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Efficiency Before Effectiveness: The Case of the Inter-American Development

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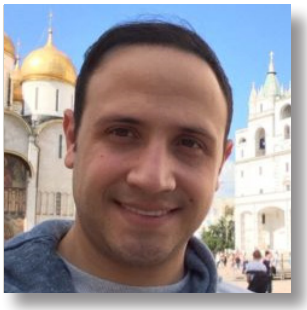
ABSTRACT

The literature on development effectiveness has traditionally focused on the ex-post analysis of projects. While this is the appropriate method of measuring benefits, a previous step must be taken as a forerunner to good ex-post evaluation: the measurement of the efficiency in the execution of investment projects. This document aims to identify the determinants of good execution. Unlike previous studies, the current study analyzes execution using a project life cycle approach. Using an Inter-American Development Bank (IDB) database with information from various departments, the authors identify the factors that are associated with faster or slower disbursement on several stages of the projects' life cycle. The basic premise is that the duration of an investment project– that is, the days elapsed from its approval to its final disbursement– is associated with preparation and execution-related factors as well as exogenous country factors. There is evidence that a sound macroeconomic and fiscal environment in countries is important for the purposes of good execution. Moreover, the authors find that delays in project planning and execution substantially extend project lives. These findings suggest the need to continue to improve efficiency in these areas. Finally, the authors find differences in project life cycles that are associated with delays caused by the projects' executing units.



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1. Introduction

The projects implemented by multilateral development banks (MDBs) seek to support countries' economic and social development. In most cases, aid is provided through financial resources for investment projects that support development or transfers for general budgetary support for the implementation of medium-term economic and legal reforms.[1] In parallel, technical assistance is provided for the implementation of both types of projects. Recent evidence—Álvarez et al. (2012)1in the IDB, and Denizer et al. (2013) in the World Bank—shows that most of the variation in aid performance is explained by project characteristics and not by country conditions.[2] In this regard, one might expect that it would be simpler to link the benefits for the population with project- specific characteristics. Though intuitive, this approach disregards the frequent cases in which the design itself does not have the same investment-target achievements in projects of different divisions (hereafter referred to as "sectors") . This document complements the available literature, inasmuch as it does not focuses on ex-post outcomes of development programs and investments, rather on life-cycle factors. In particular, we believe that in addition to the measurement of effectiveness of investment projects, it is helpful to identify inefficiencies throughout the life of development projects. Hence we believe that an investment project's level of performance could be a necessary (but insufficient) condition to gauge the success of development assistance. In this analysis we focus on understanding which factors or determinants can affect efficiency in the execution of investment projects for development. We concentrate on investment projects which usually result in social and economic infrastructure and which feature significant variance in disbursement times. Understand- ing the cause of such variance, therefore, is key to ensuring timely and efficient execution so that development is supported more effectively.

Findings are only helpful if they are used to foster change in both MDBs and the recipient countries' public policies. To that end, this study goes deeper and seeks to identify the "macro" and "micro" determinants that explain the time taken to execute investment projects throughout their life cycles. In this report, the concepts of "macro" and "micro" follow the grouping rationale used in Denizer et al. (2013), in the sense that we agree that there are "macro" factors or country-level variables that can affect the performance of the investments' execution. In contrast to that study's methodology, however, in this document "macro" represents factors related to a country's economic and political environment, and even weather events, that may determine the speed of execution of investment projects. Similarly, the "micro" factors or project-specific characteristics herein include variables particular to the different stages of the project life cycles. Three life cycle stages are analyzed: start-up, midlife and completion.

The findings of the study are based on the analysis of the projects of a single MDB: the Inter- American Development Bank (IDB). Despite this singular institutional focus, we believe that the evidence presented in this document has broader implications for development effectiveness beyond the IDB. In particular, the findings are important for projects in Latin America and the Caribbean. With US$64 billion committed to the countries of Latin America and the Caribbean since 2000, the IDB is a prominent player in the region's development financing. The Bank makes a great effort to ensure the quality of its projects by undertaking reviews, evaluations, and quality-improvement processes. On average, however, 424 days elapse between a project's approval by the Bank's board and its first disbursement, and it takes an average of 2,040 days (5.6 years) to disburse 80 percent of the resources—ranging from a minimum of 14 days to a maximum of 4,937, depending on the project. It still takes a substantial amount of time to reach the first disbursement even if the period is counted from the day the project takes legal effect (that is, the day when the operation is approved by the necessary national authorities, usually the Congress) and from total eligibility (that is, the date on which both parties-government and the IDB- have undertaken the necessary administrative procedures for disbursement to begin). The objective is to understand if these timeframes are optimal, or if certain factors can be modified in order to make project execution more timely. The analysis begins with an effort to identify the economic, political, and institutional characteristics of the country whose effects delay disbursements over time. As a second step, we accessed additional IDB information on the characteristics of preparing and executing the different projects. The matters explored can be summarized by the following questions: a) How much of the time required to make a project's disbursements is attributable to country conditions? and b) how much is attributable to internal conditions (e.g.: preparation processes) within the IDB? To answer these questions, we first look at the variables associated with the country's capacities which may delay disbursements—for instance, a country's macroeconomic condition may affect the time taken to disburse throughout the different stages of the project. To control for project management, we include institutional and idiosyncratic factors of governance. Moreover, we add controls for the year in which the disbursement was made, in addition to sector and country controls.

1 Historically, these represent about 70 percent and 30 percent, respectively, of the Inter-American Development Bank's and the World Bank's portfolios. This distribution is similar in other multilateral banks.

2 Most of the literature on the relationship between a country's growth and aid flows does not provide satisfactory answers to the question of whether aid is effective and under what conditions. This is partly because assistance provided through policy-based loans (via budgetary transfers) is hard to link to concrete results, or its impact might be apparent over the medium and long terms given that they result from the implementation of reforms.

The macroeconomic environment is also marked by political cycles and events that are exogenous to governments. For instance, we take account of extreme weather events, which undoubtedly affect the authorities' actions, including hurricanes, floods, and earthquakes. All these phenomena call for the mass mobilization of resources at a given time, which can affect the decision to proceed with execution in a more (or less) timely manner.

For the purposes of a second exercise, the analysis includes variables on (i) the determinants of the time period between the date of approval, the date of legal effectiveness, and the date of total eligibility; and (ii) the effects of the projects' characteristics across their lives on the time needed to make disbursements following approval. It should be noted that for various characteristics the quality or even existence of data is not uniform at the project level, posing a challenge to the estimates. Hence we limit our analysis to econometrically respond to those hypotheses for which the quality of the information allows significant and valid inferences to be drawn.

We contribute to the literature in two main ways: First, as far as we are aware, this study is the first one to emphasize the equally important management capacities of the public administration and MDBs, and the need to distinguish between those capacities throughout the life of a project. Second, we bring together a novel set of project-level variables to account for the disparity evident throughout a project's life cycle. We do this by including data on internal indicators of the characteristics of project preparation, the pre-investment stage, and the procurement process. This is important because, as noted earlier, although much of the empirical literature is based on country-level or project-level variables, it does not consider the distinct correlations apparent in each stage of a project's life cycle. This observation is particularly significant from a public policy perspective, since it makes clear to donors the importance of centering on public administration factors to improve execution performance. At the same time, it suggests that the actions of MDBs related to the improvement of project preparation should not be disregarded.

One of the most significant findings of this report is that "macro" and "micro" factors affect the execution of investment projects differently across their life cycle. Our results also confirm that the provision of assistance to countries enjoying a favorable fiscal environment is associated with better project performance. It also shows that disparities in project execution are correlated with differ- ences in the various stages of the investment's life cycle, including the type of investment instrument and executing agency used for each project. This suggests that, in order to improve the efficiency of the investment's execution, efforts should center on those factors subject to donor monitoring ("micro" at the project level) and stemming from management capacities of the beneficiary country ("macro at the institutional level). Finally, the findings suggest that both kinds of factors should be tackled as a whole in an effort to improve the performance of project execution.

The rest of this document is organized as follows: In the following section we briefly summarize the relevant literature. In Section 3 we describe the data in detail. Section 4 contains our main empirical findings on the links between the countries and project-level characteristics and disburse- ment times. Section 5 presents our conclusions and discusses the implications of these findings for policies geared to improving the effectiveness of development investment.

2 Literature Review

An important branch of the economic literature discusses development policies from the standpoint of whether or not they have been effective. The prime goal of this line of research is not to draw policy conclusions, but rather to highlight the main questions arising from the findings on development effectiveness. An example of this is Temple et al. (2010), which brings together contributions from the academic literature to address questions about effectiveness and the areas in which much remains unknown. This is an interesting matter, but it is only conceptually related to our study. By contrast, what is seldom evident in the literature but is interesting for our purposes is an analysis of how to make development aid policies effective, either by means of the quality of their implementation or by improving all those factors that affect proper execution.

Several attempts have been made to study the factors that explain the individual outcomes of development investment projects. Where the various studies usually differ is in their choice of the performance metric. One important branch of the literature uses investment projects' rate of economic return. This is common in some studies based on World Bank data. The return-on- investment metric, however, is not necessarily the most common comparison metric used in the literature. Other studies use project cost-benefit metrics, project scope, or total execution time.

The World Bank in particular has made several attempts to study the effectiveness of investment projects. For example, contributions such as Isham et al. (1997) and Isham and Kaufmann (1999) have studied the determinants of estimated ex-post rates of economic return at the project level. The former study uses a panel to examine the links between government effectiveness and the quality of governance. The latter looks at how country-level characteristics and public policies influence the investment's aggregate performance. According to their findings, undistorted management of the macroeconomic environment is associated with more productive development investments. Other studies have similarly focused on the country-level determinants of project returns. These include Levin and Dollar (2005), which emphasizes how differences in the quality of institutions drive differences between countries in average project success rates. Guillaumont and Laajaj (2006) focuses on country-level volatility in accounting for success at the project level. From another perspective, Dreher et al. (2013) centers on the effect of political influence on project approvals. The study finds that the quality of World Bank projects suffers as a result of political influence only if the recipient country is economically vulnerable.

Similarly, the World Bank has conducted research that addresses the question of how to make development aid effective. Most of the studies on this issue focus on impact assessments. This is a growing body of literature that seeks to link ex-post assessments with ex-ante targets so as to analyze the effectiveness of development policies in recipient countries. Examples of this are the efforts made by the World Bank, as reported in WorldBank (2012) or the progress report "Development Impact Evaluation" (DIME) (Legovini (2010)). The latter summarizes a series of mechanisms through which impact assessments induce better practices and higher quality in operations. Ruprah and Marcano (2009), a study based on IDB data, shows that technical assistance has positive effects on project outcomes and that sometimes these go beyond the impact arising from the financing itself. Finally, a more recent study (Legovini (2010)) finds among other things that project delivery is significantly more timely in initiatives with impact evaluations. Most particularly, delays are avoided and the gap between planned and actual disbursement narrows by half.

The complementary literature on the factors that explain the success of individual projects is also fairly sparse. Some of these studies have looked at the country-level determinants of project outcomes for multilaterals. For the World Bank, Denizer et al. (2013) examines explanatory factors such as democracy, civil liberties and conflict, and various macroeconomic measures ranging from the quality of macroeconomic policy and market reforms to volatility and growth. Other studies have analyzed the link between project-level discrepancies in outcomes and project-level factors such as staff time devoted to preparation and oversight. Deininger et al. (1998) finds that more analytical economic and sectoral work (as opposed to the work of preparing specific projects) is correlated with the quality of the loans and their level of disbursement. A series of studies—Kilby (2000); Kilby et al. (2012); Kilby (2013a,b)—find that greater project preparation is related to higher project ratings. Ika et al. (2012) finds a statistically significant and positive relationship between a series of five project factors (monitoring, coordination, design, training, and the institutional environment) and project success. Interestingly, Denizer et al. (2013) finds that 80 percent of the total variation in project performance stems from variation within the country and is correlated with the size of the project, the sector, the quality of the project leader, and the amount of resources devoted to project preparation and oversight. This study is also interesting because the authors identify greater variation within countries than between countries. According to the findings, the particular effort factors presented for each country explain these within-country variations. This contrasts with our findings, which make it possible to distinguish factors that are under the authority of the country from those that are under the remit of the development agency. The premise is that such factors occur at different times in the life of an investment project, and thus the pace of execution is an interesting metric to gauge success.

The IDB has made efforts, albeit on a smaller scale, to study the handling of execution. Álvarez et al. (2012) analyzes the determinants of the evolution of IDB disbursements between 1996 and 2011. Specifically, the study seeks to explain the deviation of the disbursements observed relative to historical disbursements. Among the findings is that country characteristics are more important than a distinction between sectors. The findings suggest that the project team leader influences the disbursements, especially when the leader is based in the recipient country. According to the authors, the organizational changes instituted in the IDB after 2006 have been successful, causing disbursements in 2011 to be 15 percent higher than they would have been without the changes. Barrios et al. (2016) also considers the behavior of disbursements, but is related more to regular prediction. On the basis of three autoregressive econometric models, the authors undertake an in- sample forecast of the disbursements between March and August 2016 by country. The conclusions highlight the need to carry out this exercise by country in order to control for particular institutional characteristics and the economic environment. Like these two studies, ours is based on information provided by the IDB. The proposal is novel, however, in the sense that it seeks to distinguish among the different factors that influence investment projects. In particular, it distinguishes between those that occur during the project's conception and those that determine its effective implementation and completion.

