our analysis is information on each project’s level of GEF funding and cofinancing. Panel A of table 1 reports descriptive statistics. Approved GEF grants are \$3.3 million on average, and 46 percent of the projects received a preparation grant. Although not reported in the table, the average preparation grant was approximately \$89,000. On average, projects had cofinancing commitments of \$16 million at the time of approval, and the average cofinancing ratio among projects—cofinancing over the GEF grant plus any preparation grant—was just under three.⁸ This means that, on average, each dollar of GEF funding allocated to a project was associated with approximately \$3 of cofinancing. Nevertheless, 18 percent of the projects receive no cofinancing at all.⁹ We return to panel B of table 1 below.

We summarize categorical variables from the PMIS data in table 2. Most projects are FSPs, followed by EAs and MSPs. Among the focal areas, two-thirds of the projects are categorized as either biodiversity or climate change. Multifocal area projects—ones that include at least two focal areas—are the next most common, and each of the other focal areas account for less than 10 percent. The United Nations Development Program (UNDP) is the most common lead agency, accounting for nearly half of the GEF projects. Other lead agencies with a substantial number of projects are the World Bank and the United Nations Environment Program (UNEP). For all other agencies, we kept distinct categories for those that account

7 Much of the PMIS data is available online at http://www.thegef.org/gef/gef_projects_funding. See Bayer et al. (2015) for another study that uses some of these data to study bargaining among international organizations.

8 Note this is the average cofinancing ratio among projects and not the ratio for all projects collectively, which would be \$16 million / \$3.3 million = 4.85.

9 There are some outliers at the upper ends of the grant and cofinancing distributions that we trim in our subsequent analysis. We drop observations in the upper 1 percent, leaving a maximum of \$27 million for the GEF grant and a maximum of 36 for the cofinancing ratio. While including the trimmed observations in the analysis does not change the results, we eliminate them because there is not much to learn that is more general from such extreme outliers.

Figure 1. Number of GEF Projects by Year of Approval and GEF Phase, with a Total of 3,269 Projects**Table 1.** Descriptive Statistics on Financing and Country Characteristics

Variable	Mean	Std. dev.	Min	Max	Obs.
Panel A: GEF grant and cofinancing variables					
GEF grant (\$ millions)	3.33	5.99	0.01	134.62	3,269
Preparatory grant (1=yes)	0.46	0.50	0.0	1.0	3,269
Cofinancing (\$ millions)	15.96	57.90	0.0	1,303.60	3,269
Cofinancing ratio	2.99	7.21	0.0	133.14	3,269
Panel B: Country characteristics					
GDP per capita (2013 \$)	3,007	3,202	110	24,036	3,055
Voice and accountability (WGI)	39.25	21.85	0	93.3	3,082
Government effectiveness (WGI)	41.60	19.93	0	90.9	3,070
Regulatory quality (WGI)	41.40	20.00	0	96.6	3,072
Control of corruption (WGI)	39.12	20.57	0	92.2	3,070

Note: Data for all observations are reported here, but in the statistical analysis we trim outliers on the upper end of the GEF grant and cofinancing ratio. Eliminating the upper on percent leaves a maximum of \$27 million for the GEF grant and 36 for the cofinancing ratio.

for at least one percent of the projects, while combining all others into the “other agency” category.¹⁰ Governments were the executing partner for 76 percent of the projects. Far fewer projects were executed by multilateral agencies or NGOs, foundations, and institutes; and less than one percent were executed by the private sector. Most of the projects took place in Africa, followed by Asia, Latin American / Caribbean, and Europe / Central Asia. Though not indicated separately in the table, 10 percent of the projects are categorized as “regional” because they include more than one country within the same region. Finally,

10 The other agency category includes the GEF Secretariat with 26 projects, the African Development Bank (AfDB) with 22 projects, the European Bank for Reconstruction and Development (EBRD) with 11 projects, the World Wildlife Fund (WWF) with two projects, and Conservation International (CI) with one project.

Table 2. Descriptive Statistics on Project Categorical Variables

Variable	Percentage	Variable	Percentage
Project Type		Lead agency	
Full-sized project	46.6	UN Development Programme (UNDP)	48.3
Medium-sized project	20.6	World Bank	22.0
Enabling activity	32.8	UN Environment Program (UNEP)	18.5
		UN Industrial Development Org. (UNIDO)	5.4
Focal area		Food and Agriculture Organization (FAO)	1.2
Biodiversity	36.6	Asian Development Bank (ADB)	1.1
Climate change	30.8	International Fund for Ag. Development (IFAD)	1.2
Multifocal area	12.5	Inter-American Development Bank (IADB)	1.0
Persistent organic pollutants	9.2	Other agency	1.3
International waters	5.8		
Land degradation	4.2	Region	
Ozone-depleting substances	0.9	Africa	31.3
		Asia	24.7
Executing partner type		Latin America / Caribbean	20.3
Government	76.0	Europe / Central Asia	16.1
Multilateral agency	14.7	Global (more than 1 region)	7.6
NGO/Foundation/Institute	8.5		
Private sector	0.8		

Note: Percentages based on 3,269 projects and may not sum to 100 due to rounding.

almost 8 percent of the projects are categorized as “Global” because they involve countries in more than one region.

B. Country Characteristics

We collected data on country characteristics from the World Bank. The first is gross domestic product (GDP) per capita for each country and year. We matched the data with projects based on the year of project approval and the country where the project took place.¹¹ As shown in panel B of table 1, the mean GDP per capita when averaged across projects is \$3,007 in 2013 dollars.

Other data were collected to capture potentially important dimensions of governance that could affect cofinancing and the outcome of GEF projects. We use four of the World Bank’s Worldwide Governance Indicators (WGI).¹² These include indices that measure governance as it relates to “voice and accountability,” “government effectiveness,” “regulatory quality,” and “control of corruption.” Each index is scaled as a percentage to reflect the number of countries in a given year that score worse than a particular country. For example, a 60 for regulatory quality in country *i* for year *t* means that 60 percent of the countries included in the World Bank’s data set score worse than country *j* in year *t*. The WGI data is not available for every year, so when missing, we imputed data from the closest year that was available.¹³ This is not, however, much of a limitation because these data are primarily designed for

- 11 For regional and global projects, the matching is based on the average GDP per capita of all participating countries when listed. When specific countries are not listed, the variable is left missing.
- 12 These data are available at <http://info.worldbank.org/governance/wgi/index.aspx#home>, where there is also a detailed description of the methodology. Two indicators not used in the analysis that we report here are “rule of law” and “political stability and absence of violence.” We do not include these variables to minimize collinearity with the other indicators and because they never produced statistically significant results.
- 13 Specifically, data are not available for years 1991–1995, 1997, 1999, 2001, 2013, or 2014. When first compiling the WGIs, they were produced every other year. We use data imputation such that 1996 data is used for 1991–1995, and for the other missing years, we use data available from the most recent previous year. Later in the paper, we report

studying cross-sectional differences among countries rather than changes over time, and this will influence how we use the WGI indicators in our statistical models. As shown in panel B of [table 1](#), all of the WGI variables range from zero to above 90 and have means close to 40.

