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Office of Strategic Planning and Development Effectiveness

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Can Project Preparation and Execution Efforts Be Linked?

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Abstract

This paper assesses the link between the effort to prepare investment projects and the effort to implement them. Effort is measured as the total number of staff hours devoted to the project preparation or execution stages. The analysis uses a pooled cross-sectional dataset of Inter-American Development Bank investment projects approved after 2007 and closed by December 2018. The estimates show the association between preparation and execution effort controlling for project characteristics and country, sector, and time effects. Although one would expect, all else being constant, that more effort during the preparation stage would translate into less effort during execution, the estimates display a counterintuitive positive relationship between preparation and execution effort. The conjecture in this paper is that the set of control variables fails to capture the effect of project-specific factors that may generate the co-movement between preparation and execution effort. Identifying, measuring, and accounting for these factors remains an open task.

JEL codes: F53, O22, H43, O54

Keywords: international organizations, project analysis, project evaluation, Latin America

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Key Takeaways

- In recent years, the average execution time for projects has increased, while the average amount of time spent on project preparation has declined.

- This paper finds a positive and statistically significant relationship between preparation and execution efforts. This finding is at odds with the conventional wisdom that, all else being constant, more time spent preparing a project should translate into less effort later during project execution.

- The conjecture from the analysis in this paper is that the set of control variables included in the models failed to capture factors that may produce the co-movement between preparation and execution effort.

1. Introduction

The Development Effectiveness Framework (DEF) implemented by the Inter-American Development Bank (IDB) aims to make projects more effective in reaching outcomes by establishing a set of standards and metrics for project evaluation (IDB 2008, 2018a). Although the DEF is a well-established framework, inefficiencies along the life cycle of a project emerge even before a project reaches development goals (Lagarda et al. 2018). These inefficiencies harm execution by creating disbursement delays that can subsequently compromise project targets and execution timelines, cause cost overruns, and threaten the effectiveness of the IDB's development results in Latin America and the Caribbean.

One striking finding is the increase in recent years in the execution time dedicated to completing projects. At the same time, the amount of time devoted to preparing projects has been declining, raising questions about whether the efficiency gains from shorter preparation time have translated into quality challenges and lack of readiness of projects on the ground (Soriano et al. 2013). However, Avellán, Cavalcanti, and Lotti (2019) find no evidence to support the claim that shorter project preparation time lengthens execution time (understanding time as the calendar period elapsed between project milestones).[2]

One could claim that this time variable is not the relevant one to study, and that the focus should instead be on how much labor is expended during the preparation and execution phases of a given project. The idea behind this argument is that two different projects that take the same number of months to prepare could entail different effort, measured as the number of working hours the staff involved dedicates to preparing a project. In other words, the staff could have devoted more working hours to preparing one project for approval than another project. One could then argue that more effort during the project preparation phase, all else being constant, should be associated with less execution effort because the extra preparation work should pay off.[3] For example, more risk mitigation actions might have been taken, or the project might be more likely to start disbursing sooner because some activities were prepared before approval.

In this respect, this paper aims to measure the association between the effort expended to prepare a project and the effort expended to execute it. The hypothesis is that projects with more effort expended during the preparation stage should need less effort to be completed. However, the analysis finds a positive and statistically significant relationship between preparation and execution efforts. We believe the estimates suffer from omitted variable bias, that is, there are unobservable factors that may produce the co-movement between preparation and execution effort that have not been captured by our control variables.

This analysis is related to the strand of the economic literature on development effectiveness that examines the effect of project-level factors, such as preparation time, on development outcomes. The conceptualization of development outcomes differs across research, with some authors looking at the rate of economic return or project ratings, and others at execution times (Isham,

[2] The project milestones considered by the authors are project profile approval, project approval, project eligibility, first disbursement, and project closing.
[3] We refer to effort as the total number of hours the staff devotes to either preparing or executing a project.

Kaufmann, and Pritchett 1997; Isham and Kaufmann 1999; Denizer, Kaufmann, and Kraay 2013; Geli, Kraay, and Nobakht 2014; Bulman, Kolkma, and Kraay 2015). Some evidence suggests that project-level factors can better explain development outcomes than country-related factors (Alvarez, Bueso-Merriam, and Stucchi 2012; Bulman, Kolkma, and Kraay 2015). In this regard, Denizer, Kaufmann, and Kraay (2013) find that 80 percent of the variability in development outcomes across projects results from factors within countries and not across countries. The remaining 20 percent is related to countries' macroeconomic conditions. These findings highlight the importance of disentangling project-level characteristics in order to better understand project constraints to development effectiveness.