3. Data and Descriptive Statistics

To have a better understanding of this document's data on the performance of investment projects, we must first describe how the information is gathered and processed within the IDB. The Bank's activities are organized by project. For example, a project could consist of an agreement to build a particular piece of infrastructure whose purpose is to house students, and therefore financing will be provided for furnishings and also for teacher training to support a particular use of the facilities. In some cases the projects simply take the form of budgetary support for the recipient countries. IDB staff prepare a document that describes the project and includes a proposed amount

of financing. A key ingredient of that initial document is the project's "development objective or scope," which summarizes what the project seeks to achieve. Once the IDB's board has approved the project, it is implemented over several years in line with an expected program of activities related to disbursements.[3]

In the IDB, each project has a project team headed by a "team leader." These prepare the conceptual part of the investment project and must report the risks and the status of the projects for which they are responsible. As shown below, these reports provide us with a broad set of project- level variables measured throughout the project's life. Once the project has been completed, the team leader produces a project completion report, which includes a subjective assessment of the extent to which the project was successful in meeting its development objective. All the assessments are subject to validation by the IDB's Office of Evaluation and Oversight (OVE).

The IDB repeatedly faces inefficiencies that, even long before considering a project's development effectiveness outcomes or scope, are related to the projects' failure to meet disbursement targets. In other words, prolonged periods of start-up and execution cause delays that subsequently affect the recipient countries' adjustment capacities. This results from a variety of factors, such as a country's failure to allocate a budget to continue the project, electoral cycles, or sudden shifts in priorities, to name a few. These misalignments have not been explored as possible causes of poor development effectiveness. Strictly speaking, there are few analyses of the factors that precede orderly implementation in line with the programing schedules established in the project's preparation phase.

There are various concerns about the credibility of these performance metrics. A basic matter is that they measure success by attainment of each project's stated "development objective," instead of by attainment of some standard that is common to all projects and over time. This is partly a natural consequence of the wide sectoral diversity of IDB-financed projects. It will be difficult to define a common standard to assess the outcome of, say, a roadbuilding project, a teacher training project, and a civil service or reform project. It is also quite plausible that the standards used to establish development objectives have evolved during the 15 years covered by our data set. Finally, the norms for assessing success relative to a given development objective might also have changed over time. A second obvious concern could be that the rating of project outcomes based solely on project completion reports mainly reflects the opinion of the team leaders, who might not be candid about the weaknesses of the projects for which they are responsible.

In our case, we select our project performance variable by taking account of the time needed to fully execute each project, from approval to the end of what we call the disbursement curve. This approach implicitly assumes that the conceptual goal of each project is important for the country, and that the goal has been satisfactorily met by the end of implementation. In other words, assuming that each investment project contributes to development and is executed in its planned timeframe and manner, it will be meeting its targets successfully. To this end we focus on a sample of projects that were not subject to cancellations.[4]

The information used in this study is drawn from a novel compilation of data in the sense that, in line with our literature review, this is the first effort to link different sources of data to measure portfolio efficiency. The database consists of a panel covering the period 2000–2016. It includes 710 investment projects[5] approved during that period for the IDB's partner countries in the different sectors within the Bank. The project data were obtained from a set of internal IDB sources. The information on the time taken to reach each milestone (that is, approval, legal effect, 2and eligibility), as well as the dates on which the disbursements were made, were obtained from the Enterprise Data Warehouse (EDW) under the Loan Management System (LMS). Other series of descriptive project variables—such as environmental rating, the type of executing agency, or whether final construction designs or ownership of lands were in hand before IDB approval—were included on the basis of information provided by IDB Country Offices. Moreover, we included information from project monitoring reports (PMRs) and a database of procurement processes set up on the basis of the records of the Office of Financial Management and Procurement (FMP).

3 Expected but not specified in the loan document.

4 Cancellations, sometimes result in a reallocation of resources, but this is not always the case.

5 710 of 1,090 investment loans available for the period. Because of a lack of explanatory variables for some of the projects, 380 projects were excluded from the analysis.

Macroeconomic series were downloaded from the International Monetary Fund (IMF) and the World Bank websites. The quality of public management indicators are part of a database of the IDB's Institutions for Development Sector (IFD), whose data are publicly available on the Bank's website: Management for Development Results (MfDR) Index. Finally, other variables related to political cycles, the composition of legislatures, elections, and weather events were constructed using public information from official sources in each country. The resulting dataset include 29,901 observations and at least 50 relevant variables.

Disbursement Times

Using the variables obtained from the EDW, we use project disbursements as a measure of execu- tion, since disbursements correspond on an almost one-to-one basis with actual project execution. This is because disbursements are made once there is evidence that the agreed activities are be- ing implemented by the relevant government, and overseen by the IDB's project staff. Important throughout the project's life cycle are both the targets to achieve the contractual milestones and those related to disbursement over time in line with the program. There are three milestones related to the time taken to make the first disbursement: (i) disbursement time from the date of approval; (ii) disbursement time from the date of legal effect; and (iii) disbursement time from the date of total eligibility. In the data, the projects are distributed among five different departments, each covering various sectors. Table 1 shows the distribution of these projects in all sectors on the basis of the current structure, while Tables 2[6] and 3 provide summary statistics on disbursement times from various moments in the project's life cycle. In particular, they show the time between the first disbursement and the dates of approval, legal effect, and eligibility. Since we are interested in describing the shape of the disbursement curve throughout the project's life, Table 3 shows the time between approval, legal effect and eligibility, and the 30 percent, 50 percent, and 80 percent disbursements; the aim is to give an idea of the variations in the data.

The table reveals the increase in the number of projects per year. Starting in 2011 these have stabilized at about 100 per year. The average time between approval and the first disbursement, by contrast, has increased. Before 2005 this period was less than 300 days; since 2005 it has stood at about 420 days, and was 555 days in 2013. This extension seems to be associated with the time between approval and legal effect. These circumstances have become more acute since 2008. Before then, the time between legal effect and eligibility was very similar to that between approval and legal effect. After 2008, the time between approval and legal effect was almost 100 days longer than that between legal effect and eligibility. The time between eligibility and the first disbursement has not changed much since 2008, standing at about 70 days. Table 18 in the Appendix presents these variables segmented by sectors. ENE and WSA (energy and water and sanitation) are the divisions with the longest periods between eligibility and the first disbursement, at more than 100 days; GDI and INT have the best performance, at an average of less than 20 days.

Graphical representations of disbursement curves usually render the trend lines as an "s" shape, which implies a cubic function. This is not the case for all the projects, but the average of averages

6 Table 2 shows only data on loans up to 2013 because those in later years are still in the process of being disbursed

TABLE 1: NUMBER OF OPERATIONS PER DIVISION

Sector	Number
Capital and Financial Markets (CMF)	26
Competitiveness and Innovation (CTI)	20
Education (EDU)	44
Energy (ENE)	37
Fiscal and Municipal Management (FMM)	86
Gender and Diversity (GDI)	4
Housing and Urban Development (HUD)	18
Institutional Capacity of the State (ICS)	82
Integration and Trade (INT)	4
Labor Markets (LMK)	10
Environment, Rural Development and Disaster Risk (RND)	104
Social Protection and Health (SPH)	93
Trade and Investment (TIN/TIU)	12
Transport (TSP)	100
Water and Sanitation (WSA)	70
Total	710

TABLE 2: SUMMARY STATISTICS: TIME ELAPSED BETWEEN MILESTONES

Year	Statistic	Days to First Disbursement			Days Between:	
		From Approval	From Legal Effect	From Legal Effect	Approval - Legal Effect	Legal Effect Eligibility
2000	Average	206.0	120.1	23.9	85.9	96.3
	Std. dev.	106.2	78.4	19.1	73.1	64.9
	Min	43.0	23.0	3.0	14.0	20.0
	Max	347.0	221.0	55.0	227.0	180.0
2001	Average	317.3	155.2	20.0	162.2	135.2
	Std. dev.	121.8	93.3	19.5	86.5	87.5
	Min	53.0	25.0	0.0	3.0	23.0
	Max	620.0	464.0	68.0	376.0	454.0
2002	Average	380.9	213.1	28.4	167.8	184.7
	Std. dev.	175.8	99.7	19.3	129.1	97.1
	Min	50.0	38.0	0.0	1.0	15.0
	Max	918.0	441.0	77.0	544.0	409.0
2003	Average	392.6	241.1	26.6	151.5	214.5
	Std. dev.	169.6	146.9	20.1	113.5	144.1
	Min	96.0	17.0	0.0	0.0	6.0
	Max	852.0	605.0	82.0	572.0	580.0
2004	Average	445.3	259.0	44.5	186.3	214.5
	Std. dev.	225.5	162.6	51.4	161.0	155.0
	Min	127.0	35.0	0.0	6.0	33.0
	Max	1169.0	778.0	184.0	799.0	778.0
2005	Average	435.6	249.6	47.4	186.0	202.2
	Std. dev.	279.9	183.8	71.2	184.8	151.7
	Min	61.0	33.0	0.0	8.0	20.0
	Max	1610.0	869.0	391.0	911.0	797.0
2006	Average	537.6	293.5	64.5	244.0	229.0
	Std. dev.	427.5	231.2	118.1	272.1	182.6
	Min	86.0	24.0	0.0	2.0	16.0
	Max	1913.0	1221.0	660.0	1057.0	918.0
2007	Average	448.5	254.9	71.2	193.6	183.7
	Std. dev.	226.9	157.6	117.7	163.1	104.8
	Min	15.0	1.0	0.0	6.0	0.0
	Max	1189.0	769.0	672.0	846.0	575.0
2008	Average	470.1	257.9	44.9	212.2	213.0
	Std. dev.	301.0	190.0	77.9	214.4	167.2
	Min	19.0	6.0	0.0	7.0	5.0
	Max	1763.0	888.0	405.0	1185.0	806.0
2009	Average	442.6	214.5	48.9	228.1	165.7
	Std. dev.	349.3	180.7	109.3	255.5	132.1
	Min	7.0	6.0	0.0	1.0	1.0
	Max	1709.0	875.0	651.0	1493.0	811.0
2010	Average	479.4	253.1	64.7	226.4	188.4
	Std. dev.	317.9	178.9	114.4	228.7	124.6
	Min	57.0	5.0	0.0	1.0	3.0
	Max	1521.0	1052.0	819.0	1280.0	599.0

2011	Average	420.7	244.3	71.1	176.4	173.1
	Std. dev.	243.4	168.9	113.6	181.8	120.9
	Min	14.0	6.0	0.0	5.0	4.0
	Max	1104.0	853.0	678.0	1028.0	687.0
2012	Average	422.1	237.4	69.3	184.6	168.1
	Std. dev.	293.2	176.4	124.0	223.1	102.0
	Min	6.0	5.0	1.0	1.0	1.0
	Max	2191.0	1086.0	729.0	1752.0	462.0
2013	Average	555.7	275.6	86.5	280.1	189.1
	Std. dev.	425.6	183.0	126.9	363.0	118.6
	Min	28.0	2.0	0.0	2.0	1.0
	Max	2528.0	887.0	706.0	2305.0	636.0

effectively has that shape. Since the nature of the disbursement curve is not linear, we consider that it makes sense to group a project's life cycle into three stages: 1) start-up stage: which refers the period during which 30 percent of the approved amount is disbursed; 2) midlife stage, corresponding to the period during which 50 percent of the approved amount is disbursed; and 3) completion, or the period during which disbursements sum up to almost 100 percent of the approved amount. We choose these values because typically the cubic inflection points occur at the boundaries of these intervals. Most particularly, we are interested in determining if there are different effects in each of these three episodes. It is important to note that during the final stage of execution the curve is quite flat, and therefore we decided to consider a project finalized when its disbursements are equivalent to at least 80 percent of the approved amount. To illustrate what happens in these intervals we refer again to Table 3, which presents the summary statistics by milestone during the three different life stages. Note that it takes a long time to disburse up to 30 percent: almost 600 days from eligibility and up to 1,000 days from approval. The relative time to execute between 30 percent and 50 percent is less than the time between 50 percent and 80 percent. This suggests that most delays occur in the early stage of loans, that the process moves relatively quickly during the midlife stage, and that once more there is a slowdown during the final stages of the projects.