C. Loan and Private Sector Cofinancing

We obtained a further data set from the GEF Secretariat that includes more detail on the types and sources of project cofinancing. Of particular interest is (a) whether the cofinancing was in the form of a loan, including both concessional and nonconcessional loans, and (b) whether cofinancing was delivered through the private sector. We consider loan and private sector cofinancing for only MSPs and FSPs because no EAs include loans and only two have private sector involvement. Of the 2,198 MSPs and FSPs in the data set, we obtained the more detailed cofinancing data on 1,778 (81 percent) of the observations. These are all of the projects for which the data are available.¹⁴ Twenty-two percent of the projects include loan financing, and the conditional mean amount of loan financing is 59 percent of each project's total cofinancing. Regarding private sector involvement, 38 percent of the projects have private sector involvement, and the conditional mean of private sector financing is 36 percent of a project's total cofinancing. Other sources of private sector financing were grants and in-kind contributions.

D. Project Terminal Evaluations

Our final source of data comes from the GEF-IEO and is based on reviews of the terminal evaluations that agencies provide upon project completion. For a subset of the GEF's completed projects, the GEF-IEO conducted a detailed and independent evaluation of the terminal evaluations and created a consistent set of variables for making comparisons among projects. We use the complete set of data available from the GEF-IEO as of March 2014.

Project outcomes.—The first variable is an overall evaluation of project outcomes based on stated goals. The variable is based on indicators in three dimensions: relevance to the intended focal area and country priorities; effectiveness at achieving outcomes; and efficiency with respect to costs and implementation times.¹⁵ The indicators are then combined into an overall outcome variable with six ordered categories. These data are available for 688 MSPs and FSPs. The different categories and percentages are highly satisfactory (5%), satisfactory (42%), moderately satisfactory (36%), moderately unsatisfactory (13%), unsatisfactory (4%), and highly unsatisfactory (less than one percent). In our subsequent analysis, we convert the outcome variable into a binary indicator of satisfactory or better (47%).

Sustainable impact.—The second variable is a measure of sustainable impact, which measures the likelihood of continued project benefits after project completion. The variable is based on indicators in four dimensions: likelihood of continued financial resources; sufficient social and political interests; adequacy of institutional frameworks and governance; and environmental conditions. It is worth noting that this variable is based on expectations of sustainable impact rather than some measure that has been verified long after project completion. The overall sustainable impact variable is available for 666 MSPs

clustered standard errors for our regression models that account for the data imputation. Again, for regional and global projects, we use the mean of all countries participating in the project when countries are listed, otherwise the variable is left missing.

- 14 Unfortunately, there is no general explanation for why the more detailed data is not available for all projects. A comparison of means for project characteristics shows that the missing data is more likely for older projects. While this means that our analysis involving these data will be for a selected sample, we do not find a systematic pattern indicating expectations of bias.
- 15 The project outcome measure focuses on results and does not include other dimensions such as monitoring and evaluation, project design, or, importantly, cofinancing. More details on how the GEF-IEO created variables from the terminal evaluations are contained in annex B of the GEF Annual Outcome Report 2013 ([GEF 2013](#)).

and FSPs. In this case, the evaluation is based on four ordered categories for the likelihood of sustained impacts, which are likely (15%), moderately likely (45%), moderately unlikely (30%), and unlikely (10%). When analyzing these data, we convert the categories into a binary indicator of moderately likely or better (55%).

Actual cofinancing.—The data set also includes information on the realized level of cofinancing delivered as part of project implementation. This, of course, may differ from the cofinancing numbers described previously based on intended levels of cofinancing at the time of project approval. Data on actual cofinancing is available for 610 MSPs and FSPs. The mean amount of actual cofinancing is \$17 million, compared to the expected mean amount for these same projects of \$13 million. When conducting our analysis of variables that affect project outcomes and sustainable impact, we will use the measure of *actual* cofinancing. We will also account for whether actual cofinancing exceeded or fell short of the expected amount. Among the 610 projects for which the data are available, 60 percent received more than the expected amount of cofinancing.

V. The Determinants of Cofinancing at Project Approval

We begin with the question of what explains variation in cofinancing at the project approval stage. Understanding the determinants of cofinancing will inform those looking for ways to target greater cofinancing and those concerned about how doing so may implicitly influence GEF priorities. Some key questions guiding our analysis are whether greater cofinancing is associated with larger projects, the focal area of climate change because of its frequent association with revenue generating energy projects, multilateral development banks because of their access to credit and capital, and countries with better governance.

A. Empirical Strategy

We first estimate a model of the form

$$Y_{ijt} = \alpha \ln(\text{GEF grant}_i) + \beta \text{Prep}_i + \gamma \text{EA}_i + \delta \text{Focal}_i + \theta \text{Agency}_i + \rho \text{Part}_i + \sigma \ln(\text{GDPcap}_{jt}) + \pi \text{WGI}_{ji} + \mu \text{Region}_i + \tau_t + \epsilon_{ijt}, \quad (1)$$

where the dependent variable is the cofinancing ratio for project i in country j and approval year t . The independent variables are the size of the GEF grant, an indicator for having received a preparatory grant, an indicator for an enabling activity, a categorical variable for focal area, a categorical variable for lead agency, a categorical variable for executing partner type, GDP per capita, the set of WGI indicators, and a categorical variable for region.¹⁶ The specification also controls for annual fixed effects with τ_t , and ϵ_{ijt} is an error term. The regional controls in specification (1) mean that coefficients are identified based on variation in projects within regions after controlling for a common time trend. This is useful for estimating potential effects of the WGI indicators, which are better equipped for cross-sectional comparisons than for differences within countries over time.