The evidence shows that project-level characteristics – such as project size, sector, team leader location at completion, project preparation, changes in funding, monitoring, coordination, design, training, supervision, and the institutional environment – are related to better development results (Kilby 2000, 2012; Alvarez, Bueso-Merriam, and Stucchi 2012; Ika, Diallo, and Thuillier 2012; Denizer, Kaufmann, and Kraay 2013; Bulman, Kolkma, and Kraay 2015). Other studies also identify the supervisory aspect of a project as a positive factor for development success (Kilby 2000; Chauvet, Collier, and Fuster 2015). Regarding preparation, Denizer, Kaufmann, and Kraay (2013) find a negative and statistically significant relationship between project preparation costs and project ratings, with the explanation being that more difficult projects will be more likely both to fail at delivering development results and to need more effort during the preparation stage. Geli, Kraay, and Nobakht (2014) also find a negative relationship between preparation time and project ratings, although not statistically significant.

The literature that studies the relationship between preparation time and project ratings focuses on the final outcomes of projects, that is, whether projects are successful in achieving their development objectives. But another strand of the literature analyzes the processes of project preparation and execution. These studies examine the implementation of projects in order to uncover inefficiencies along the way that can hamper achieving project objectives. In this respect, Lagarda et al. (2018) and Alvarez, Bueso-Merriam, and Stucchi (2012) look at project-level and macroeconomic factors that affect project disbursements. Lagarda et al. (2018) find that a sound macroeconomic and fiscal environment in countries is relevant for execution. They find that project characteristics are also important – that is, poor strategic planning capacity, coupled with weak procurement systems, negatively affects project execution. Alvarez, Bueso-Merriam, and Stucchi (2012) find that the country is more important than the sector in understanding project performance (defined as the percentage disbursed at the end of each year and the number of months since approval of the project), and that team leader characteristics also play a relevant role.

The next section of this paper looks at the data for the model and offers a brief overview of the relationship between preparation and execution efforts. The third section describes the empirical strategy and presents the results, and the fourth section presents conclusions and recommendations.

2. Data

This analysis used a pooled cross-sectional dataset of 245 sovereign-guaranteed investment projects approved after 2007 and closed by December of 2018 that is only available in the IDB's internal databases. The data contain information on the number of hours spent on preparing and executing a project.

Preparation is measured as the total number of staff hours spent between the date when the project profile is approved and the date when the loan document is approved by the IDB's Board of Executive Directors. Total staff execution effort refers to the total number of hours spent from the date the project is approved until the project is closed.

To further understand the effect of preparation effort on execution effort, we express total staff execution effort as the sum of two components: first, effort expended from project approval to project eligibility,[4] and second, effort expended from project eligibility to project closure. We decompose total staff execution effort because it is important to distinguish the effort spent preparing the project for its first disbursement (approval - eligibility) from the time period when the actual physical execution of the project starts (once disbursements start, eligibility - closing). This is important because there might be differences in how these two phases could be related to preparation effort. It could be argued, for example, that different actions are required to make a project disbursement-ready than to manage its progress and disbursements once its execution starts.

In addition, we define outliers as those observations below the 1st percentile and above the 99th percentile of the distribution for the preparation effort variable and for the total time in months dedicated to preparing a project. In this regard, we run our estimations using projects that took between 133 and 4,424 hours to prepare and that required longer than 1 month but less than 43 months to be designed. We consider the bottom 1 percent as extraordinary cases or circumstances in which staff has been under-reporting the total number of hours dedicated to the operation. For the top 1 percent, we believe external factors beyond the scope of the operation – such as fluctuations in political or economic circumstances, changes in policy priorities, and/or overly difficult operations – could have extended preparation times and efforts beyond reasonable scopes.

Projects in the sample include sovereign-guaranteed investment projects with current loan modalities. The modalities include Specific Investment Operations (ESP), Global Credit Programs (GCR), Global Multiple Works Operations (GOM), Multiphase Operations (PFM), and Technical Cooperation Loans (TCR).

[4] An approved project reaches "eligibility" when it obtains legal or administrative approval by the beneficiary country and when the conditions for its first disbursement have been met.