TABLE 3: TIME TO FIRST DISBURSEMENT

Statistic	Days since			No. projects
	Approval	Legal effect	Eligibility	
	To 30% disbursed			
Average	1015.4	807.5	605.2	-
Sum	-	-	-	936.0
Std. dev.	520.9	469.4	442.7	-
Min	7.0	2.0	0.0	-
Max	3877.0	3234.0	2880.0	-
	To 50% disbursed			
Average	1179.8	977.1	776.0	-
Sum	-	-	-	962.0
Std. dev.	602.2	558.3	532.3	-
Min	7.0	2.0	0.0	-
Max	4131.0	3477.0	3170.0	-
	To 80% disbursed			
Average	1372.1	1173.0	974.7	-
Sum	-	-	-	979.0
Std. dev.	698.6	665.7	644.2	-
Min	6.0	2.0	0.0	-
Max	4131.0	3977.0	3817.0	-

4

Macroeconomic Variables and Public Management Indicators

Part of the purpose of this study is to ascertain the relative importance of factors that are specific to the country conditions. Drawing on the pertinent literature, we use a set of macroeconomic variables that represent the country's fiscal stability: fiscal balance and public debt, both as a percentage of GDP. As a proxy of the financial-monetary environment, we use annual inflation and the risk premium on the debt (in basis points), the latter which is measured by JP Morgan's Emerging Market Bond Index (EMBI) when available, or is otherwise the difference between US Treasury Bonds and the equivalent in the country of interest. GDP growth (annual variation) and the local currency's exchange rate with the US dollar are used as proxies of the macroeconomic environment. These variables are obtained from the World Bank and the IMF websites to ensure consistency.

Since investment cycles can be affected by occurrences other than macro-fiscal events, we include political and weather-related variables. In particular, we include a dichotomous variable of natural disasters (equivalent to 1 if there was such a disaster in the period), a dichotomous variable of elections (equivalent to 1 if there were presidential or congressional elections in the period), a dichotomous variable if the congress approves multilateral lending, and the percentage of ruling- party seats in the legislature in each year. These series were constructed using data available in the websites of the legislatures in each country. Interestingly, on average, the government usually holds less than 50 percent of the legislative seats, a circumstance that will be important for the statistical analysis. Table 19 in the Appendix shows the main statistics on these and the macro-fiscal variables.

In line with the literature on public management capacities in their many dimensions, this study uses indices of government effectiveness in public management—specifically, the MfDR Index and its subindices.[7] The MfDR assesses (from 0 to 5, where 5 is the best) five pillars of the cycle of public policy management that are deemed important for the implementation of management for development results: a) results-oriented planning; b) results-based budgeting; c) public financial management; d) program and project management; and e) monitoring and evaluation. We only have values for two years of this index, 2007 and 2013, and thus we have interpolated and extrapolated for the remaining years. The indicators are closely interlinked: note, for example, the similarity between the mean and the standard deviation. The main statistics on these variables are presented in Table 20 in the Appendix.

7 Database of MfDR Indicators, available at: https://publications.iadb.org/handle/11319/7456.

Project Life Cycle Variables

Having addressed the variables that measure the economic environment and country capacities, we include those that are specific to the execution process itself. For internal purposes of the IDB, projects' life cycles are divided into four stages: i) programming; ii) preparation and design; iii) conditions for the first disbursement; and iv) the stages after the first disbursement. The programming exercises and decisions between the IDB and the borrowing countries are annual, as is evident from the yearly allocation of resources to finance the operational program in each country. If the allocations are not approved in that year they cannot be used and are lost. This implies that the behavior of disbursements is not necessarily represented by these four stages. For example, the annual allocation of budgets carries incentives for the countries to maximize the use of the annual allocation and for the Bank's teams to secure project approval in that year. Another possible effect is that a project is paused when no budget is allocated because of some shift in priorities or an unexpected austerity measure. Electoral cycles and changes in administrations also trigger decisions that could affect execution. This balance of incentives could contrast with the evidence of success.

Before the project is approved, the preparation stage unfolds within the IDB. In this stage a document is prepared that specifies amounts, timeframes, the type of investment instrument, the risks of the operation, the components to be implemented, and other matters. Given that what happens in this period can affect not only approval but also achievement of the ensuing milestones, this is a crucial phase. Apart from the Bank's internal procedures to ensure approval, before the first disbursement there are pre-investment activities in the preparation and design phase. For the purposes of this document, the pre-investment activities include feasibility studies, design, environ- mental impact assessment, architectural work, preparation of tenders and evaluation of bids.8 With this in mind it was possible to extract information from a review, prepared by the IDB's Country Offices, of all the projects approved between 2000 and 2013. With this set of 1,090 investment projects we were able to identify a subset of 710 projects that were completed in the same period, and that served to make the estimates presented in this study. This sample, however, includes a substantial number of projects for which data was not available or that were of poor quality. As for the variables related to the set of actions undertaken in the stages before the first disbursement (our preparation variables), we have a dichotomous variable that is equal to 1 if the final designs for the project's planned infrastructure works were ready before approval, and 0 otherwise. The same to extract and use the cost of the personnel assigned to the project during the preparation stage.

During preparation, all projects are classified as A, B, or C according to their risk of environmental and social impacts during execution. The classifications seek to provide the project team with information that helps define mitigation measures, so that the investment's appraisal in present value (including its private, public, social, and environmental returns) is positive. Nonetheless, compliance with the IDB's environmental and social safeguards involves additional actions that can affect regular execution times. An analysis of a subset of 528 projects completed between 2000 and 2013, with data on the environmental and social classification, indicate that A and B projects have an execution period of 6.2 years on average, while C projects take 6.1 years. Depending on the financial instrument, multiphase programs (PFM) classified as A have an average execution period of 9.1 years and global multi works programs (GOM) with an A classification take seven years, with four- and three-year extensions, respectively. The pattern is also observed in the B projects, with average execution times of 6.9 years for PFMs and 6.4 years for GOMs.

As for the execution-related variables (post-eligibility), it was possible to collect information on the characteristics of implementation schemes. Among a subset of 688 projects approved and completed between 2000 and 2013, and for which information on implementation schemes was available, 71 percent had "traditional" schemes and the rest had "non-traditional" schemes. For traditional schemes, the executing unit (EOE) arrangement has the shortest average execution time, at five years between 2000–2006 and four years between 2007–2013. For non-traditional schemes, the partial trust (FP) has the shortest average life, at 5.3 years between 2000–2006 and four years between 2007–2013. Notice that the countries' legal frameworks can impose constraints that limit the use of alternative schemes, though the latter can create efficiencies and positive incentives for execution. In this respect, the available information does not allow for a detailed examination; it is only possible to distinguish between traditional and non-traditional schemes, and an additional subcategory.

With this set of variables we propose a methodological framework to characterize the links between different times in a project's life cycle. The next section presents the functional forms and the results of the analysis.

5

8 As long as these activities are not financed with technical cooperation funds.

4. Empirical Strategy and Estimates

Figure 1 presents the full panel, showing the time that the different projects take to be completed. If the different projects were plotted, we would see that the percentage disbursed increases over time, usually following a cubic path. Nonetheless, for the project efficiency metrics we prefer to use the execution time, simply because we find its interpretation more intuitive. Hence we are interested in determining which factors significantly explain the time taken for the disbursement of a project. To this end we distinguish between those factors that associated with country conditions and those that are specific to project management. The general form that we seek to estimate corresponds to:

$$T_{ij} = \delta t + \lambda s + X'\beta + G'\gamma + e_{ij}, \qquad (1)$$

where δt represents the fixed effects or time control, λs represents the effects related to the sectoral orientation of the investment project, X is the matrix of macroeconomic controls and exogenous factors, G is the matrix of national-level project-management factors, and e_{ij} is the error series. The current section therefore describes how we best estimate this relationship. In order to achieve this, we first explain some considerations related to the preparation and execution processes, as well as to the data, and then we present the relevant estimates.

After a project has been approved, or has reached eligibility, the first disbursement is pro- grammed. The total number of disbursements responds to the particular needs of each project. The subsequent disbursements are not defined contractually, nor are the total and individual amounts. On the contrary, these are determined in line with the progress made on the project. It might be the case, for example, that a project to provide a rural school with equipment and material requires a small amount for the initial disbursement. Subsequently, the ensuing disbursements would be of similar amounts since expenditures on computer equipment or desks would not be high. A loan for a highway construction, in contrast, is likely to be associated with fewer but bigger disbursements. In other words, the project type is important in determining the number of disbursements, and thus there could be some correlation with the time between partial disbursements but also with the time taken to complete the project. The number of disbursements could also be determined by the previously disbursed amounts. As an example, consider that if the first disbursement is relatively small, but the second is very big, it is likely that the number of subsequent disbursements would decline.

Proper controls for this relationship would require a set of variables that are not necessarily in the database. In particular, the current database does not allow us to distinguish between, for example, a project to build a school equipped with computers and another one to construct an office building equipped with computers for an energy company. In other words, the ideal scenario would be to have a classification that reflects the specific circumstances of each project. We attempt to cover this absence using two controls. The first is a variable that indicates the sectoral division to which each project belongs. The assumption is that projects might differ between divisions, but there might be many similarities between projects in the same division. The second control consists of a variable that classifies the projects according to the number of disbursements. This serves our purposes because there is a reasonably high correlation between this classification and the type of investment, and at the same time we do not suspect that there is much contemporaneous correlation with the errors.9

Another group of elements to be considered relates to variance between the different levels of aggregation. For example, there is variance at the project level, among the projects in a particular country, and among projects in other countries. This can result in autocorrelation among these levels.

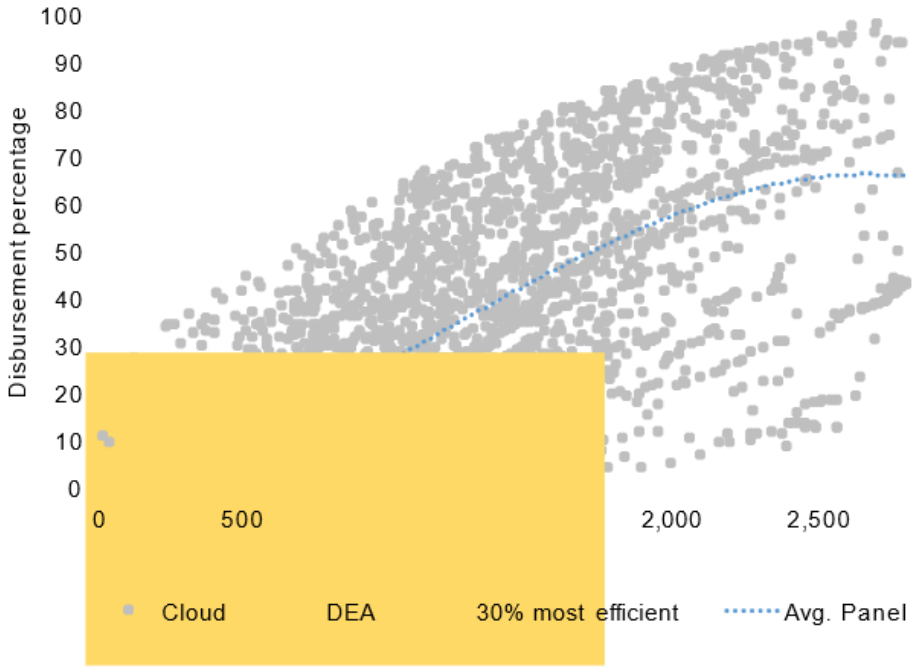
We suspect that the correlation of errors among countries is weak. Hence, the reasons for approving and executing a project in one country do not have to be correlated with what happens in another country. The only relation between them could arise from economic integration, such that a macroeconomic incident in[6] one country could affect borrowing decisions in another. By contrast, the differences between countries must have an impact within the projects in each country. To mitigate this, controls have to be introduced to replicate country-level fixed effects or to control for macro-fiscal factors that somehow internalize these phenomena.

There might be no correlation between projects in a country. Within the country, two projects originating in the same sectoral division could

9 Since the amount disbursed in t˜1 is related to the number of future disbursements t, t + 1, ...T , the balance to be disbursed can also be considered a control variable.

reflect co-dependency or complementarity. Nonethe- less, the dichotomous sector variables act as controls for this kind of correlation. Finally, the possible autocorrelation between stages within a particular project is important as long as its origin involves some of the variables that we are currently considering as controls. We do not suspect, however, that there is any omission that could cause a significant bias. However, to obviate this possible autocorrelation, we will undertake the estimates in stages, where every stage will have a single observation per project. As mentioned before, the disbursement stages that we will use for our analysis are the following: start-up, midlife, and completion. With this in mind, this summarized version of the panel is the final dataset used for the estimates. Next, we proceeded to establish a formal definition of the life cycle stages: The "start-up" stage is understood as the time a project takes to execute an amount close to the first third of the disbursement distribution; "midlife" is the time a project takes to execute close to the second third of the distribution; and the "completion" stage refers to the execution of 80 percent or more.

FIGURE 1: PROJECT PANEL 2000-2013.