A limitation of specification (1) is that it does not control for sources of unobserved yet time-invariant heterogeneity among countries that could affect cofinancing ratios. To address this concern, we estimate a fixed effects model of the form

$$Y_{ijt} = \alpha \ln(\text{GEF grant}_i) + \beta \text{Prep}_i + \gamma \text{EA}_i + \delta \text{Focal}_i + \theta \text{Agency}_i + \rho \text{Part}_i + \sigma \ln(\text{GDPcap}_{jt}) + v_j + \tau_t + \epsilon_{ijt}, \quad (2)$$

16 We do not include a categorical variable to distinguish between MSPs and FSPs because of collinearity with the size of the GEF grant, which is the basis for distinction between the two categories.

where the only difference is the inclusion of a country fixed effect v_i in place of the WGI indicators and regional controls. This means that coefficients are identified entirely off of variation in projects within countries assuming an overall common time trend.¹⁷

In addition to ordinary least squares (OLS) estimates of specifications (1) and (2), we estimate corresponding Tobit models for each. The first is a pooled Tobit, and the second is the random-effects Tobit.¹⁸ Recall that 18 percent of the projects have zero cofinancing, and this motivates estimation of the Tobit models, which are able to account for a large number of corner solutions at zero for the dependent variable (Wooldridge 2002). In particular, the Tobit model is useful for deriving marginal effects of the explanatory variables that account for the combined effects of changes in the probability of having cofinancing and changes in cofinancing conditional on having a positive amount. The Tobit models, therefore, provide our preferred estimates, while comparisons with the OLS models provide useful robustness checks.¹⁹

B. Results

We report the results in table 3. The first two columns contain the OLS estimates. The second two columns contain the Tobit estimates of the overall marginal effect; that is, we report the unconditional marginal effects for each independent variable evaluated at its mean. We find that the estimates are quite consistent across models.²⁰ Hence we focus our discussion on the Tobit results and specifically on coefficients of the random-effects estimates, unless otherwise indicated.

We find evidence that projects with larger GEF grants are associated with a higher cofinancing ratio. Because the GEF grant variable is log transformed, it can be interpreted such that a 10 percent increase in the size of a GEF grant is associated with a 0.048 increase in the cofinancing ratio. In other words, a 10 percent increase in the GEF grant for the averaged sized project means that there is just under 5 cents in additional cofinancing per GEF dollar spent. In contrast, EAs are associated with significantly lower cofinancing ratios, with each GEF dollar producing \$1.17 less on average. This result is not surprising because EAs tend to focus on foundational work that is less likely to attract cofinancing.

The cofinancing ratios differ across focal areas, and the most notable comparison is between the GEF's primary areas of climate change and biodiversity. The coefficients are interpreted relative to the omitted category of multifocal area projects. The magnitude of the difference between climate change and biodiversity is that climate change projects leverage cofinancing of 80 cents per dollar more on average.²¹ Other focal areas with lower ratios, but not significantly different from each other, are ozone-related and organic pollutants; whereas international waters projects are associated with higher ratios.

Regarding differences among lead agencies, there is evidence that some MDBs support projects with higher cofinancing ratios. The ADB stands out with the highest cofinancing ratios—a substantial 3.8 higher on average than the omitted category of the UNDP. Other agencies with higher ratios are the World Bank and the other agency category. These are 0.86 and 0.68 higher than the UNDP on average, but while the World Bank is generally higher than most agencies with statistical significance, the other agency

17 To take advantage of all the data, we also include regional and global projects with their own fixed effects when estimating specification (2). The results do not change in any meaningful way if these observations are excluded.

18 We estimate the random-effects Tobit model rather than a fixed effects Tobit because the latter is not unbiased (Wooldridge 2002).

19 We also estimate double hurdle models to examine the extensive and intensive margins of cofinancing ratios separately. We discuss these models and results at the end of this section.

20 Regarding the Tobit models, a likelihood-ratio test for significance of the panel-level variance component does not reject the null hypothesis ($\bar{X}^2 = 47.32$, $p < 0.00$), implying that the overall random-effects estimates are not statistically different from the pooled estimates.

21 Miller and Yu (2012) find a similar pattern of results across focal areas on a more restricted sample, though their models do not include country-level fixed effects.

Table 3. Regression Models Explaining Differences in Cofinancing Ratios at Project Approval

	(1) OLS	(2) OLS fixed effects	(3) Tobit	(4) Random-effects Tobit
GEF grant (ln)	0.414*** (0.070)	0.452*** (0.074)	0.473*** (0.060)	0.488*** (0.061)
Preparatory grant (1=yes)	0.065 (0.215)	0.019 (0.213)	0.137 (0.148)	0.096 (0.124)
Enabling activity (1=yes)	-1.156*** (0.271)	-1.078*** (0.263)	-1.118*** (0.192)	-1.168*** (0.200)
Focal areas (multifocal area omitted)				
- Biodiversity	-0.147 (0.187)	-0.236 (0.191)	-0.447*** (0.127)	-0.500*** (0.160)
- Climate change	1.088*** (0.238)	0.976*** (0.253)	0.348** (0.169)	0.293* (0.164)
- International waters	0.753 (0.525)	1.285** (0.582)	0.188 (0.327)	0.436* (0.264)
- Land degradation	0.913 (0.560)	0.821 (0.549)	0.380 (0.362)	0.333 (0.265)
- Ozone-related	-1.652*** (0.383)	-1.675*** (0.531)	-1.026*** (0.248)	-1.037** (0.516)
- Organic pollutants	-0.773** (0.336)	-1.015*** (0.366)	-0.614*** (0.234)	-0.704*** (0.225)
Lead agency (UNDP omitted)				
- ADB	6.085** (2.708)	6.115** (2.524)	3.710** (1.695)	3.797** (0.508)
- FAO	-0.585 (0.428)	-0.330 (0.441)	-0.419 (0.275)	-0.321 (0.418)
- IADB	1.355* (0.781)	1.474** (0.693)	0.703 (0.515)	0.653 (0.447)
- IFAD	0.079 (0.479)	0.067 (0.485)	-0.086 (0.306)	-0.120 (0.408)
- UNEP	-0.319** (0.142)	-0.035 (0.161)	-0.050 (0.112)	0.051 (0.142)
- UNIDO	0.257 (0.306)	0.439 (0.306)	-0.185 (0.213)	-0.080 (0.247)
- World Bank	1.292*** (0.317)	1.278*** (0.311)	0.866*** (0.201)	0.856*** (0.133)
- Other agency	0.922 (0.847)	0.889 (0.799)	0.631 (0.541)	0.675* (0.407)
Executing partner type (multilateral omitted)				
- Government	0.235 (0.289)	-0.278 (0.306)	0.187 (0.210)	-0.004 (0.172)
- Private sector	0.071 (0.813)	-0.385 (0.920)	0.117 (0.575)	0.006 (0.566)
- NGO/Foundation/Institution	-0.211 (0.351)	-0.495 (0.374)	0.124 (0.243)	0.019 (0.226)
GDP per capita (ln)	-0.037 (0.100)	0.458 (0.323)	-0.040 (0.073)	0.067 (0.055)
Voice & accountability (WGI)	-0.012* (0.007)	-	-0.008* (0.005)	-
Government effectiveness (WGI)	0.020** (0.008)	-	0.015** (0.006)	-
Regulatory quality (WGI)	0.014* (0.007)	-	0.008 (0.006)	-

Table 3. (continued)