The data also contain information on various project characteristics, such as loan amount, the environmental safeguard classification[5] and the location of the project team leader,[6] who can be located either at IDB headquarters in Washington, DC, at the country office where the project is executed, or at another country office.

Table 1 presents descriptive statistics for our categorical and time variables, while Table 2 shows summary statistics for the main variables of interest broken down by IDB department. The sample includes data for 283 completed (closed) projects in all member countries in Latin America and the Caribbean. The typical project in the sample is from the ESP modality, comes from the infrastructure sector, has a "C" environmental classification, and has a team leader located at the country office. The average project size, expressed as the average amount approved per project, is around US$78.4 million. Execution effort, defined as the total number of hours from project approval to closing, is on average around 3,248 hours per project.

[5] We control for projects with environmental classifications A, B, B13, and C, which are described as follows: A: Projects likely to cause significant negative impacts, or have profound implications affecting natural resources; B: Projects likely to cause mostly local and short-term negative environmental and associated social impacts and for which effective mitigation measures are readily available; C: Projects likely to cause minimal or no negative environmental and associated social impacts; B13: This is a catch-all category not related to the severity of impacts, but rather covers lending for which ex-ante impact classification may not be feasible, such as financial intermediary operations or policy-based loans (IDB 2018b).

[6] This refers to the location of the team leader at the closing of the operation.

Table 1. Frequency of Categorical and Time Variables

Department	Frequency
CSD	22
IFD	88
INE	102
INT	8
SCL	63
Total	283

Project Modality	Frequency
ESP	215
GCR	13
GOM	22
PFM	29
TCR	4
Total	283

Environmental Classification	Frequency
A	7
B	108
B13	23
C	116
Total	254

Team Leader Location	
COF	188
COF2	55
HQ	36
Total	279

Country	Frequency
AR	18
BA	4
BH	2
BL	7
BO	19
BR	45
CH	5
CO	15
CR	1
DR	8
EC	17
ES	7
GU	5
GY	6
HA	5
HO	16
JA	7
ME	22
NI	19
PE	5
PN	12
PR	5
SU	8
TT	4
UR	16
VE	5
Total	283

Closing Year	Frequency
2010	4
2011	6
2012	2
2013	17
2014	53
2015	38
2016	49
2017	53
2018	61
Total	283

Approval Year	Frequency
2007	24
2008	55
2009	60
2010	58
2011	44
2012	26
2013	10
2014	3
2015	2
2016	1
Total	283

Source: Authors' calculations based on data from sovereign guaranteed investment projects approved after 2007 and closed by December of 2018.

Note: Department: CSD: Climate Change and Sustainable Development Sector; IFD: Institutions for Development Sector; INE: Infrastructure and Energy Sector; INT: Integration and Trade Sector; SCL: Social Sector.

Modality: ESP: Specific Investment Operations; GCR: Global Credit Programs; GOM: Global Multiple Works Operations; PFM: Multiphase Operations; TCR: Technical Cooperation Loans.

Environmental Classification: A: Likely to cause significant negative impacts or have profound implications affecting natural resources; B: Likely to cause mostly local and short-term negative environmental and associated social impacts for which effective mitigation measures are readily available; B13: Uncategorized Directive B.13 (do not apply environmental classification); C: Likely to cause minimal or no negative environmental and associated social impacts.

Team Leader Location: COF: Team leader located in the project's country office; COF2: Team leader located in a country office different from the project's country; HQ: Team leader located at headquarters.