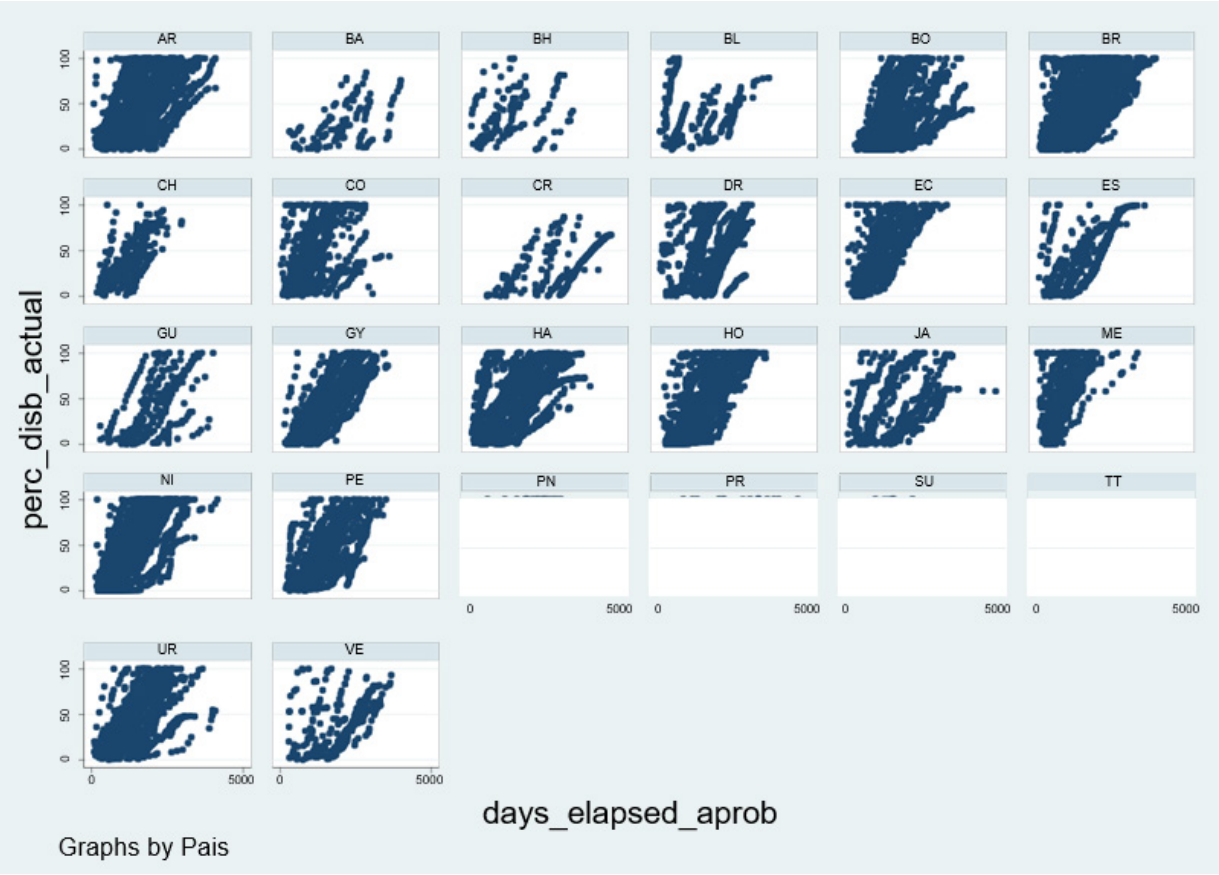
Although Figure 2 seems to suggest that there is a non-trivial variation among countries, a key characteristic of IDB projects is that there is also variation in the execution of projects in a single country. In other words, while there are clear differences between countries, as Figure 2 shows, there is also a wide variation within countries, with successful and unsuccessful projects coexisting in the same country. One way of directly documenting this within-country variation is to consider a regression with country dummies. The R – squared of that regression corresponds to the part of the variation in the results of the project in a given year that can be explained by differences in the average among countries. Specifically, for each year between 2000 and 2013, the R2 ranges between 0.5 and 0.75. This confirms our suspicion of the shared importance of country factors and project factors.

We begin the analysis with an effort to identify the country-specific and political-economic characteristics that could affect disbursement times. This macro-level characterization offers a view of how the economic environment, political cycles, and institutional capacities affect the countries. In a second stage, based on the previous results, we seek to go further into the level of project characteristics. Specifically, the issues explored can be grouped into two main questions: How much of the time required to make a project's disbursements is attributable to conditions external to the IDB (country conditions), and how much is associated with internal conditions (IDB processes and capacities)? Which of these capacities or characteristics significantly influence good execution?

The independent variables are listed as follows: GDP growth, inflation, country risk, fiscal deficit as a percentage of GDP, political variables (elections, distribution of ruling-party seats in legislatures); country-specific factors, such as institutional capacity; the sector, whose

characteristics could hinder or hasten implementation (as in the case of building infrastructure, for example); and project-specific factors such as resources expended on preparation and the form of project management. Since the distinction between each start-up milestone (approval, legal effect, and total eligibility) depends to a large extent on a country's administrative procedures, we model the effect of each country's legal factors as if the project required legislative ratification and since the approval milestone.

FIGURE 2: PROJECT PANEL BY COUNTRY 2000-2013



Based on the descriptive findings taken from the database, we perform an incremental estimate with a set of "macro" and "micro" controls:

$$Tij = \delta t + \lambda s + X\,X\beta + GX\gamma + M\,X\pi + eij\,, \qquad (2)$$

where δt represents the fixed time effects, λs groups the dichotomous variables of IDB sectors, X is the matrix of macroeconomic controls and exogenous factors, G represents the management capacity controls, M represents the project-level controls, and eij is the error series. We extract the country-level fixed effects because we have a complete set of variables that in theory hold much of the country-level information. The panel includes a fixed effect related to temporality.

"Macro" Factors and Management Capacities

The results of these estimates are presented in Table 4. High GDP growth is significantly related to longer execution times. A possible explanation for this could be that countries experiencing a good economic performance might find it easy to mobilize funds from other sources, or might need less financing. In other words, the sign could be indicating that, once we control for institutional capacity variables, IDB financing is secondary in countries that are experiencing high growth.

The fiscal dimension shows that the bigger the deficit, the longer the disbursement time (the deficit data have a negative sign), suggesting less space to complement an investment program or to pay current liabilities. As an alternative to using the deficit to measure the fiscal position, we used the variable of public debt as a percentage of GDP, with the same result—higher debt levels are related to longer disbursement times, suggesting less appetite to take on more liabilities. Since these variables are usually related, we present only those in which the deficit is used.

TABLE 4: COMPLETE LIFE CYCLE ESTIMATE

	Base	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP growth	22.99**	25.68**	27.80**	20.81**	14.39*	29.55**	23.58**	12.81+	24.42**
	(3.29)	(3.11)	(3.30)	(2.62)	(1.71)	(3.87)	(2.92)	(1.57)	(2.91)
Country risk	0.179**	0.0915	0.108+	0.0897	0.0843	0.0400	0.115+	0.0989+	0.107+
	(2.90)	(1.35)	(1.58)	(1.32)	(1.24)	(0.60)	(1.58)	(1.47)	(1.54)
Fiscal def. % GDP	-3.599	-19.62+	-21.46+	-12.63	-4.269	-30.77**	-12.22	0.582	-16.96
	(-0.34)	(-1.45)	(-1.59)	(-0.92)	(-0.32)	(-2.35)	(-0.98)	(0.04)	(-1.26)
Inflation	8.710**	30.46**	30.02**	28.01**	23.44**	31.33**	27.58**	21.32**	28.90**
	(3.12)	(5.20)	(5.27)	(4.59)	(3.89)	(5.45)	(4.88)	(3.56)	(5.03)
Weather event	3.668	-56.75	-58.66	-60.71	-68.24+	-64.32+	-43.63	-84.65*	-55.63
	(0.09)	(-1.29)	(-1.34)	(-1.38)	(-1.52)	(-1.50)	(-0.90)	(-1.85)	(-1.24)
Elections	-30.34	-55.56	-57.61	-55.54	-56.87	-58.68	-53.46	-56.37	-55.65
	(-0.61)	(-1.04)	(-1.08)	(-1.04)	(-1.07)	(-1.11)	(-1.01)	(-1.07)	(-1.05)
Legis. approval	263.1**	276.4**	288.2**	251.1**	232.3**	339.0**	256.6**	244.3**	266.8**
	(6.34)	(5.70)	(5.79)	(5.39)	(4.83)	(7.03)	(5.51)	(5.22)	(5.53)
Legis. majority	3.607	40.26	41.24	54.23	75.45	22.66	41.92	97.25+	50.54
	(0.07)	(0.70)	(0.72)	(0.95)	(1.31)	(0.40)	(0.73)	(1.65)	(0.89)
Management capacities									
MfDR Index		-39.55*							
		(-1.69)							
Planning			-44.95**						
			(-2.07)						
Budgeting by results				-4.903					
				(-0.23)					
Financial management					35.18+				
					(1.63)				
Monitoring						-81.28**			
						(-4.60)			
Ex ante eval.B33							-19.51		
							(-1.06)		
Procurement system								51.42**	
								(2.56)	
Mid-term vision									-24.61
									(-1.16)
Observations	1178	1030	1030	1030	1030	1030	1030	1030	1030
Time control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.851	0.852	0.853	0.852	0.852	0.855	0.852	0.853	0.852

t statistics in parentheses

+ p<0.15, * p<0.10, ** p<0.05

The risk premium also has a positive sign, albeit of modest significance. In that regard, note that the risk premia reflect the country's expected intertemporal behavior in various dimensions. It is difficult to determine the extent to which this indicator in itself contains fiscal and macroeconomic information. Nonetheless, given that the statistical significance was lost by including this variable along with others, we assume that it holds little explanatory information. In contrast, inflation has a positive and highly significant sign. Inflation reduces the current value of a loan, requiring additional efforts to make up the shortfalls, which could be reflected in this coefficient. The need for legislative ratification negatively affects disbursement times. Finally, a weather event demands resources for rebuilding in a relatively short period, which reduces disbursement times. The estimates, however, indicate only weak significance.

Inclusion of the institutional capacity variables reduces disbursement times. Results-based plan- ning gives coherence to the public administration's strategies, leading to budgets that are consistent with the project's cycle. The management of programs and projects assumes good sectoral plan- ning, perhaps with multiannual targets for the provision of goods and services. Another component, ex-ante evaluation, involve greater project preparation: identification, profile, prefeasibility, and fea- sibility. Finally, a procurement system with high regulatory and institutional standards is crucial for the projects' financial management (transparency, procurement efficiency, tendering, and com- petition).

The results for the public management variables show that the various indices and subindices referring to public management are significant, and have the expected sign: an improvement in these indicators is correlated with shorter disbursement times during the life of the investments.

Project Factors Are Also Important

To recap, once the Bank has approved the projects and before they can begin to be implemented, certain legal requirements and procedures have to be complied with in the countries so that the loan contract with the IDB can take legal effect (entry into force). Prominent among the foregoing estimates is the consistent role of the public management indicator in the different specifications.

The strength of project management capacities before execution should be important in the initial stages. But what makes this episode different? The critical route between entry into force and eligibility is the following: once the loan contract has legal effect, the work of the project teams of the countries and the IDB focuses on meeting the eligibility conditions so that the project can begin execution with the first disbursement. For example, at this stage there is not always a local executing counterpart in place that would allow progress in meeting the preconditions for disbursement. From the moment of eligibility, in theory, the first disbursement can be made. The issue is the extent to which the IDB and country teams (especially the executing unit) are prepared to bring about this first disbursement. Here, several matters come into play. These are related to the actions taken when the project was prepared and planned, but also to the capacities of the beneficiary country's institutions.

As a first approximation to preparation and planning, we look at the effort to comply with the investment project's milestones. The human capital devoted to preparation, assuming a one-to-one ratio between cost and effort, should have a negative correlation with disbursement times. At the same time it is necessary to include a control that takes into account the size of the loan. This seeks to capture the correlation between the loan amount and the effort needed to complete the operation. In broad terms, the effort centers on creating the proper conditions that allow execution to occur naturally. Nonetheless, if this effort is not made early enough before the date of legal effect/ eligibility, there is a risk that the counterpart will have insufficient capacity to carry out the work in a timely manner. These types of activities include the design of building works, tender documents, and even prior actions such as ensuring land ownership or other purchases.

The success of execution can also be influenced by executing agency-related factors. For instance, when a project is implemented through an executing agency, it is not always the case that the staff who will work on the project have been assigned, or the team might be incomplete. In the case of an executing unit, sometimes the latter has not yet been established because the project resources are needed to hire personnel. It is possible that if the resources are unavailable, the establishment and shaping of the project's executing unit could be delayed. This results in a vicious circle because if key personnel are not available (i.e.: coordinator, financial management, and procurement specialists), progress cannot be made on procurement planning, nor on activities whose resolution was left to the execution phase (pre-investment, land acquisition, environmental matters, consultations with affected populations, and so on). In such circumstances the quality and experience of human resources in the executing agencies can be important for the speed of project execution.

With this in mind, equation (2) is estimated using the variables that represent characteristics inherent to the projects and related to their life

cycle. The results of these estimates are presented in Table 5.

The "macro" results obtained earlier hold in most cases. The estimate under the "Baseline" column is the simplest, since it includes only the "macro" variables. Just like in Table 4, the time control is included in an effort to capture the trend patterns stemming from the reduction in the balance to be disbursed, as well as other temporal effects. The results in the second column are also identical to those in Table 4. Estimate (1) corresponds to inclusion of the dichotomous variables for each IDB sector (not featured). This is important, as mentioned earlier, because of the similarities between the execution characteristics of projects in a given division. The dummies are codified in relation to WSA, the water and sanitation sector. In the panel, WSA has an average disbursement time of 1,737 days. The sectors of Capital and Financial Markets (CMF) and Social Protection and Health (SPH) stand out for having projects that on average are at least 290 days faster than those of WSA. Energy (ENE) and Housing and Urban Development (HUD) also have consistently shorter times than WSA, although the magnitude varies depending on the specification.