	(1) OLS	(2) OLS fixed effects	(3) Tobit	(4) Random-effects Tobit
Control of corruption (WGI)	-0.011* (0.007)	—	-0.005 (0.005)	—
Region (global omitted)				
- Africa	0.917*** (0.306)	—	0.727*** (0.228)	—
- Asia	0.952*** (0.293)	—	0.841*** (0.212)	—
- Europe/Central Asia	0.721** (0.333)	—	0.720*** (0.241)	—
- Latin America/Caribbean	0.626*** (0.218)	—	0.578*** (0.168)	—
Year dummies	Yes	Yes	Yes	Yes
Country fixed effects		Yes		
Observations	2,978	2,990	2,978	2,990
R-squared (within)	0.303	0.276		

Note: Standard errors reported in parentheses are clustered at the country level. One, two, and three asterisk(s) indicate statistical significance at the 90-, 95-, and 99-percent levels.

category is not. These results build on [Miller and Yu's \(2012\)](#) finding that MDB's tend to have higher cofinancing ratios than UN agencies. We find no statistically significant differences among the executing partner types of multilateral agencies, governments, private sector, or NGO/foundation/institution.

Together, these results suggest a few areas where greater emphasis on cofinancing could implicitly influence GEF priorities. To the extent that cofinancing is weighted more heavily in project development and approval, there may be a trend towards projects that are larger, focused on climate change (especially relative to biodiversity), and with the lead agencies being MDBs, particularly the World Bank and ADB.

We now turn to the question of whether cofinancing is greater in countries with better governance, as this too could shift where GEF projects take place as cofinancing becomes a higher priority. In both the OLS and Tobit models, voice and accountability are associated with lower ratios, yet government effectiveness is associated with higher ratios.²² The former result may represent an unintended consequence of more participatory and transparent processes, while the latter result shows a relationship between good governance and greater cofinancing. There is also evidence that better regulatory quality promotes cofinancing, yet greater control of corruption discourages it. The latter result is interesting to the extent that reported cofinancing may not always be legitimate, perhaps being based on nonadditional finance or double counting. We also find that country or regional projects are associated with greater cofinancing ratios than global projects (the omitted category). Greater emphasis on cofinancing may, therefore, discourage globally focused projects.

C. An Alternative Approach

The preceding analysis considers how different variables affect intended cofinancing ratios at the time of project approval. A limitation of the models is the assumption that a single mechanism determines whether a project has cofinancing (the extensive margin) and the amount of cofinancing conditional on

22 Multicollinearity is a potential concern in all models that include the WGI indicators. To help address this concern, we estimate the variance inflation factor (VIF) for these variables in all models. We find only one as a potential concern: government effectiveness with a VIF of approximately six, with all others being relatively low. However, removing government effectiveness from the models does not result in statistically different results, which builds confidence in the robustness of our conclusions about the WGI indicators throughout the paper.

having some (the intensive margin). While the OLS models do not distinguish between the two margins at all, the Tobit model assumes the sign of the two effects is the same. It is nevertheless possible that variables could have different effects on the extensive and intensive margins. To explore this possibility, we estimate a “double hurdle” model that separately examines the two margins with (i) a linear probability model of whether the cofinancing ratio is greater than zero, and (ii) an OLS regression on only those observations with positive cofinancing. We again estimate pooled and fixed effects variants of the model and report the full set of results in appendix table A1.

A few results are worth highlighting. We find that climate change (and international waters) projects have different effects on each margin. Specifically, projects in these areas are less likely to have cofinancing, but conditional on having it, they have more of it. We also find differential effects with two governance indicators. Better regulatory quality decreases the odds of having cofinancing, but when there is cofinancing, better regulatory quality is associated with higher ratios. Interestingly, better control of corruption has the opposite pattern: better control increases the odds of having cofinancing but decreases the conditional cofinancing ratio.

VI. Loans and Private Sector Involvement

We now investigate the factors that influence whether project cofinancing includes (i) some amount in the form of a loan (concessional or nonconcessional), and (ii) private sector involvement.²³ The guiding questions of our analysis continue to be on the effect project size, climate change projects, MDBs, and better governance.

We estimate linear probability models using the same general specification as that in [equations \(1\) and \(2\)](#). For one set of models, the dependent variable is an indicator for whether the project’s cofinancing includes a loan. In parallel with the previous analysis, we estimate one model with regional dummies and the WGI indicators and another model with country fixed effects. The same pair of models are then estimated again with the dependent variable as an indicator of whether the project’s cofinancing has private sector involvement. The only change in the right-hand-side variables from the previous models is the exclusion of the indicator for EAs. [Table 4](#) reports the results of all four models, and we focus primarily on the fixed effects estimates.²⁴

A. Loans

Projects with larger GEF grants are more likely to include loans: doubling the size of a GEF grant increases the probability of the project including a loan by 8 percentage points. Projects that received a preparatory grant are 6 percentage points less likely to included loans. One possible explanation for this result is that a project needing more assistance in the development stage is a good indicator of whether it is less likely to generate revenue in support of loan payments.

The pattern of results for climate change projects and other focal areas is similar to that shown previously for the overall cofinancing ratio. Climate change projects are 8 percentage points more likely to include loans than multifocal area projects, which are not statistically different from those focused on biodiversity. The focal areas that are significantly less likely to include loans are ozone-related and organic pollutants.

23 Loans need not come from the private sector, and the private sector can support GEF projects in ways other than loans. Recall that the loan and private sector cofinancing data are available for a subset of projects analyzed in the previous section and that the data apply only to MSPs and FSPs.

24 We also estimated standard and random-effects Probit models. We do not report these results here because the qualitative results and magnitudes of the marginal effects are so similar to those of the linear probability models.