Table 2. Summary Statistics of Continuous Variables

		Total Hours [Approval-Closing]	Total Hours [Approval-Elegibility]	Total Hours [Elegibility-Closing]	Total Hours [Preparation]	Std. Deviation [Preparation Hours]	Project Size (Million of U.S.
CSD	Mean	4,008	353	3,655	916	80.1	40.4
	Median	3,751	260	3,485	749	76.5	26.0
	Std. Dev.	1,522	237	1,491	455	37.5	39.4
	Minimum	1,264	139	1,012	312	23.8	9.8
	Maximum	6,852	1,115	6,422	1,833	159.2	170.0
IFD	Mean	2,997	415	2,578	823	63.3	76.6
	Median	2,909	332	2,509	622	51.5	20.0
	Std. Dev.	1,770	295	1,734	660	34.4	157.0
	Minimum	489	56	81	189	16.1	2.3
	Maximum	9,052	1,426	8,286	4,171	178.9	1,000.0
INE	Mean	3,169	443	2,723	980	81.2	73.5
	Median	3,046	378	2,707	797	75.1	32.7
	Std. Dev.	1,741	318	1,531	713	44.4	126.0
	Minimum	330	36	138	166	17.3	2.5
	Maximum	11,732	1,809	9,923	4,424	306.9	800.0
INT	Mean	3,255	481	2,774	584	66.4	9.4
	Median	3,090	455	2,718	505	60.9	8.8
	Std. Dev.	1,133	359	982	222	34.7	5.3
	Minimum	1,854	80	1,684	366	25.4	3.0
	Maximum	5,281	1,115	4,435	953	134.3	20.0
SCL	Mean	3,447	498	2,967	1,005	102.2	111.0
	Median	3,582	436	2,954	835	102.3	37.0
	Std. Dev.	1,671	313	1,571	587	44.5	185.0
	Minimum	653	74	391	158	23.6	2.5
	Maximum	8,718	1,545	7,644	2,624	218.2	850.0
Total	Mean	3,248	441	2,808	921	79.8	78.4
	Median	3,122	362	2,773	751	73.1	25.0
	Std. Dev.	1,716	306	1,606	647	42.9	146.0
	Minimum	330	36	81	158	16.1	2.3
	Maximum	11,732	1,809	9,923	4,424	306.9	1,000.0

Source: Authors' calculations based on data from sovereign guaranteed investment projects approved after 2007 and closed by December of 2018.

Note: Department: CSD: Climate Change and Sustainable Development Sector; IFD: Institutions for Development Sector; INE: Infrastructure and Energy Sector; INT: Integration and Trade Sector; SCL: Social Sector. Standard deviation [preparation effort] refers to the standard deviation in the number of hours dedicated to preparing a project.Project size refers to original amount approved for the project

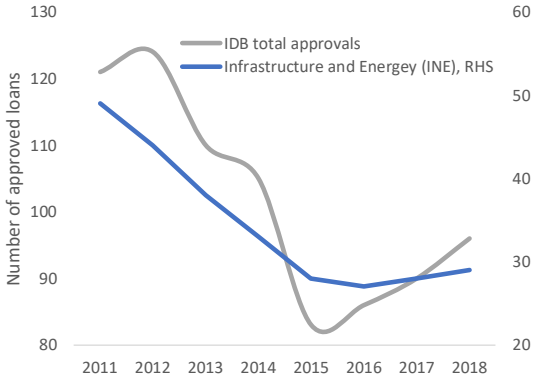
2.1. Overview of Preparation and Execution Stages

The number of loans approved by the IDB's Board of Executive Directors declined from 121 sovereign-guaranteed loans in 2011 to 96 sovereign-guaranteed loans in 2018, explained mainly by a reduction in the number of loans approved for the infrastructure and energy sector (Figure 1, panel a). However, the IDB's lending envelope in Latin America and the Caribbean expanded from US$9,451 million in 2011 to US$13,202 million in 2018, hence increasing the average size of loans across all sectors, including infrastructure and energy, but to a greater extent to projects in the social, integration and trade, and institutions for development sectors (Figure 1, panels b and c). The changes in the average size of loans have shifted the composition of the IDB's envelope in the region from a higher component of loans focusing on infrastructure and energy towards a higher component of loans focusing on institutions and social sectors (Figure 1, panel d).

Figure 1. An Overview of Approved Loans and Execution

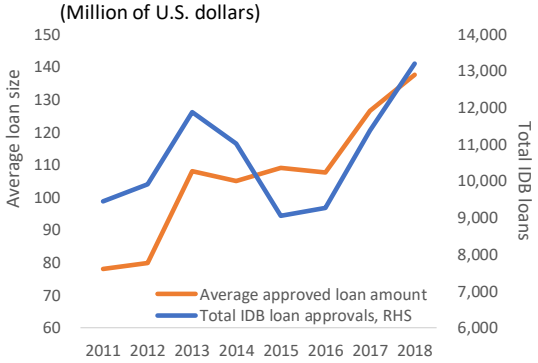
The number of IDB loan approvals has declined, explained by a drop in infrastructure loans.