These outputs, though they seek to control for some of the similarities between projects in each

TABLE 5: ESTIMATES WITH "MICRO" CONTROLS

Time to Disburse Entire Life Cycle								
	Base	Gestion	(1)	(2)	(3)	(4)	(5)	(6)
GDP growth	22.99**	25.68**	23.64**	25.36**	15.59	13.45	2.328	18.00**
	(3.29)	(3.11)	(2.78)	(2.93)	(0.75)	(0.66)	(0.10)	(2.11)
Country risk	0.179**	0.0915	0.0660	0.0757	-0.0406	-0.0449	0.0307	0.0132
	(2.90)	(1.35)	(0.98)	(1.05)	(-0.21)	(-0.23)	(0.14)	(0.19)
Fiscal def. % GDP	-3.599	-19.62+	-17.46	-31.90**	-47.97	-53.17+	-40.11	-25.95*
	(-0.34)	(-1.45)	(-1.30)	(-2.24)	(-1.41)	(-1.52)	(-1.05)	(-1.74)
Inflation	8.710**	30.46**	29.03**	24.25**	23.07**	18.66*	14.71	16.83**
	(3.12)	(5.20)	(5.03)	(4.17)	(2.33)	(1.82)	(1.21)	(2.73)
Weather event	3.668	-56.75	-35.71	-11.31	61.78	91.72	94.04	2.245
	(0.09)	(-1.29)	(-0.82)	(-0.26)	(0.68)	(0.97)	(0.98)	(0.05)
Elections	-30.34	-55.56	-61.75	-103.7**	-206.4+	-208.7+	-193.6+	-108.8**
	(-0.61)	(-1.04)	(-1.18)	(-2.01)	(-1.54)	(-1.63)	(-1.47)	(-2.22)
Legis. approval	263.1**	276.4**	270.5**	174.6**	266.3*	273.0**	245.0*	174.2**
	(6.34)	(5.70)	(5.51)	(3.34)	(1.89)	(2.02)	(1.73)	(3.06)
Legis. majority	3.607	40.26	57.87	-70.13	-152.6	-192.2+	-266.9*	-108.8**
	(0.07)	(0.70)	(1.02)	(-1.36)	(-1.43)	(-1.61)	(-1.94)	(-2.14)
MfDR Index		-39.55*	-34.64	20.10	-121.1*	-154.6**	-181.3**	-35.58
		(-1.69)	(-1.40)	(0.79)	(-1.88)	(-2.17)	(-2.13)	(-1.15)
Life cycle-related variables								
Approved amount				-0.640**	-1.533**	-1.605**	-1.623**	-0.487**
				(-5.51)	(-5.31)	(-5.14)	(-4.01)	(-3.67)
Prep. cost % balance				-0.0708**	226.7	326.3	527.8	-0.0769**
				(-7.37)	(0.62)	(0.81)	(1.20)	(-7.47)
Designs				-84.73+	-259.6**	-249.7**	-267.4**	-141.4**
				(-1.47)	(-2.15)	(-2.06)	(-2.00)	(-2.31)
Land				49.59	271.2+	235.9	213.9	24.21
				(0.61)	(1.49)	(1.23)	(1.09)	(0.30)
TC % disbursements					-2.751**	-2.508**	-2.514**	
					(-5.10)	(-4.81)	(-4.32)	
Type of instrument								
GCR						0	0	-52.71

						(.)	(.)	(-0.42)
GOM						-196.5	-185.8	-91.00
						(-1.16)	(-0.81)	(-1.02)
GPR						0	0	0
						(.)	(.)	(.)
INo						0	0	270.8
						(.)	(.)	(1.40)
IRF						0	0	-877.0**
						(.)	(.)	(-5.31)
PDL						845.4**	683.6*	-283.7*
						(2.46)	(1.81)	(-1.94)
PFM						-152.1	-214.1	73.08
						(-1.11)	(-1.36)	(1.02)
SEF						730.8**	676.2**	213.0**
						(3.27)	(2.41)	(2.93)
TCR						-455.5*	-493.3*	118.1
						(-1.78)	(-1.71)	(0.68)
Executing unit								
AECG							62.57	46.04
							(0.31)	(0.58)
EOE							251.3*	-114.7*
							(1.77)	(-1.66)
FF							0	276.2
							(.)	(1.34)
FP							-10.98	-159.6+
							(-0.06)	(-1.59)
GCIA							204.0	115.2
							(0.75)	(1.07)
NGO							-131.8	88.02
							(-0.56)	(0.40)
UEA							-126.5	-37.79
							(-0.52)	(-0.39)
UEB							48.93	-60.17
							(0.35)	(-0.94)
AE							291.6	221.2+
							(1.39)	(1.51)
Risk classification								
Environmental A								429.2**
								(6.12)
Observations	1178	1030	1030	822	186	186	186	822
Time control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sectoral Division Dummies	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.851	0.852	0.860	0.866	0.873	0.88	0.879	0.876
t statistics in parentheses								
+ p<0.10, * p<0.08, ** p<0.05								

division, do not allow us to infer what lies behind the values. Hence the estimates are complemented with other project characteristics. We add variables related to the effort made before execution, finding that various pre-disbursement actions (our preparation and pre-investment variables) reduce the time. For example, having the final designs of building works has favorable effects on disburse- ment times, while having the necessary land seems to have counterintuitive effects, although in no case are these statistically significant. In estimate (2) of Table 5, inclusion of this first set of project variables does not seem to affect the previous results in the "macro" variables (except for the fiscal deficit), though it does affect the significance of the MfDR index.

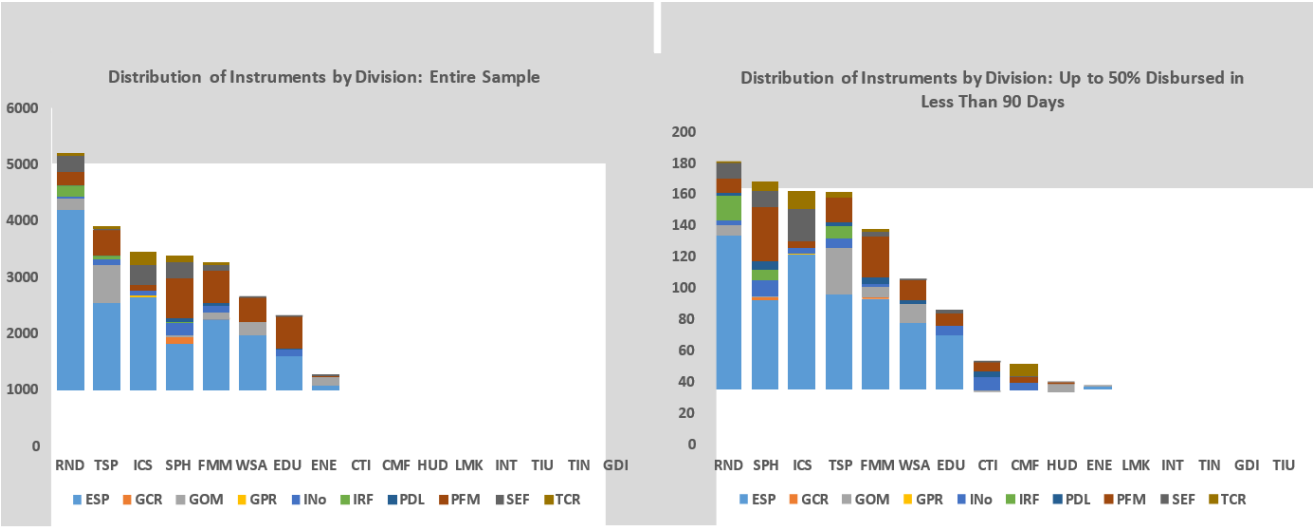
The effort expended on project preparation, measured as personnel and administrative costs, helps reduce the disbursement time, although when these are included along with the technical cooperation variable (column 3), these lose significance. The inclusion of the cost of technical cooperation for support purposes makes the preparation cost coefficient non-significant. It is likely, however, that this simply reflects a redundancy, since technical cooperation projects normally are prepared and monitored by the personnel conducting the investment project. As column (3) shows, technical cooperation initiatives as a percentage of disbursements are associated with a reduction in project execution times. However, the number of operations that include technical cooperation is limited and thus reduces substantially the sample to be estimated, a circumstance that has to be kept in mind when considering the validity of this result.

In an effort to further explore the evidence on pre-investment, we looked at the differences between the IDB's financial instruments for investment. As a subsequent exercise to address this matter, we used a dummy variable by loan type and a measure to classify them in terms of efficient start-up. The underlying idea is that only those that have made pre-investment progress could carry out significant disbursements in the start-up phase, ceteris paribus. Figures 3 (a) and (b) show the distribution by instrument in the sample and in those that attained up to 50 percent disbursement in less than 90 days. This shows that the efficiency of the start-up phase is not confined to any one instrument in particular; even in specific investment loans (ESP) there are some with efficient start-ups. Table 6 shows the essential statistics of the sample in the first 90 days by type of instrument. The five most commonly used instruments (by amount and number) are: specific, global credit (GCR), global multi-works (GOM), PDL, and multiphase program (MFP). Relative to the instrument most often used in the Bank (ESP), on average they all have swifter disbursements. Nonetheless, there is little evidence of significant differences with GCR, GOM, PFM and TCR. In contrast, loans with significant differences of less than 10 percent include those for innovation (INO) IRF, PDL and sectoral facilities (SEF).

TABLE 6: SUMMARY STATISTICS: PERCENTAGE DISBURSED

Percentages Disbursed up to 90 Days since Eligibility								
Instrument	Mean	Median	Std. dev.	Min	Max	Hypothesis	t-stat	p-val
ESP	10.0	5.0	16.3	0.0	100.0			
GCR	12.9	10.0	16.5	0.0	91.4	ESP=GCR	-0.723	0.470
GOM	10.5	5.2	16.2	0.0	94.9	ESP=GOM	-0.137	0.891
GPR	5.2	5.2	-	5.2	5.2	ESP=GPR	-	-
INo	5.3	5.2	4.3	0.0	17.6	ESP=INo	3.586	0.000
IRF	24.6	20.5	21.0	0.0	98.3	ESP=IRF	-2.835	0.005
PDL	23.3	20.0	19.7	0.1	100.0	ESP=PDL	-2.749	0.006
PFM	12.4	5.1	17.8	0.0	79.9	ESP=PFM	-0.549	0.583
SEF	5.3	5.0	4.3	0.0	25.7	ESP=SEF	3.595	0.000
TCR	8.5	5.1	14.6	0.1	64.1	ESP=TCR	0.416	0.678

FIGURE 3: COMPOSITION OF INSTRUMENTS USED BY SECTORS: ENTIRE SAMPLE (LEFT) AND COMPOSITION OF INSTRUMENTS USED BY SECTORS: "QUICK START-UP" PROJECTS. NOTE: QUICK START-UP DEFINED AS THOSE PROJECTS FOR WHICH UP TO 50% OF THE APPROVED AMOUNT WAS DISBURSED IN THE FIRST 90 DAYS OF ELIGIBILITY.



(a) Entire sample (b) Quick start-up

Estimate (4) in Table 5, as well as including the customary macro, public management, and project-related variables, includes the investment instrument. According to the estimates, instru- ments like PDL or SEF increase times relative to the IDB's most-used instrument (ESP). There is little evidence that the instruments reduce disbursement times relative to ESP. SEF is an inter- esting case, since these projects usually have a swift start-up but on average take longer. Other instruments such as TCR, by contrast, have a rapid start-up and also take less time. This variance might be explained by the characteristics of each project during the pre-investment stage. Current information is helpful in exploring this point, but is insufficient to reach any specific conclusion about which particular element determines these differences. Moreover, as Figure 3 (b) shows, the projects with rapid start-up include a high percentage of ESP initiatives. While the direction and magnitude of these estimates is within the logic of pre-investment progress as a precursor to good execution, certain details should be kept in mind. Some ESPs could be masking fast-disbursing projects. For example, 11 percent of ESPs are SPH initiatives that sometimes included components of transfer-type disbursements.

The estimates in Table 5 also include a variable on the project's executing agency in column (5). With respect to the presence or absence of an executing agency with the capacity to manage the project efficiently, we use the MfDR index as a proxy. Once again, a higher MfDR index is associated with a reduction in the projects' lives. As for the variables on the type of executing agency (traditional or non-traditional), we found no significant differences between them. In addition, non- wage costs in the project preparation stage did not prove to be significant, nor did labor and non-labor costs during the execution stage. The variables on fiduciary risk were not significant either, and thus were not included in the table.