Table 4. Linear Probability Models of Loans and Private Sector Involvement

	(1)	(2)	(3)	(4)
	Loans		Private sector	
	LPM	LPM fixed effects	LPM	LPM fixed effects
GEF grant (ln)	0.063*** (0.012)	0.083*** (0.011)	0.044** (0.018)	0.054*** (0.018)
Preparatory grant (1=yes)	-0.039* (0.020)	-0.060*** (0.019)	0.058* (0.031)	0.058* (0.031)
Focal areas (multifocal area omitted)				
- Biodiversity	-0.025 (0.034)	-0.039 (0.033)	-0.086** (0.039)	-0.079** (0.039)
- Climate change	0.094*** (0.035)	0.079** (0.034)	0.112** (0.046)	0.108** (0.047)
- International waters	0.024 (0.047)	0.065 (0.050)	-0.125* (0.070)	-0.083 (0.073)
- Land degradation	0.043 (0.055)	0.030 (0.054)	-0.087 (0.065)	-0.107* (0.064)
- Ozone-related	-0.202** (0.078)	-0.237** (0.093)	0.308** (0.124)	0.318** (0.123)
- Organic pollutants	-0.143*** (0.045)	-0.156*** (0.048)	0.162*** (0.058)	0.155** (0.061)
Lead agency (UNDP omitted)				
- ADB	0.613*** (0.107)	0.617*** (0.109)	0.010 (0.071)	0.001 (0.067)
- FAO	0.029 (0.043)	0.051 (0.043)	-0.025 (0.092)	0.037 (0.093)
- IADB	0.602*** (0.096)	0.648*** (0.092)	-0.041 (0.070)	-0.049 (0.074)
- IFAD	0.393*** (0.088)	0.370*** (0.088)	0.229** (0.092)	0.228** (0.098)
- UNEP	0.076*** (0.019)	0.119*** (0.024)	-0.082** (0.036)	-0.031 (0.042)
- UNIDO	0.202*** (0.057)	0.203*** (0.057)	0.238*** (0.064)	0.253*** (0.068)
- World Bank	0.408*** (0.031)	0.403*** (0.032)	0.068** (0.032)	0.057* (0.031)
- Other agency	0.631*** (0.106)	0.663*** (0.105)	-0.038 (0.147)	-0.150 (0.164)
Executing partner type (multilateral omitted)				
- Government	0.013 (0.024)	-0.026 (0.026)	0.026 (0.035)	0.005 (0.033)
- Private sector	-0.117 (0.116)	-0.153 (0.121)	0.215 (0.141)	0.221 (0.153)
- NGO/Foundation/Institution	-0.044 (0.037)	-0.043 (0.037)	0.147*** (0.051)	0.139** (0.056)
GDP per capita (ln)	-0.041*** (0.015)	-0.031 (0.032)	0.037* (0.020)	0.049** (0.024)
Voice & accountability (WGI)	-0.001 (0.001)	-	-0.001* (0.001)	-
Government effectiveness (WGI)	0.001 (0.001)	-	0.003* (0.001)	-
Regulatory quality (WGI)	0.001 (0.001)	-	0.000 (0.001)	-

Table 4. (continued)

	(1)	(2)	(3)	(4)
	Loans		Private sector	
	LPM	LPM fixed effects	LPM	LPM fixed effects
Control of corruption (WGI)	-0.001 (0.001)	—	-0.001 (0.001)	—
Region (global omitted)				
- Africa	0.078*** (0.028)	—	-0.062 (0.038)	—
- Asia	0.082*** (0.026)	—	-0.113*** (0.035)	—
- Europe/Central Asia	0.155*** (0.035)	—	-0.044 (0.046)	—
- Latin America/Caribbean	0.143*** (0.026)	—	-0.051 (0.032)	—
Year dummies	Yes	Yes	Yes	Yes
Country fixed effects		Yes		Yes
Observations	1,653	1,653	1,653	1,653
R-squared (within)	0.379	0.381	0.141	0.119

Note: Standard errors reported in parentheses are clustered at the country level. One, two, and three asterisk(s) indicate statistical significance at the 90-, 95-, and 99-percent levels.

As anticipated, MDB supported projects are significantly more likely to have cofinancing that includes a loan. When compared to the UNDP, all agencies are more likely to lead projects with loans. Specifically, the point estimates are such that the ADB, IADB, and the other agency category are all more than 60 percentage points more likely. The World Bank and IFAD are also significantly more likely, by 40 and 37 percentage points, respectively.

In the pooled linear probability model, none of the WGI variables is statistically significant, but there is a regional pattern worth noting. When projects are based in one region, or more commonly one country, they are more likely to include a loan as part of the cofinancing. Those in Europe / Central Asia and Latin America / Caribbean are the most likely to include loans, with both being close to 15 percentage points more likely than a global project. Projects in Africa and Asia are also more likely but with approximately half the magnitude. Finally, GDP per capita is associated with a negative effect on the probability of a project including a loan.

B. Private Sector

Projects with larger GEF grants are more likely to involve the private sector, though the magnitude is small. Differences between the primary focal areas of climate change and biodiversity continue to arise, with the latter being almost 20 percentage points less likely to involve the private sector and being significantly less likely than multifocal area projects. These results suggest that greater emphasis on private sector involvement may tend to shift GEF priorities in much the same way as greater emphasis on cofinancing: towards larger projects focused on climate change.

When it comes to promoting private sector involvement, IFAD and UNIDO are the leading agencies rather than the MDBs. These agencies are about 25 percentage points more likely than the UNDP to have projects that involve the private sector. This is perhaps not surprising given that IFAD seeks to promote agricultural development and UNIDO has a specific mandate to promote private sector development. While the World Bank is also associated with greater private sector involvement, the ADB and IADB are not (unlike the results for loans). When the executing partner type is an NGO/Foundation/Institution,

projects are significantly more likely—that is, 14 percentage points—to have private sector cofinancing than if the partner type is a multilateral agency.²⁵

In contrast to the results for loans, we find that GDP per capita increases the probability of cofinancing from the private sector. A doubling of GDP per capita increases the probability of private sector cofinancing by 5 percentage points. We also find evidence that greater voice and accountability decreases private sector cofinancing, while greater government effectiveness increases it. Finally, among regions, Asia is the outlier, having the lowest probability of private sector cofinancing.

VII. Project Outcome and Sustainable Impact

We now turn to the question of whether a greater emphasis on cofinancing and private sector involvement results in better projects. We take advantage of the GEF's terminal evaluations, from which we have two measures: project outcome related to the achievement of goals and the likelihood of sustained impacts. We estimate linear probability models to explain project outcome and the likelihood of sustained impact.²⁶ The explanatory variables are generally the same as those used previously. The only differences are our use of actual levels of cofinancing as an explanatory variable, along with an indicator of whether actual cofinancing exceeded anticipated cofinancing at the time of project approval.

A. Project Outcome

We first consider models where the dependent variable is an indicator of whether a project achieves an outcome rating of “satisfactory” or better. We report three linear probability models in columns (1) through (3) of [table 5](#). We estimate the different specifications because of missing data for some of the variables.²⁷ Given our focus on cofinancing and the advantages of including country characteristics in the model, we prefer the estimates in column (3), upon which we concentrate discussion. It is nevertheless reassuring to see that the coefficients estimated across all three models change little when restricting the sample.