1a. Sovereign-Guaranteed Loan Approvals



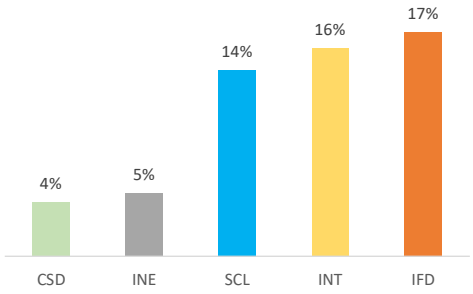
However the average size of the loans has been on the rise…

1b. Average Sovereign-Guaranteed Loan Approvals (Million of U.S. dollars)



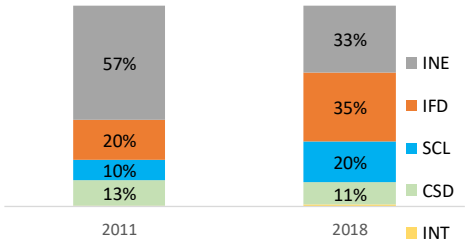
…fueled by bigger loans across all sectors….

1c. Growth in Average Approved Loan Amount 2011-18 (Average annual growth rate in percent)



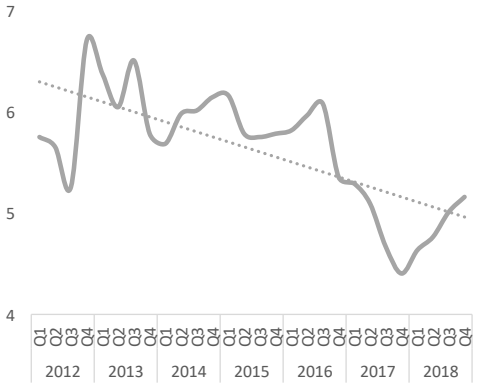
…that entailed a shift in the composition of the IDB's envelope towards IFD and SCL loans…

1d. Sector Composition of Loan Approvals (Percent of the total approved amount)



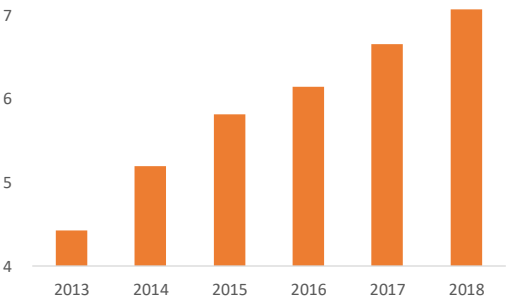
…and a decline in the preparation time of projects.

1e. Time Elapsed from Projects Profile to Approval of Sovereign-Guaranteed Loans



At par we observe the rise in execution time

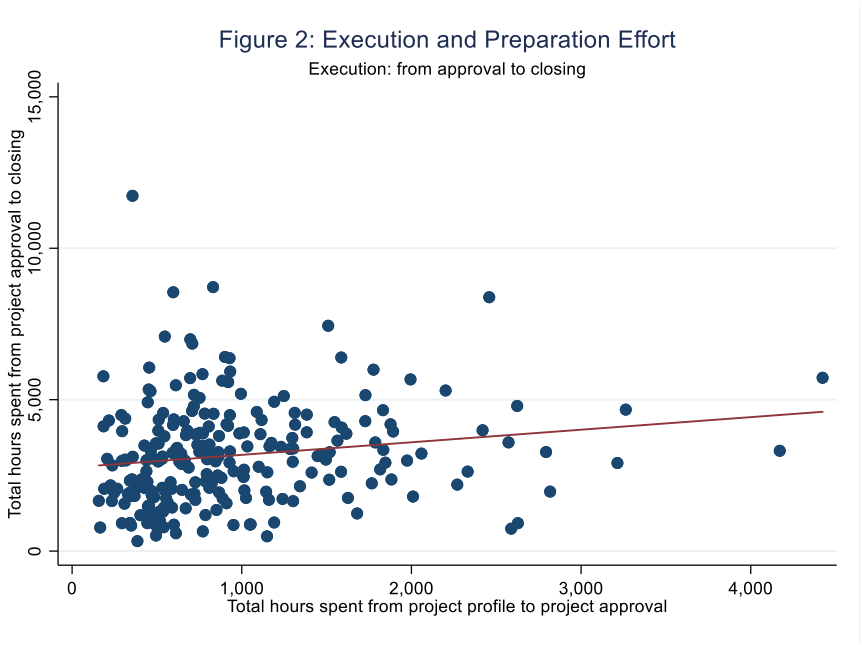
1f. Time Elapsed from Approval to Closing for Sovereign-Guaranteed Loans Approved after 2007 (Years)