Finally, to complement the discussion on tendering processes, we matched the procurement database provided by FMP with the rest of the variables. This reduces the numbers of observations substantially: the sample contains 1,466 processes of national public bidding (NPB) and interna- tional public bidding (IPB) for construction works, goods and services above US$200,000 in Bank projects with ex-ante review (297 projects) in the period 2000–2013. Thus 1,178 observations are reduced to about 800. The procurement variables measure the time taken to complete the different stages involved in the bidding process. The dataset also includes the classification of the executing agency participating in the project. With this variable we wanted to determine whether the exe- cuting agencies had some particular correlation with disbursement times in the project's life cycle. The estimates only yield, with significance, EOEs as time-increasing and, with less significance, the international-agency mechanism seems to be correlated with delays in the projects' life cycle.

For information purposes, we used the FMP variables to identify correlations during the tender- ing process. We created a variable of time elapsed between publication of the tender and signing of the contract. The objective was to identify the factors that are significantly correlated with the time taken to complete the tendering process. The results are presented in Table 7. Confirming intuition, the sample reveals a positive correlation between the contract amount of the bid or num- ber of bidders with the time frame of the tendering process. For their part, the negative effects on tendering times for construction work, provision of a good, or consultancy services were of little or no significance. In contrast and unambiguously, IPB took about 30 days more than NPB. The controls describing characteristics of the execution schemes have the expected signs, but with mixed results regarding their statistical significance. For example, the Financial Trust and the Partial Trust are only 15 and 36 days slower than Specialized International Agencies (SPAs). The other mechanisms, in contrast, exceed SPAs by more than 50 days. Further, although the sample and variables used in the estimates yielded few significant correlations in the area of procurement, we found that (i) the time taken by the executing agencies to assess offers (the time between receipt and the adjudication report) seems to have increased by up to eight weeks; this might be because of the growing complexity of the building works and goods acquired by the projects; and (ii) the time between the IDB's issuing of a no objection and the adjudication and signing of the contract is excessive (nine weeks on average), which could reflect the system for reviewing and authorizing within the executing agencies.

Finally, returning to table 5, we included a variable on the classification of environmental risk. This ranking is independent, and the more restrictions involved (i.e.: the "A" classification), the more actions have to be taken by the executing agency. The variable used is a dummy that indicates whether the project has been assigned an "A" risk or another (B or C, which have less risk latency). The regression in column (6) show that a risk classification of A delays disbursements, as one might expect.

The regression in column (6) is our preferred estimate. This estimate by representing the pre- ferred set of variables, yields an indicator of the inflation of variances in the acceptable parameters, signaling the absence of multicollinearity problems. Thus, we regard this as our baseline for what follows in this document.

Stage-Distinct Effects: Start-Up, Midlife, and Completion

It is interesting to check whether, throughout the projects' lives, there are factors that affect dis- bursements in distinct ways. We therefore proceed to verify whether the previous results are consis- tent throughout the project's disbursement process. First, as Table 3 shows, it takes more time to reach 30 percent disbursement than to advance between 30 percent and 50 percent; and this latter period is longer than the time to reach 80 percent. Given this apparent non-linearity, one could expect that the factors have different behaviors throughout the different disbursement stages. To this end we undertook estimates by percentiles. The choice is certainly arbitrary but, as discussed above, for the purposes of this research three stages are of interest: start-up, midlife, and comple- tion. To create this grouping we chose to divide the disbursement distribution in three groups and use these "thresholds" to select the point on each project's disbursement curve that is closest to the resulting percentile. As mentioned before, given that each project has only one observation per disbursement stage, we eliminated the possible presence of temporal autocorrelation. Considering the possibility of heteroskedasticity because of the differences among projects, we estimated an OLS that adjusts standard errors in a robust manner and therefore yields consistent estimators. With this in mind, we estimated the following equation:

TABLE 7: TIME FACTORS REQUIRED TO CONCLUDE A TENDER, FIXED EFFECTS

Estimates of Time to Complete a Tendering Process						
	(1)	(2)	(3)	(4)	(5)	(6)
Contract size	0.190**	0.190**	0.183**	0.239+	0.183**	0.178**
	(6.67)	(6.63)	(5.29)	(1.71)	(5.30)	(5.11)
No. participants	2.797**	2.724**	1.899+	3.231**	1.917+	1.954+
	(2.78)	(2.69)	(1.93)	(3.02)	(1.94)	(1.94)
Tender type						
Consulting firms		15.32	1.715	-28.50	2.662	0.666
		(0.18)	(0.05)	(-0.93)	(0.08)	(0.02)
Building works		6.413	16.58+	0.434	16.83+	15.30
		(0.61)	(1.67)	(0.04)	(1.69)	(1.55)
International or national						
IPT			38.93**	24.11+	38.91**	34.88**
			(3.65)	(1.68)	(3.63)	(3.26)
Executor						
Non-traditional					-8.347	
					(-0.39)	
Traditional					4.857	
					(0.42)	
Executor type						
AECG						62.93**
						(2.97)
EOE						82.60**
						(4.22)
FF						15.56
						(0.24)
FP						36.46
						(1.05)
GCIA						84.68**
						(3.36)
NGO						49.80+
						(1.74)
UCP						67.92*
						(2.44)
UEA						-6.034
						(-0.18)
UEB						69.23**
						(3.05)
N	1182	1182	1181	1131	1181	1181
Country dummies	Yes	Yes	No	No	No	No
Division dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Year	Year	No	No	No	No
EF time	No	No	Year	Year	Year	Year
EF country	No	No	Yes	Yes	Yes	Yes
EF project	No	No	No	Yes	No	No
Adjusted R squared	0.709	0.708	0.388	0.489	0.387	0.390

t statistics in parentheses

+p<0.10, *p<0.05, **p<0.01

$$(T_{ij}^{k} \mid \leq pN) = \delta_t + \lambda_s + X'\beta + G'\gamma + M'\pi + e_{ij}, \qquad (3)$$

where δt is the time control, λs represents the sectoral division dummies, X is the matrix of macroeconomic controls and exogenous factors, G represents the management capacity controls, M represents the project-level controls, and e_{ij} is the error series. In this specification pN corresponds to the percentile value of each stage, and k is the superscript corresponding to $k = \{Start - up, Midlife, Completion\}$. This equation uses the same independent variables used for equations (1) and (2), except that this time, the results are estimated by disbursement stages.

The results of the "macro" estimates presented in Table 8 are consistent with the previous estimates. In fact, they suggest that in the start-up stage, the macroeconomic variables usually remain significant and have a sign similar to the result in Table 4 (hereafter referred to as "the general estimate"). In other words, GDP growth is related to lesser appetite for implementation, while a reduction in the fiscal deficit is correlated with a shorter period of disbursement. What is interesting is that the value of the growth coefficient is incremental between stages. This could be related to the fact that the amounts to be executed are usually lower in the completion stage, and that for a country experiencing high growth, it makes more sense to pursue an alternative financing strategy where more funds can be secured. The case of the fiscal deficit is also peculiar. Though it retains the signs of the general estimate, the statistical significance in the start-up stage is much weaker than in the other stages. Most particularly, it is broadly significant towards the completion of the project.

The risk premium moves in the same direction as it did in the general estimate. Throughout the three stages it remains with a positive and significant sign, though its coefficients are small. In contrast, inflation is strongly linked to longer delays in all stages of execution. In general, inflation has greater effects in the later stages, which could be consistent with the authorities realizing that the original amount has lost value, requiring a greater mobilization of their own resources. Weather events hasten disbursement times, but the coefficients show little or no significance.

The political environment variables are also significant and consistent with the general estimate: for example, legislative ratification is correlated with a general 5 percent lengthening of timeframes throughout the three stages. Interestingly, a legislature in which a ruling party holds a majority is correlated with longer timeframes. This relationship is significant in the early stages and loses significance in the completion stage. This result is consistent with the ones shown in Table 4, although in that case, the variable was not significant in most of the cases (except for column (7), where it was significant at the 10 percent level).

In the case of the public management indicators, the planning and monitoring variables stand out: their coefficients are associated with shorter disbursement periods in all three stages. However, their sizes change substantially. For example, the coefficient on the planning variable is -95.7 in the start-up stage but -202 and -262.5 during the midlife and completion stages, respectively. This might suggest that it is essential to have planning and monitoring capacities in order to reduce execution times. Another important component of the index, the procurement system, has a similar pattern, although its differences in magnitude do not vary much between stages.

TABLE 8: ESTIMATES BY DISBURSEMENT STAGE

Time to Disburse during the Different Stages of the Project Life Cycle														
	Start-up stage									Midlife stage				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(1)	(2)	(3)	(4)	(5)
GDP growth	69.75**	40.77**	42.65**	45.70**	24.82**	59.02**	33.74**	30.31**	33.48**	136.3**	72.58**	73.01**	86.92**	46.16**
	(7.11)	(3.33)	(3.41)	(3.89)	(2.04)	(5.15)	(2.77)	(2.65)	(2.69)	(11.46)	(4.44)	(4.34)	(5.56)	(2.82)
Country risk	0.497**	0.366**	0.342**	0.412**	0.272**	0.448**	0.187+	0.348**	0.262**	0.795**	0.514**	0.452**	0.600**	0.423**
	(4.91)	(3.17)	(2.89)	(3.56)	(2.51)	(3.71)	(1.58)	(3.25)	(2.19)	(6.08)	(3.83)	(3.24)	(4.56)	(3.40)
Fiscal def. % GDP	-28.33	-20.59	-25.89	-21.35	-3.116	-44.39**	-35.88*	0.579	-11.36	-106.1**	-33.95	-41.43+	-38.29	-12.74
	(-1.40)	(-0.90)	(-1.14)	(-0.92)	(-0.14)	(-1.97)	(-1.72)	(0.03)	(-0.50)	(-5.54)	(-1.26)	(-1.54)	(-1.42)	(-0.50)
Inflation	27.46**	32.66**	36.08**	29.57**	22.58**	40.98**	39.04**	21.90**	33.92**	-3.583	37.01**	48.05**	27.79*	16.23
	(4.26)	(3.70)	(4.15)	(3.26)	(2.51)	(4.75)	(4.60)	(2.44)	(3.95)	(-0.82)	(2.44)	(3.21)	(1.77)	(1.08)
Weather event	147.7**	-27.25	-18.67	-20.91	-46.94	-12.88	-124.4+	-86.89	-58.15	357.4**	29.38	49.12	44.70	-35.00
	(2.17)	(-0.39)	(-0.26)	(-0.30)	(-0.67)	(-0.18)	(-1.63)	(-1.22)	(-0.81)	(4.37)	(0.33)	(0.56)	(0.51)	(-0.40)
Elections	20.42	17.89	24.65	15.35	6.909	28.20	17.69	16.84	16.05	-21.88	-142.5	-131.3	-153.7	-138.8
	(0.24)	(0.21)	(0.29)	(0.18)	(0.08)	(0.32)	(0.21)	(0.20)	(0.19)	(-0.19)	(-1.26)	(-1.16)	(-1.35)	(-1.30)
Legis. approval	363.6**	254.8**	259.6**	319.2**	235.8**	327.2**	307.3**	314.5**	246.9**	409.7**	251.7**	250.3**	394.6**	235.0**
	(5.62)	(3.20)	(3.17)	(4.34)	(3.10)	(4.06)	(4.12)	(4.39)	(3.21)	(4.67)	(2.38)	(2.27)	(4.05)	(2.33)
Legis. majority	82.45	229.8**	218.5**	217.5**	266.6**	193.0**	290.3**	311.6**	209.3**	79.28	190.8*	158.9	170.6+	261.4**
	(1.05)	(2.50)	(2.36)	(2.37)	(2.94)	(2.09)	(3.09)	(3.39)	(2.30)	(0.71)	(1.66)	(1.36)	(1.49)	(2.35)
Management capacities														
MfDR Index		-122.3**									-251.6**			
		(-3.91)									(-5.61)			
Planning			-95.71**									-202.0**		
			(-3.28)									(-4.91)		
Budgeting by results				-115.2									-232.9*	
				(-3.87)									(-5.36)	
Financial management					-171.7*									-316.6**
					(-6.08)									(-7.99)
Monitoring						30.56								
						(1.20)								
Ex ante eval.							-126.1**							
							(-5.24)							
Procurement system								-172.0**						
								(-6.38)						
Mid-term vision									-135.4**					
									(-4.88)					
Observations	463	401	401	401	401	401	401	401	401	416	365	365	365	365
Adjusted R-squared	0.714	0.717	0.714	0.717	0.732	0.708	0.724	0.734	0.721	0.763	0.787	0.783	0.786	0.804
t statistics in parentheses + p<0.15, * p<0.10, ** p<0.05														