We find that greater cofinancing increases the probability of a project achieving a satisfactory rating, as does having greater cofinancing than expected. A 1 percent increase in the amount of cofinancing increases the probability of a satisfactory rating by 3 percentage points, and achieving greater than expected cofinancing increases the probability by 10 percentage points. Interestingly, after controlling for cofinancing, projects with larger GEF grants receive lower ratings: a 1 percent increase in the GEF grant decreases the probability of a satisfactory rating by more than 6 percentage points. Finally, projects with preparatory grants also rate less well, having a lower probability of a satisfactory rating by 9 percentage points.²⁸

There are no statistically significant differences in the outcome ratings of projects within the single focal areas, including climate change. Yet when compared to multifocal area projects, those with a singular focus on climate change, biodiversity, and land degradation are all more likely to achieve a satisfactory rating

25 It is worth noting, however, that the executing partner type being the private sector does not mean projects received private sector cofinancing. Indeed, we do not find a significant effect of the variable on private sector cofinancing, though this is likely because of the small number of observations (only 15 in the regression model) that have a private sector entity as the executing partner.

26 For these models, we include country characteristics but do not estimate fixed effects models because there are fewer observations upon which to identify within-country effects. Because of the fewer observations, we also control for the common time trend with GEF Phase dummies rather than a dummy variable for each year.

27 The first model excludes the cofinancing and country-characteristic variables and has 688 observations. The second model includes the cofinancing variables, but the data are missing for 96 observations, thereby reducing the observations in the model to 592. The third model includes the country characteristics, which are missing for some regional and global projects with unspecified countries, and this reduces the observations further to 546.

28 See [Denizer et al. \(2013\)](#) for a qualitatively similar result among World Bank projects.

Table 5. Linear Probability Models of Outcome and Sustainability

	Outcome			Sustainability		
	(1)	(2)	(3)	(4)	(5)	(6)
Cofinancing actual (ln)	–	0.032*** (0.011)	0.029** (0.012)	–	0.027** (0.013)	0.024* (0.013)
Cofinancing greater than expected (1=yes)	–	0.107** (0.048)	0.105** (0.050)	–	0.110*** (0.041)	0.089* (0.047)
GEF grant (ln)	–0.022 (0.023)	–0.055** (0.027)	–0.062** (0.029)	–0.017 (0.022)	–0.052** (0.025)	–0.054* (0.028)
Preparatory grant (1=yes)	–0.091*** (0.033)	–0.096*** (0.035)	–0.090** (0.039)	0.042 (0.039)	0.014 (0.044)	0.032 (0.048)
Focal areas (multifocal area omitted)						
- Biodiversity	0.159*** (0.059)	0.145** (0.067)	0.176** (0.080)	0.110 (0.080)	0.076 (0.088)	0.079 (0.098)
- Climate change	0.173*** (0.064)	0.143* (0.079)	0.152* (0.091)	0.260*** (0.086)	0.211** (0.093)	0.181* (0.104)
- International waters	0.144 (0.104)	0.125 (0.138)	0.173 (0.110)	0.252*** (0.092)	0.212* (0.108)	0.176* (0.105)
- Land degradation	0.176 (0.109)	0.192* (0.107)	0.282* (0.149)	0.249*** (0.091)	0.168 (0.105)	0.226 (0.150)
- Ozone-related	0.206 (0.162)	0.177 (0.190)	0.208 (0.200)	0.504*** (0.090)	0.555*** (0.097)	0.539*** (0.128)
- Organic pollutants	–0.052 (0.088)	–0.106 (0.083)	0.044 (0.145)	–0.143 (0.087)	–0.221** (0.111)	–0.021 (0.154)
Lead agency (other agency omitted)						
- UNDP	–0.057 (0.173)	–0.178 (0.152)	–0.173 (0.150)	–0.395*** (0.143)	–0.376** (0.172)	–0.365** (0.169)
- UNEP	–0.044 (0.147)	–0.160 (0.127)	–0.198 (0.142)	–0.285* (0.145)	–0.261 (0.159)	–0.218 (0.164)
- UNIDO	0.077 (0.253)	–0.043 (0.222)	–0.214 (0.254)	–0.014 (0.210)	0.006 (0.213)	–0.200 (0.243)
- World Bank	–0.026 (0.179)	–0.168 (0.151)	–0.164 (0.149)	–0.256 (0.155)	–0.254 (0.183)	–0.250 (0.183)
Executing partner type (multilateral omitted)						
- Government	0.041 (0.076)	0.040 (0.080)	0.035 (0.086)	0.051 (0.046)	0.053 (0.048)	0.027 (0.053)
- Private sector	–0.403** (0.154)	–0.374** (0.176)	–0.314* (0.167)	–0.234 (0.181)	–0.288 (0.185)	–0.313* (0.185)
- NGO/Foundation/Institution	0.068 (0.083)	0.033 (0.085)	0.041 (0.099)	0.024 (0.052)	–0.016 (0.053)	0.000 (0.066)
GDP per capita (ln)	–	–	0.066* (0.034)	–	–	0.054 (0.040)
Voice & accountability (WGI)	–	–	–0.002 (0.002)	–	–	0.001 (0.002)
Government effectiveness (WGI)	–	–	–0.002 (0.003)	–	–	0.004 (0.003)
Regulatory quality (WGI)	–	–	0.005** (0.002)	–	–	–0.000 (0.003)
Control of corruption (WGI)	–	–	0.000 (0.002)	–	–	0.000 (0.002)
Region (global omitted)						
- Africa	–0.168** (0.066)	–0.156** (0.072)	–0.250*** (0.083)	–0.072 (0.044)	–0.117** (0.050)	–0.171*** (0.056)

Table 5. (continued)

	Outcome			Sustainability		
	(1)	(2)	(3)	(4)	(5)	(6)
- Asia	-0.019 (0.077)	0.006 (0.078)	-0.089 (0.087)	0.041 (0.080)	0.057 (0.071)	-0.010 (0.070)
- Europe/Central Asia	0.029 (0.081)	0.015 (0.081)	-0.182** (0.089)	0.080 (0.057)	0.046 (0.060)	-0.066 (0.063)
- Latin America/Caribbean	-0.042 (0.097)	-0.041 (0.097)	-0.264** (0.110)	0.101* (0.057)	0.092 (0.056)	-0.092 (0.062)
GEF phase dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	688	592	546	666	576	530
R-squared (within)	0.054	0.078	0.113	0.085	0.101	0.159

Note: Standard errors reported in parentheses are clustered at the country level. One, two, and three asterisk(s) indicate statistical significance at the 90-, 95-, 99-percent levels.

by at least 15 percentage points. One possible explanation is that multifocal area projects face additional challenges of needing to satisfy outcome criteria in more than one focal area, in addition to being more complex.

We find a particularly interesting result when the executing partner type is from the private sector: projects tend to perform less satisfactorily. Compared to projects executed by multilateral organizations, those executed by the private sector are 31 percentage points less likely to achieve a satisfactory rating. The apparent underperformance on the outcome measure by the private sector is an important result in light of the way that the GEF and other environment and development agencies—in addition to many donor countries—are seeking to promote greater private sector engagement in such projects.