Source: Author's calculations; and the *2018 Annual Business Review.*
Note: CSD: Climate Change and Sustainable Development Sector; IFD: Institutions for Development Sector; INE: Infrastructure and Energy Sector; INT: Integration and Trade Sector; SCL: Social Sector. Panel f refers to sovereign-guaranteed investment projects approved after 2007 and closed by December 2018 and for which the loan modalities are Specific Investment Operations, Global Credit Programs, Global Multiple Works Operations, Multiphase Operations, and Technical Cooperation Loans.

At the same time, there has been a decline in the time that it takes to prepare an operation. In 2012, it took around 5.85 months from preparation of the project profile to reach approval of the operation by the IDB Board of Executive Directors, while this time period decreased to 4.64 months in 2018 (Figure 1, panel e). However, there has been an increase in the time to complete project execution. Projects approved after 2007 and closed by December 2018[7] show a steady increase of average execution time, from four years for projects closing in 2013 to up to seven years for projects closing in 2018 (Figure 1, panel f).

Looking instead at the effort expended during the preparation and execution stages for a given project, Figure 2 shows a positive association between these two stages of the project life cycle. Effort is measured as the total number of staff hours spent from project profile to project approval (preparation effort) or from approval to closing (execution effort). This positive association between preparation and execution effort is counterintuitive, as will be discussed later in this paper.



Source: Prepared by the authors

Figures 3 and 4 further split execution effort into two components (staff hours from approval to eligibility,[8] and staff hours from eligibility to closing), and we plot their association with preparation effort (total number of staff hours spent from project profile to project approval). Figure 3 also displays the counterintuitive finding previously described, as there is a positive association between the effort spent from project eligibility to closure and effort spend on project preparation. Figure 4 also shows a positive relationship between the effort expended from project approval to

[7] This result only includes investment projects approved by 2007 and closed by December 2018 that has the following loan modalities: Specific Investment Operations, Global Credit Programs, Global Multiple Works Operations, Multiphase Operations, and Technical Cooperation Loans.

[8] Eligibility is the first date when the loan contract conditions are partially or totally met, allowing for partial or total disbursement of funds.

eligibility and that expended on project preparation, albeit that relationship is weaker than what we find in the previous figures.

Figure 3: Execution and Preparation Effort

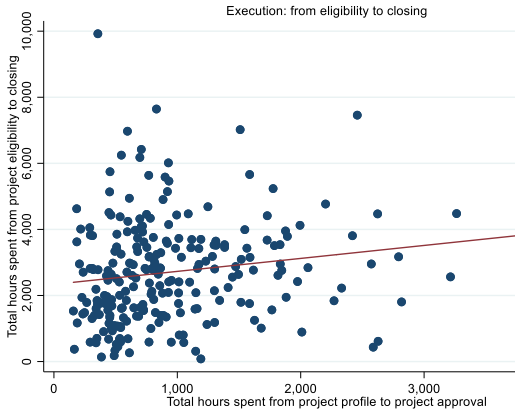
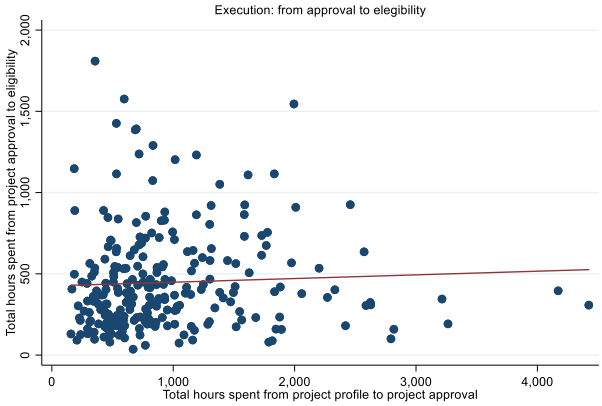


Figure 4: Elegibility and Preparation Effort



Source: Prepared by the authors

So far, the figures above suggest that preparation and execution effort are positively associated. However, one should be very careful about jumping to conclusions about causation. The figures are not suggesting that more effort spent preparing a project causes more execution effort. What they are stating is that these two variables tend to move together, and we believe that this is because there are common factors driving them.[9] If we could account for these factors, we could then have a more accurate measure of the association between project preparation and execution effort.