				Completion stage								
(6)	(7)	(8)	(9)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
102.0**	74.25**	62.65**	59.86**	189.8**	94.87**	91.73**	118.1**	64.45**	141.4**	101.6**	96.33**	63.58**
(6.58)	(4.21)	(4.01)	(3.50)	(10.10)	(4.29)	(4.12)	(5.26)	(3.12)	(6.47)	(4.29)	(4.66)	(2.93)
0.627**	0.327**	0.553**	0.343**	1.199**	0.692**	0.593**	0.814**	0.605**	0.834**	0.390*	0.790**	0.384**
(4.49)	(2.30)	(4.78)	(2.61)	(5.37)	(3.48)	(2.93)	(4.07)	(3.27)	(3.94)	(1.87)	(4.36)	(1.98)
-67.91**	-77.28**	-16.81	-24.77	-172.6**	-69.52**	-72.46**	-85.77**	-40.79	-126.4**	-128.6**	-62.70*	-45.02+
(-2.50)	(-3.02)	(-0.65)	(-0.91)	(-6.83)	(-2.14)	(-2.30)	(-2.35)	(-1.36)	(-3.87)	(-4.56)	(-1.92)	(-1.48)
56.13**	63.82**	21.16	41.67**	-6.513	60.82**	68.78**	54.88**	42.34**	79.98**	81.68**	50.78**	60.11**
(3.70)	(4.19)	(1.43)	(2.85)	(-0.68)	(5.08)	(5.65)	(4.49)	(3.59)	(6.33)	(6.22)	(4.03)	(5.21)
96.49	-98.95	-83.22	0.865	363.8**	-73.92	-50.80	-67.19	-115.4	-30.51	-232.3*	-178.6+	-86.61
(1.09)	(-1.02)	(-0.91)	(0.01)	(3.37)	(-0.62)	(-0.43)	(-0.56)	(-1.02)	(-0.25)	(-1.92)	(-1.49)	(-0.76)
-143.7	-160.3	-125.7	-149.2	-44.03	-13.65	-8.000	-46.12	-6.841	-45.89	-87.44	-48.92	32.17
(-1.23)	(-1.40)	(-1.17)	(-1.33)	(-0.29)	(-0.09)	(-0.05)	(-0.30)	(-0.05)	(-0.29)	(-0.62)	(-0.34)	(0.24)
308.1**	353.2**	368.1**	238.3**	374.9**	248.7**	222.1*	413.0**	256.6**	303.2**	343.3**	407.1**	193.7*
(2.85)	(3.44)	(3.88)	(2.29)	(3.38)	(2.08)	(1.83)	(3.62)	(2.26)	(2.47)	(3.02)	(3.64)	(1.66)
156.3	214.5*	324.4**	135.0	-413.8**	8.088	-52.30	-24.79	134.0	-72.46	5.463	160.0	-4.941
(1.33)	(1.79)	(2.81)	(1.19)	(-2.75)	(0.06)	(-0.40)	(-0.18)	(1.06)	(-0.53)	(0.04)	(1.15)	(-0.04)
					-294.2**							
					(-5.79)							
						-262.5**						
						(-5.67)						
							-245.5**					
							(-4.47)					
								-349.1**				
								(-8.02)				
-112.7**									-123.5**			
(-3.00)									(-2.86)			
	-172.0**									-226.8**		
	(-4.95)									(-5.18)		
		-291.8**									-287.6**	
		(-7.26)									(-6.10)	
			252.2									340.4
			(6.36)									(7.81)
365	365	365	365	316	281	281	281	281	281	281	281	281
0.773	0.783	0.799	0.791	0.816	0.861	0.861	0.857	0.871	0.850	0.862	0.862	0.870

These estimates suggest that the aforementioned factors are affecting the stages of the projects' life cycles in different manners. The macroeconomic factors display a common denominator: sound fiscal health is a determinant throughout a project's entire life. The second element that stands out is the importance of the political environment when ratification depends on the legislature, a factor that is exogenous to the IDB. With regards to strengthening management capacities, however, there seems to be evidence that merits further analysis. For example, the presence of a procurement system seems to be functional for the mid and final stages of execution, while planning capacity is important throughout the whole project life cycle.

TABLE 9: ESTIMATES IN THE START-UP STAGE

Disbursement Time at Project Start-up										
	Macro	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP growth	40.77**	69.75**	47.78**	50.37**	60.46**	63.31**	48.00+	55.44**	45.82**	29.42**
	(3.33)	(7.11)	(4.15)	(4.28)	(2.72)	(2.45)	(1.56)	(5.26)	(4.39)	(2.71)
Country risk	0.366**	0.497**	0.294**	0.382**	0.449**	0.440*	0.433+	0.471**	0.396**	0.189*
	(3.17)	(4.91)	(2.95)	(3.67)	(2.03)	(1.90)	(1.62)	(4.24)	(3.61)	(1.90)
Fiscal def. % GDP	-20.59	-28.33	-17.00	-34.74+	-66.33**	-67.23*	-52.79	-51.42**	-46.10**	-29.52*
	(-0.90)	(-1.40)	(-0.79)	(-1.55)	(-2.12)	(-1.77)	(-1.22)	(-2.82)	(-2.50)	(-1.67)
Inflation	32.66**	27.46**	26.83**	23.41**	15.65+	16.16+	18.21+	20.71**	20.08**	19.63**
	(3.70)	(4.26)	(4.67)	(4.19)	(1.61)	(1.55)	(1.62)	(3.61)	(3.50)	(3.75)
Weather event	-27.25	147.7**	94.45	110.6*	289.4**	312.9**	337.4*	90.66+	65.17	22.60
	(-0.39)	(2.17)	(1.37)	(1.66)	(2.15)	(2.04)	(1.95)	(1.46)	(1.03)	(0.38)
Elections	17.89	20.42	-12.14	-37.25	-271.7+	-249.9	-192.0	-68.82	-77.03	-58.96
	(0.21)	(0.24)	(-0.15)	(-0.49)	(-1.62)	(-1.39)	(-1.03)	(-0.92)	(-1.03)	(-0.82)
Legis. approval	254.8**	363.6**	314.4**	228.8**	173.9	182.1	224.3	230.7**	229.8**	198.3**
	(3.20)	(5.62)	(4.77)	(3.64)	(1.21)	(1.18)	(1.26)	(3.72)	(3.40)	(3.13)
Legis. majority	229.8**	82.45	94.14	-58.93	-209.5	-235.4	-279.9	-95.97	-62.75	-43.62
	(2.50)	(1.05)	(1.23)	(-0.81)	(-1.28)	(-1.26)	(-1.33)	(-1.29)	(-0.82)	(-0.61)
MfDR Index	-122.3**									
	(-3.91)									
Life cycle-related variables										
Approved amount				-0.279*	-0.858**	-0.896**	-1.216**	-0.288*	-0.420**	-0.365**
				(-1.88)	(-2.10)	(-2.09)	(-2.25)	(-1.86)	(-2.58)	(-2.13)
Prep. cost % balance				38.19**	166.80**	159.09**	157.04**	29.95**	29.06**	21.30**
				(2.50)	(3.44)	(2.83)	(2.53)	(2.33)	(2.61)	(2.12)
Designs				23.38	-305.6*	-292.0+	-325.1+	-0.291	-85.72	-151.4*
				(0.26)	(-1.77)	(-1.50)	(-1.60)	(-0.00)	(-0.95)	(-1.81)
Land				-36.57	188.4	159.9	138.4	-63.31	-22.41	-24.63
				(-0.31)	(0.79)	(0.61)	(0.50)	(-0.54)	(-0.19)	(-0.22)
TC % disbursements					7.845*	10.34**	11.85**			
					(1.99)	(2.43)	(2.49)			
Risk classification										
Environmental A										557.4**
										(5.51)
Observations	401	463	463	418	102	102	102	418	418	418

Sectoral Division Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Instrument Dummies	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Executing Unit Dummies	No	No	No	No	No	No	Yes	No	Yes	Yes
Adjusted R-squared	0.717	0.714	0.738	0.756	0.792	0.785	0.775	0.773	0.781	0.798
t statistics in parentheses + p<0.10, * p<0.08, ** p<0.05										

By including the "micro" variables we can run estimates for each stage. Since the estimate in equation (3) replicates the results in Table 5, the discussion here will focus on column (9) of Tables

9,10 and 11. the inclusion of project-level variables does not change the results from the "macro" variables. In the case of the fiscal deficit, the sign is the same but the variable is only significant in the start-up and midlife stages. The weather event variable loses significance in all stages and the legislative majority variable has a negative sign, but with low significance (about 15 percent).

Moving to the project variables, the "amount approved" variable is significant only in the first two stages and with a declining magnitude. Preparation cost as a percentage of the balance to be executed has a positive sign and is highly significant in the start-up stage. In contrast, at midlife and completion it helps to reduce times substantially. This is in contrast with the general estimate, which shows a coefficient with a negative sign and high significance. Having project designs is associated with shorter disbursement periods, but is only significant during the start-up stage. The amounts used for technical cooperation initiatives as a percentage of the programmed disbursement is associated with a longer start-up stage, but with a shorter midlife stage. In the completion stage,

TABLE 10: ESTIMATES IN THE MIDLIFE STAGE

Disbursement Time at Project Start-up										
	Macro	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP growth	72.58**	136.3**	91.07**	99.35**	114.2**	94.26*	58.75	91.85**	74.04**	31.94**
	(4.44)	(11.46)	(6.36)	(6.43)	(2.38)	(1.82)	(0.90)	(5.90)	(4.35)	(2.08)
Country risk	0.514**	0.795**	0.550**	0.537**	0.535+	0.481	0.423	0.589**	0.459**	0.130
	(3.83)	(6.08)	(4.22)	(4.00)	(1.61)	(1.32)	(0.95)	(4.18)	(3.29)	(1.07)
Fiscal def. % GDP	-33.95	-106.1**	-68.74**	-100.9**	-74.16*	-77.39*	-24.55	-97.52**	-79.67**	-27.97
	(-1.26)	(-5.54)	(-3.43)	(-4.81)	(-1.83)	(-1.70)	(-0.47)	(-4.65)	(-3.61)	(-1.32)
Inflation	37.01**	-3.583	1.733	-1.085	-2.505	-4.595	-2.103	-1.358	1.351	7.718**
	(2.44)	(-0.82)	(0.42)	(-0.27)	(-0.37)	(-0.70)	(-0.29)	(-0.33)	(0.30)	(2.13)
Weather event	29.38	357.4**	245.2**	231.2**	432.2**	398.0*	237.9	218.2**	159.6*	59.14
	(0.33)	(4.37)	(2.86)	(2.61)	(2.08)	(1.80)	(1.02)	(2.43)	(1.83)	(0.75)
Elections	-142.5	-21.88	-99.60	-168.6+	-252.1	-202.5	-325.2	-152.2	-180.7*	-114.6
	(-1.26)	(-0.19)	(-0.90)	(-1.56)	(-0.84)	(-0.66)	(-0.96)	(-1.44)	(-1.75)	(-1.29)
Legis. approval	251.7**	409.7**	350.5**	254.8**	352.2	379.5	452.7+	284.9**	275.9**	203.2**
	(2.38)	(4.67)	(3.90)	(2.79)	(1.38)	(1.41)	(1.57)	(3.12)	(2.81)	(2.31)
Legis. majority	190.8*	79.28	71.15	-89.51	-55.05	4.795	-128.0	-140.7	-135.8	-137.4
	(1.66)	(0.71)	(0.68)	(-0.81)	(-0.22)	(0.02)	(-0.44)	(-1.24)	(-1.20)	(-1.33)
MfDR Index	-251.6**									
	(-5.61)									
Life cycle-related variables										
Approved amount				-0.531**	-1.498**	-1.193**	-1.552**	-0.456**	-0.637**	-0.377+

				(-2.53)	(-2.94)	(-2.28)	(-2.22)	(-2.20)	(-2.78)	(-1.55)
Prep. cost % balance				-0.0795**	-12.5	-17.3**	-16.19**	-0.0777**	-0.0698**	-0.0628**
				(-7.87)	(-1.19)	(-2.31)	(-2.33)	(-6.20)	(-4.46)	(-4.08)
Designs				146.4	-215.0	-132.2	-164.9	148.9	23.97	-119.8
				(1.24)	(-0.75)	(-0.47)	(-0.57)	(1.25)	(0.19)	(-1.11)
Land				27.89	584.8*	641.1*	670.1*	19.54	68.29	33.20
				(0.16)	(1.69)	(1.72)	(1.91)	(0.11)	(0.39)	(0.21)
TC % disbursements					-4.575**	-4.554**	-4.370**			
					(-5.33)	(-4.00)	(-3.61)			
Risk classification										
Environmental A										1078.7**
										(7.34)
Observations	365	416	416	367	95	95	95	367	367	367
Sectoral Division Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Instrument Dummies	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Executing Unit Dummies	No	No	No	No	No	No	Yes	No	Yes	Yes
Adjusted R-squared	0.787	0.763	0.787	0.792	0.793	0.805	0.806	0.800	0.809	0.840
t statistics in parentheses + p<0.10, * p<0.08, ** p<0.05										