Three other results stand out based on country characteristics. First, greater GDP per capita is associated with better outcomes. Second, better regulatory quality within a country improves project outcomes, and this finding accords with [Dollar and Levin's \(2005\)](#) aggregate level result that better institutions lead to better project outcomes.²⁹ Finally, global projects are more likely to obtain satisfactory ratings than regional or single-country projects.

B. Sustained Impacts

Models explaining the likelihood of sustained impacts being at least “moderately likely” are reported in columns (4) through (6). Similar to the results for project outcome, we find that greater amounts of cofinancing, and cofinancing exceeding the anticipated level, increases the likelihood of sustained impacts. Hence greater cofinancing does appear to result in better projects according to this measure. Interestingly, so do smaller projects.

With regard to focal areas, we find that climate change and international waters are associated with greater likelihoods of sustained impacts, but the most likely by a wide margin are ozone-related projects, at 54 percentage points more likely than multifocal area projects. Because ozone-related projects typically involve changes to production practices based on the diffusion of a new technology, this result may not be particularly surprising.

We again find a large and statically significant result when the executing agency is from the private sector: compared to all other types, projects executed by the private sector are about 30 percentage points less likely to have sustained impacts. This result, in particular, should raise questions about the underlying rationale for greater emphasis on private sector involvement in GEF programs and projects.

29 We do not find a statistically significant effect of “government effectiveness.” This result contrasts with that in [Buntaine and Parks' \(2013\)](#) study of environmentally related projects at the World Bank.

The UNDP is an outlier with regard to its leading on projects that are less likely to have sustained impacts. Compared to the other agency category, UNDP projects are 37 percentage points less likely to rate at least moderately likely for sustainable impacts. The UNDP ratings are also significantly less likely than those for UNEP, UNIDO, and the World Bank. Finally, projects in Africa are less likely to have sustained impacts, and the magnitude of this result is substantial: African projects are significantly less likely than all other regions and 17 percentage points less likely than global projects.

VIII. Conclusions

Leveraged cofinancing from public and private sources has emerged as a policy priority among international environment and development agencies as a means for accomplishing environmental and development goals. This paper contributes to the literature with a focus on the determinants and impacts of cofinancing, private sector involvement, and loan rather than grant financing in the largest and longest running multilateral fund focused on global environmental problems and sustainable development.

We consider how project, country, and agency characteristics affect the observed patterns of cofinancing. While these results can help the GEF strategically target greater cofinancing, they also indicate ways that greater emphasis on cofinancing can implicitly shift the GEF's environment and development priorities. We find that greater emphasis on cofinancing will tend to favor projects that are larger, are less global in reach, are focused on climate change, and are led by MDBs, especially the ADB and the World Bank. We also find evidence that greater emphasis on cofinancing will tend to favor countries rated as having better "government effectiveness" and "regulatory quality," thereby creating an incentive for projects in countries where there may be less need.

The increasing priority given to loan cofinancing and private sector involvement also has the potential to promote mission creep within the GEF. Loan cofinancing and private sector involvement are both more common in larger projects focused on climate change, in addition to those focused on reducing ozone and organic pollutants. Moreover, institutions more likely associated with projects that include both loan cofinancing and private sector involvement are IFAD, UNIDO, and the World Bank.

We also find evidence that greater cofinancing results in better projects as measured by ex post evaluations for both outcome satisfaction and sustained impacts. However, despite increasing emphasis on private sector involvement, projects executed by the private sector tend to achieve lower ratings for both project outcome and sustainable impacts. This finding raises important questions for further research. One question worth pursuing, for example, is whether these projects receive lower ratings on average because they tend to be riskier.

Finally, the results presented in this paper have broader implications going forward. Greater demands for cofinancing are emerging in a wide range of agencies and governments seeking to maximize the impact of aid for environment and development. The trend is clear across bilateral and multilateral development agencies, including the GEF, the CIFs, and the newly created GCF. Regarding climate finance, in particular, cofinancing is considered central to achieving the necessary scale and transformative effects. In this context, our results further the understanding of how project, country, and agency characteristics may affect cofinancing, the use of loan financial instruments, and private sector involvement. We also provide the first evidence on how cofinancing affects project outcomes.

References

- Assefa, Y., O. Rivera, and D. Vencatachellum. 2014. "Macro and Micro Determinants of Project Outcome," *African Evaluation Journal*, 2 (1), Article #86.
- Bayer, P., C. Marcaux, and J. Urpelainen. 2015. "When International Organization Bargain: Evidence from The Global Environment Facility," *Journal of Conflict Resolution*, 59 (6): 1074–1100.