Several factors could be driving this co-movement between the effort expended during project preparation and execution stages. For example, time-invariant country-specific factors such as local capacity could be the culprit. In this specific case, one would expect that if the local capacity to execute projects is lacking, both the preparation and execution of a project becomes more challenging and requires more effort. Also, the nature of some projects could make them more challenging to prepare and execute, as in the case of projects that have environmental impacts. Local regulation could also become challenging and prompt the need for more effort to prepare and execute a project. In sum, several factors could add up and make projects more challenging to prepare and execute, so not accounting for these factors results in a misleading assessment of the relationship between the effort exerted to prepare and execute a project. To tackle this issue, we performed a regression analysis introducing several control variables that could capture the factors that may simultaneously drive project preparation and execution effort.

[9] The classic textbook example of this concept, known as “omitted variable bias,” is as follows. Suppose we observe a spike in both ice cream consumption and air conditioner use in the month of August. In this case, we would not conclude that turning on the air conditioner causes more ice cream consumption, but we could certainly conclude that both variables move together. What happens is that there is a third factor (temperature) driving both of the spikes.

3. Empirical Strategy and Results

To estimate the association between project preparation effort and execution effort, we estimate the following equation:

$$y_i = x_i'\beta + \varepsilon_i \,, \qquad (1)$$

Where y_i is the natural logarithm of the total number of staff hours spent executing project i, x_i is a vector of control variables, β is a vector of coefficients and ε_i corresponds to the disturbance term.

As mentioned in the previous section, we measure execution effort at different milestones in the project cycle. Total execution effort is the effort exerted from project approval to closing. We further split this variable in two parts at the disbursement eligibility mark: the preparation effort from project approval until the project reaches eligibility, and the execution effort from eligibility to closing. We estimated the model for total effort and for each one of its components.

The set of control variables includes the following:

- The logarithm of the total number of hours spent preparing the project (preparation effort).

- A set of project variables to capture project-specific characteristics. These include project size (the natural logarithm of the original amount approved for the project), loan modality, environmental classification, and the location where the team leader is based when the project closes (headquarters, country office in the beneficiary country, or another country office). We also included time-invariant country-specific and sector-specific effects. The pooled cross-sectional dataset collects data from different points in time. We account for those time differences controlling for the year when the operation was approved.

- The standard deviation of the monthly preparation effort for project *i* (standard deviation preparation effort). We introduced this variable to control for differences in the time allocation during the project preparation stage. This captures differences between teams that smoothly and continuously allocate the number of hours during the preparation stage (low dispersion) and teams that create spikes in the reporting of hours around milestones within the preparation stage (higher dispersion). This higher dispersion could play a role, as it might be argued that working intensively on projects to meet milestone deadlines while idle or working on separate projects during the preparation stage could adversely affect the readiness of the project at the execution stage.

We used ordinary least squares to estimate equation 1. Table 3 presents results using each of the variations in the dependent variable for the execution effort. First, we estimated a simple linear regression model using the broader definition of execution (from approval to closing) without controls to observe the plain correlation between total staff execution effort and preparation effort (Model 1). We found a counterintuitive positive and significant relationship between preparation

and execution efforts that can be explained by the absence of controls. Nonetheless, after we include the set of control variables, this positive relationship still holds in Model 2.

Then, we re-estimated equation 1, splitting the dependent variable at the disbursement eligibility milestone as explained before. We observe that project preparation effort is positively correlated with execution effort when we measure the outcome variable from approval to eligibility (Model 3) and from eligibility to closing (Model 4).

This positive correlation is counterintuitive because one would expect that, all else being constant, more effort spent preparing a project should result in less effort later during the execution stage. In other words, we would expect that more staff hours spent preparing a project would reduce the number of hours staff spends executing the project. The estimates indicate the opposite, even after controlling for project characteristics and for country, sector, and time-specific effects.

Table 3: Model Results

Outcome variable : Execution Effort

	Model 1 [Approval-Closing]	Model 2 [Approval-Closing]	Model 3 [Approval-Eligibility]	Model 4 [Eligibility-Closing]
Preparation effort	0.199***	0.205***	0.173*	0.186**
	(0.0572)	(0.0660)	(0.102)	(0.0772)
Standard deviation preparation effort		0.000781	0.00247**	0.000110
		(0.000832)	(0.00111)	(0.00104)
ln (project size)		0.0703	-0.0512	0.0760
		(0.0485)	(0.0567)	(0.0566)
ln_total_hrs_elig				0.132**
				(0.0638)
Modality				
GCR		-0.271	0.325	-0.585**
		(0.211)	(0.294)	(0.255)
GOM		-0.0396	0.0714	-0.0938
		(0.120)	(0.146)	(0.142)
PFM		-0.0574	-0.197	0.0145
		(0.107)	(0.156)	(0.124)
TCR		-0.0608	-0.442	0.0582
		(0.247)	(0.362)	(0.249)
Environmental Class				
B		-0.568***	-0.580**	-0.499***
		(0.152)	(0.275)	(0.164)
B13		-1.163***	-0.759**	-1.276***
		(0.272)	(0.355)	(0.327)
C		-0.546***	-0.637**	-0.499***
		(0.171)	(0.306)	(0.189)
Sector				
IFD		-0.0731	0.182	-0.158
		(0.126)	(0.203)	(0.145)
INE		-0.373***	0.152	-0.509***
		(0.117)	(0.173)	(0.135)
INT		0.1000	0.633*	-0.125
		(0.139)	(0.344)	(0.202)
SCL		-0.258*	0.440**	-0.431***
		(0.136)	(0.192)	(0.151)
Team leader				
COF2		0.0305	-0.0437	0.0516
		(0.0932)	(0.115)	(0.112)
HQ		0.260**	-0.0476	0.352***
		(0.101)	(0.173)	(0.111)
Constant	6.580***	5.858***	5.386***	5.188***
	(0.382)	(0.992)	(1.285)	(1.163)
Observations	245	245	245	245
R-squared	0.048	0.524	0.312	0.573
Country effects		Yes	Yes	Yes
Year effects		Yes	Yes	Yes
Robust errors		Yes	Yes	Yes

Source: Prepared by the authors

Note: Department: CSD: Climate Change and Sustainable Development Sector; IFD: Institutions for Development Sector; INE: Infrastructure and Energy Sector; INT: Integration and Trade Sector; SCL: Social Sector. Standard deviation [preparation effort] refers to the standard deviation in the number of hours dedicated to preparing a project.Project size refers to original amount approved for the project. *** p<0.01, ** p<0.05, * p<0.1

We believe that the result is driven by the fact that the control variables failed to capture factors that are positively associated with preparation and execution effort, hence the coefficient over-estimates the degree of association between these two variables. For example, projects that are executed in an environment with severe institutional constraints, or projects that are meant to

contribute to the solution of a very complex issue, would take more time to prepare and execute. Not including these factors or any other unknown factors in the set of controls would result in an upward-biased estimate.

4. Conclusions and Recommendations

This paper has examined the association between the effort required to prepare a project and the effort required to execute an operation on the field. We measured effort as the total number of hours that the staff spends on each of these stages of a project's life cycle. We also distinguished effort between the effort expended preparing the project for its first disbursement (from approval to eligibility) and the effort expended once physical execution of the project starts (from eligibility to closing). We did this in order to disentangle any differences in how both project stages are related to preparation effort.

We conducted a regression analysis on a pooled cross-sectional dataset of IDB sovereign-guaranteed investment projects approved after 2007 and closed by December 2018. We controlled for project size, loan modality, location of the team leader at project completion, and environmental safeguard classification. We also controlled for time-invariant country-specific and sector-specific effects. We account for time differences controlling for the year when the operation was approved.

The results show a positive and statistically significant relationship between project preparation and execution efforts that is at odds with a view that more effort during project preparation, all else being constant, should lead to less effort later during the execution stage. These results indicate the opposite, even after the introduction of the control variables.

We believe that to the extent that the control variables could not capture the effect of factors that make project preparation and execution more challenging, the resulting estimate is over-estimated. For example, projects that are more challenging will require more staff time during the preparation stage and might require more staff time as well to be completed. The results suggest that one needs to be careful when linking preparation and execution effort, as the resulting positive association between them is very likely the result of the omission of project features for which there are no systematic metrics available that we are aware of.

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