- Buntaine, M., and B. Parks. 2013. "When Do Environmentally Focused Assistance Projects Achieve Their Objectives? Evidence from World Bank Post-Project Evaluations," *Global Environmental Politics*, 13: 65–87.
- Buntaine, M., and W. Pizer. 2014. "Encouraging Clean Energy Investment in Developing Countries: What Role for Aid?" *Climate Policy*, DOI:10.1080/14693062.2014.953903.
- CIFs. 2014. "About the Climate Investment Funds," Available on the CIFs webpage, accessed January 28, 2014 at <https://www.climateinvestmentfunds.org/cif/aboutus>.
- Chauvet, L., P. Collier, and A. Fuster. 2006. "What Explains Aid Project Success in Post-Conflict Situations," World Bank Policy Research Working Group Paper No. 5418.
- Deninger, K., S. Lyn, and S. Basu. 1998. "Does Economic Analysis Improve the Quality of Foreign Assistance?" *World Bank Economic Review*, 12: 385–418.
- Denizer, C., D. Kaufmann, and A. Kraay. 2013. "Good Countries or Good Projects? Macro and Micro Correlates of World Bank Project Outcome," *Journal of Development Economics*, 105: 288–302.
- Dollar, D., and V. Levin. 2005. "Sowing and Reaping: Institutional Quality and Project Outcomes in Developing Countries," World Bank Policy Research Working Group Paper No. 3524.
- GCF. 2013. *Decisions of the Board—Fifth Meeting of the Board*, 8–10 October 2013. Green Climate Fund, GCF/B.05.23.
- GEF. 2013. "GEF Annual Outcome Report 2013," Prepared by the GEF Independent Evaluation Office.
- GEF. 2008. "Guidelines for GEF Agencies in Conducting Terminal Evaluations," The GEF Independent Evaluation Office, Evaluation Document N.3.
- GEF. 2014a. "What is the GEF," Available on the GEF webpage, accessed January 28, 2014 at <http://www.thegef.org/gef/whatisgef>.
- GEF. 2014b. "Report of the Sixth Replenishment of the GEF Trust Fund," Prepared by the GEF Secretariat and the World Bank as Trustee, GEF/A.2/07/Rev.01.
- GEF. 2014c. "Co-Financing Policy," Prepared by the GEF Secretariat, GEF Policy: FI/PL/01.
- GEF. 2014d, "GEF-6 Indicative STAR Allocations," GEF/C.47/Inf.08, July 1.
- Guillaumont, P., and R. Laajaj. 2006. "When Instability Increases the Effectiveness of Aid Projects," World Bank Policy Research Working Group Paper No. 4034.
- Harms, P., and M. Lutz. 2006. "Aid, Governance and Private Foreign Investment: Some Puzzling Findings for the 1990s," *The Economic Journal* 116: 773–90.
- Herzer, D., and M. Grimm. 2012. "Does Foreign Aid Increase Private Investment? Evidence from Panel Cointegration," *Applied Economics* 44: 2537–50.
- International Monetary Fund. 2014. *External Debt Statistics: Guide for Compilers and Users*, Washington, DC: IMF Publication Services.
- Isham, J., and D. Kaufmann. 1999. "The Forgotten Rationale for Policy Reform: The Productivity of Investment Projects," *Quarterly Journal of Economics* 114: 149–84.
- Isham, J., D. Kaufmann, and L. Prichett. 1997. "Civil Liberties, Democracy, and the Outcome of Government Projects," *World Bank Economic Review* 11: 219–42.
- Khwaja, I. 2009. "Can Good Projects Succeed in Bad Communities?" *Journal of Public Economics* 93: 899–916.
- Kilby, C. 2000. "Supervision and Outcome: The Case of World Bank Projects," *Journal of Development Economics* 62: 233–59.
- Miller, S., and B. Yu. 2012. "Mobilizing Resources for Supporting Environmental Activities in Developing Countries: The Case of the GEF Trust Fund," IDB Working Paper Series, N. IDB-WP-329.
- Papanek, G. 1973. "Aid, Foreign Private Investment, Savings, and Growth in Less Developed Countries," *Journal of Political Economy*, 81:120–30.
- Selaya, P., and E. Sunesen. 2012. "Does Foreign Aid Increase Foreign Direct Investment?" *World Development* 40: 2155–76.
- Venugopal, S., and A. Srivastava. 2012. *Moving the Fulcrum: A Primer on Public Climate Financing Instruments Used to Leverage Private Capital*, World Resources Institute, Working Paper, August 2012.
- Wooldridge, J. M. 2002. *Econometric Analysis of Cross Section and Panel Data*, Cambridge Massachusetts: The MIT Press.
- World Bank. 2014. *Additions to IDA Resources: Seventeenth Replenishment - IDA17: Maximizing Development Impact*. Washington, DC: World Bank Group.

Appendix

Table A1. Double Hurdle Models Explaining Differences in Cofinancing Ratios at Project Approval

	(1) LPM	(2) Fixed effects LPM	(3) OLS	(4) OLS fixed effects
GEF grant (ln)	0.061*** (0.007)	0.063*** (0.008)	0.500*** (0.098)	0.571*** (0.104)
Preparatory grant (1=yes)	0.041*** (0.011)	0.038*** (0.010)	-0.021 (0.220)	-0.051 (0.221)
Enabling activity (1=yes)	-0.175*** (0.026)	-0.169*** (0.027)	-1.064*** (0.269)	-0.980*** (0.278)
Focal areas (multifocal area omitted)				
- Biodiversity	-0.109*** (0.014)	-0.118*** (0.015)	-0.347* (0.201)	-0.462** (0.206)
- Climate change	-0.165*** (0.016)	-0.169*** (0.017)	1.344*** (0.277)	1.200*** (0.304)
- International waters	-0.112*** (0.026)	-0.094*** (0.027)	0.714 (0.548)	1.267** (0.592)
- Land degradation	-0.085*** (0.021)	-0.098*** (0.022)	0.979* (0.569)	0.782 (0.565)
- Ozone-related	0.006 (0.039)	0.004 (0.037)	-1.673*** (0.422)	-1.636*** (0.565)
- Organic pollutants	-0.049** (0.019)	-0.064*** (0.020)	-0.816** (0.367)	-1.100*** (0.405)
Lead agency (UNDP omitted)				
- ADB	-0.051** (0.021)	-0.003 (0.025)	5.937** (2.699)	6.010** (2.529)
- FAO	-0.019 (0.026)	0.010 (0.028)	-0.594 (0.435)	-0.296 (0.452)
- IADB	-0.043* (0.025)	-0.021 (0.028)	1.214 (0.747)	1.293** (0.640)
- IFAD	-0.032* (0.018)	-0.033 (0.024)	-0.077 (0.494)	-0.129 (0.512)
- UNEP	0.056*** (0.016)	0.061*** (0.017)	-0.341* (0.174)	0.060 (0.200)
- UNIDO	-0.135*** (0.028)	-0.109*** (0.027)	0.143 (0.371)	0.354 (0.367)
- World Bank	-0.003 (0.012)	-0.001 (0.013)	1.421*** (0.354)	1.411*** (0.355)
- Other agency	-0.032 (0.051)**	-0.025 (0.003)	1.174 (5.937)**	1.146 (6.010)**
Executing partner type (multilateral omitted)				
- Government	0.000 (0.015)	-0.015 (0.014)	0.274 (0.325)	-0.334 (0.351)
- Private sector	0.001 (0.058)	-0.010 (0.059)	0.227 (0.896)	-0.195 (0.992)
- NGO/foundation/institution	0.056*** (0.021)	0.046** (0.021)	-0.028 (0.379)	-0.322 (0.417)
GDP per capita (ln)	-0.004 (0.008)	0.008 (0.017)	-0.034 (0.115)	0.492 (0.363)
Voice & accountability (WGI)	0.000 (0.000)	-	-0.014* (0.008)	-

Table A1. (continued)

	(1) LPM	(2) Fixed effects LPM	(3) OLS	(4) OLS fixed effects
Government effectiveness (WGI)	0.001 (0.001)	—	0.018* (0.009)	—
Regulatory quality (WGI)	-0.001* (0.001)	—	0.022** (0.009)	—
Control of corruption (WGI)	0.001* (0.001)	—	-0.013* (0.008)	—
Region (global omitted)				
- Africa	0.034* (0.017)	—	0.946*** (0.338)	—
- Asia	0.062*** (0.020)	—	1.050*** (0.329)	—
- Europe/Central Asia	0.070*** (0.019)	—	0.804** (0.381)	—
- Latin America/Caribbean	0.044*** (0.015)	—	0.668*** (0.253)	—
Year dummies	Yes	Yes	Yes	Yes
Country fixed effects		Yes		Yes
Observations	2,978	2,990	2,436	2,440
R-squared (within)	0.513	0.500	0.268	0.245

Note: Standard errors reported in parentheses are clustered at the country level. One, two, and three asterisk(s) indicate statistical significance at the 90-, 95-, and 99-percent levels.