TABLE 11: ESTIMATES IN THE COMPLETION STAGE

Disbursement Time at Project Start-up										
	Macro	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP growth	94.87**	189.8**	126.9**	156.4**	142.5*	99.54	7.398	176.8**	191.1**	104.0**
	(4.29)	(10.10)	(5.29)	(4.12)	(1.88)	(0.97)	(0.03)	(4.99)	(5.35)	(3.20)
Country risk	0.692**	1.199**	0.767**	0.373+	0.179	0.217	-0.223	0.377	0.220	0.00761
	(3.48)	(5.37)	(3.37)	(1.49)	(0.32)	(0.33)	(-0.25)	(1.38)	(0.81)	(0.03)
Fiscal def. % GDP	-69.52**	-172.6**	-121.1**	-130.5**	-274.0**	-249.6*	-143.6	-130.7**	-126.7**	-51.23
	(-2.14)	(-6.83)	(-4.24)	(-3.32)	(-2.80)	(-2.01)	(-0.43)	(-3.34)	(-3.32)	(-1.40)
Inflation	60.82**	-6.513	-3.191	-2.053	81.74	80.75	154.4	-1.793	-0.0689	6.806
	(5.08)	(-0.68)	(-0.43)	(-0.32)	(1.38)	(1.16)	(1.42)	(-0.29)	(-0.01)	(1.38)
Weather event	-73.92	363.8**	164.4+	248.5*	-30.61	-140.8	-575.0	154.0	189.3	91.86
	(-0.62)	(3.37)	(1.51)	(1.71)	(-0.08)	(-0.31)	(-0.75)	(1.06)	(1.24)	(0.69)
Elections	-13.65	-44.03	-19.21	-185.6	-397.1	-191.2	-336.7	-260.3	-191.4	-177.4
	(-0.09)	(-0.29)	(-0.14)	(-1.00)	(-0.81)	(-0.36)	(-0.33)	(-1.41)	(-1.02)	(-1.10)
Legis. approval	248.7**	374.9**	262.5**	234.8+	-51.93	130.7	-106.9	152.3	156.2	226.4+
	(2.08)	(3.38)	(2.35)	(1.50)	(-0.09)	(0.16)	(-0.10)	(0.96)	(0.97)	(1.65)
Legis. majority	8.088	-413.8**	-254.2*	-114.2	-353.2	-323.0	48.39	-153.9	-71.50	-150.6
	(0.06)	(-2.75)	(-1.79)	(-0.65)	(-0.97)	(-0.81)	(0.04)	(-0.87)	(-0.40)	(-1.00)
MfDR Index	-294.2**									
	(-5.79)									
Life cycle-related variables										
Approved amount				-0.146	0.194	0.523	-1.974	0.00602	0.191	0.183
				(-0.48)	(0.15)	(0.29)	(-0.55)	(0.02)	(0.39)	(0.40)
Prep. cost % balance				-0.0581**	-0.179*	-1.84+	-0.128	-0.0921**	-0.0694**	-0.0772**
				(-2.01)	(2.09)	(1.63)	(0.47)	(-2.74)	(-2.00)	(-2.67)
Designs				327.1	-194.4	-156.8	-1134.4	392.0	360.4	67.66
				(1.38)	(-0.47)	(-0.32)	(-1.09)	(1.43)	(1.43)	(0.32)
Land				-202.8	482.9	554.7	1633.7+	-266.9	-191.7	7.623
				(-0.63)	(0.79)	(0.78)	(1.73)	(-0.82)	(-0.69)	(0.03)
TC % disbursements					-6.342	-4.083	-5.889			
					(-0.12)	(-0.06)	(-0.06)			
Risk classification										
Environmental A										1235.6**
										(4.17)
Observations	281	316	316	150	41	41	41	150	150	150
Sectoral Division Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Instrument Dummies	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Executing Unit Dummies	No	No	No	No	No	No	Yes	No	Yes	Yes
Adjusted R-squared	0.861	0.816	0.840	0.881	0.879	0.859	0.784	0.891	0.897	0.918

t statistics in parentheses

+ p<0.10, * p<0.08, ** p<0.05

although the sign suggests a faster disbursement, the coefficient lacks sufficient significance. Further, projects with an "A" classification for environmental risk are associated with delays, as expected.

Finally, as with any analysis that has such a large set of variables, the question arises as to which or how many of them should be included. In the previous exercises, the basic criterion used was a variance inflation factor to avoid problems of multicollinearity and include all the available and intuitive variables. Nonetheless, there are other ways of trying to improve the choice of the variables to be included. As a final exercise, we explore statistical methods that are increasingly used, especially in the literature on machine learning. These are the methods based on Lasso (see Tibshirani (1996)) or Ridge (see Hoerl and Kennard (1970)). The basic idea of these estimators is to assign a value to the estimated parameters that tend to reduce their value in line with a penalization parameter Λ. A second important parameter α is elasticity, which is assigned a value between 0 and 1, corresponding in the former to the extreme Ridge case and in the latter to the Lasso case. Lasso, as Tibshirani (1996) specifies, assigns a value of 0 to the parameters that contribute least to improving the model's goodness of fit. In contrast, Ridge assigns a value that is not necessarily 0 to improve the goodness of fit. With this in mind, we proceed to estimate the series by disbursement stage, and thus contrast the results with those obtained earlier.

Formally, the Lasso estimate is such that given a value of Λ and α, a vector of coefficients B is selected

$$\min_{\beta,\gamma,M} \left\{ \sum (T_{ij}^{k} - \delta_t - \lambda_s - X'\beta - G'\gamma - M'\pi) + \Lambda\left(\alpha \parallel B \parallel_1 + (1-\alpha) \parallel B \parallel_2^2\right) \right\}$$

where δt is the time control, λs represents the sectoral division dummies, X is the matrix of macroe- conomic controls and exogenous factors, G represents management capacity controls and M repre- sents project-level controls. In this specification, k is the superscript that corresponds to Start-up, Midlife, and Completion.

Tables 12 and 13 show the results of the same equation estimated for each stage, but using an elastic net α to determine the estimation method. In particular, they show the extreme value when the estimate corresponds to Lasso, an intermediate value, and the extreme value when it corresponds to Ridge. We use the value of Λ = 1500, which arises from a cross-validation among a range of values from 1 to 10,000. The tables report the values of the estimates, and in the case of the dummies, they show which of them were discarded by the methodology. Finally, the goodness of fit and the number of observations are reported. The number of observations is identical to the previous estimates, but the goodness of fit varies. Since the aim of these methodologies is to improve this indicator, we must choose those that, after validation of the penalization parameter, display a higher R2. As the tables show, during the start-up, midlife, and completion stages, the best fit typically corresponds to the Ridge estimate. In terms of predictive capacity, these results—although they exceed the previous OLS and FE estimates—are not significantly higher. In contrast, what is valuable for this study is that, in general and in most cases, the variables used previously survive these methodologies, which are stricter for selection purposes. Again, this is good news, since it indicates that the selection and the previous results are robust, in the sense that they reflect a similar predictability to a set of variables that are practically identical. The coefficient values usually remain in similar ranges, with the exception of the extreme Lasso value. Once more, the best performing outputs stem from the Ridge, whose estimators are not very far from those of the previous OLS. Note that Ridge involves a better goodness of fit at a cost of greater bias in the estimators. Interestingly, given that the R2 are not so different in the two methodologies and that the coefficient values are relatively similar, one may conclude that the methodology initially used is suitable for prediction, and therefore, that that there is no need to use values that may display some bias.

TABLE 12: ELASTIC NET ESTIMATIONS, LASSO AND RIDGE IN THE START-UP STAGE

Macro			(1)			(2)			(3)			(4)		
	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5
	40.22	26.79	22.36	69.79	52.33	44.64	48.76	44.86	39.43	50.94	36.74	31.37	54.29	29.12
	0.36	0.30	0.27	0.50	0.47	0.44	0.30	0.40	0.39	0.38	0.37	0.35	0.41	0.27
	-19.27	-15.03	-15.50	-28.26	-30.25	-29.48	-17.42	-26.95	-26.73	-35.01	-30.43	-28.40	-59.67	-23.20
	32.31	22.33	19.46	27.42	21.02	18.52	26.83	19.61	17.28	23.37	16.73	14.55	14.74	8.39
	-19.64	41.34	55.71		173.70	169.61	98.95	149.45	149.89	116.52	154.49	148.88	276.92	132.29
	16.10	44.84	50.09	18.39	90.61	104.57	-6.13	68.29	87.79	-29.12	63.64	81.12	-218.01	28.27
		129.10	104.36		302.32	267.57	316.81	273.21	244.24	233.01	224.04	203.36	194.38	179.99
		174.21	141.74	80.17	155.94	160.83	92.66	143.63	147.57	-48.65	75.11	94.68	-152.42	64.37
	124.80	172.71	178.70											
Life cycle-related variables														
										-0.25	-0.03	0.04	-0.65	0.12
										38583.36	34819.69	30204.74	167737.09	69106.42
										16.28	72.05	79.49	-238.93	40.59
										-24.28	39.58	55.12	172.79	104.64
TC % disbursements													6.96	2.92
Sectoral Division Dummies														
Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Aggregated	13/13	13/13	13/13	13/13	13/13	13/13	12/13	13/13	13/13	12/13	12/13	13/13	11/13	13/13
Type of Instrument Dummies														
Included	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Aggregated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Executing Unit Dummies														
Included	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Aggregated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Observations	401	401	401	463	463	463	463	463	463	418	419	420	102	102
R-squared	0.638	0.753	0.789	0.635	0.750	0.785	0.657	0.775	0.812	0.673	0.794	0.832	0.705	0.832

(5)			(6)			(7)			(8)			
alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0
23.77	54.73	28.40	23.35	42.91	25.93	21.85	54.96	35.74	30.39	45.24	31.64	27.44
0.23	0.40	0.27	0.22	0.39	0.26	0.21	0.47	0.38	0.35	0.39	0.34	0.32
-18.22	-61.00	-23.21	-18.17	-51.32	-21.89	-17.29	-50.46	-32.60	-29.19	-44.71	-29.89	-27.00
6.60	14.52	8.30	6.55	15.71	7.91	6.27	20.72	16.49	14.43	20.05	15.56	13.62
103.54	294.08	129.87	101.90	304.18	124.30	97.69	95.00	148.99	144.59	70.01	133.10	132.23
35.86	-199.07	26.10	34.64	-149.25	20.88	30.99	-60.38	56.50	75.91	-68.39	43.54	65.57
140.85	206.14	177.89	139.26	240.62	170.91	134.01	231.73	223.92	201.53	230.09	208.59	187.79
64.42	-159.58	64.96	64.18	-187.04	56.52	59.04	-83.79	69.91	91.37	-49.05	69.58	86.17
0.15	-0.65	0.12	0.15	-0.84	0.11	0.14	-0.27	-0.03	0.04	-0.40	-0.06	0.01
50012.58	158170.89	67193.83	49106.79	154723.02	63343.41	46782.12	30323.51	32116.42	28666.92	29481.24	30568.07	27245.44
44.64	-213.73	42.68	45.22	9.31	2.82	2.14		71.18	79.43	-73.33	49.15	65.55
79.89	154.12	106.74	80.74	-225.29	37.91	41.97	-49.75	39.07	55.73	-14.31	39.38	52.52
2.24	8.69	2.75	2.14	137.72	101.71	77.59						
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13/13	9/13	13/13	13/13	11/13	13/13	13/13	12/13	13/13	13/13	12/13	13/13	13/13
No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N/A	5/8	6/8	6/8	7/8	7/8	8/8	7/8	8/8	8/8	7/8	8/8	8/8
No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
N/A	N/A	N/A	N/A	6/9	6/9	6/9	N/A	N/A	N/A	9/9	8/9	9/9
102	102	102	102	102	102	102	418	418	418	418	418	418
0.871	0.699	0.824	0.864	0.690	0.814	0.853	0.688	0.812	0.850	0.695	0.820	0.859

TABLE 13: ELASTIC NET ESTIMATIONS, LASSO AND RIDGE IN THE COMPLETION STAGE

	Macro			(1)			(2)			(3)		
	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0
	92.46	40.60	31.86	188.42	99.33	77.18	128.32	85.44	68.56	162.26	72.34	52.15
	0.69	0.46	0.40	1.19	0.85	0.74	0.77	0.73	0.66	0.37	0.68	0.58
	-66.40	-31.23	-31.26	-170.76	-90.92	-77.84	-121.71	-79.50	-69.90	-133.12	-56.26	-46.93
	60.23	42.24	36.74	-5.94	6.87	7.74	-2.75	6.15	7.03	-1.17	4.12	3.97
	-60.54	100.50	125.40	368.46	488.42	434.60	177.93	408.11	380.33	280.56	377.84	304.71
		109.73	105.77	-30.73	239.24	235.97	-7.75	211.29	212.66	-175.03	170.83	161.97
	240.71	152.12	141.66	374.87	473.09	434.01	265.22	412.00	388.89	242.09	358.84	302.73
	8.90	119.39	110.79	-399.24	110.47	164.54	-244.78	102.13	149.60	-95.49	163.06	166.79
	298.96	381.64	375.26									
Life cycle-related variables												
										-0.04	0.39	0.38
										-0.05	0.00	0.00
										308.54	218.64	178.94
										-162.76	104.92	116.40
TC % disbursements												
Sectoral Division Dummies												
Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Aggregated	13/13	13/13	13/13	13/13	13/13	13/13	12/13	12/13	12/13	12/13	12/13	12/13
Type of Instrument Dummies												
Included	No	No	No	No	No	No	No	No	No	No	No	No
Aggregated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Executing Unit Dummies												
Included	No	No	No	No	No	No	No	No	No	No	No	No
Aggregated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Observations	281	281	281	316	316	316	316	316	316	150	150	150
R-squared	0.784	0.887	0.913	0.743	0.840	0.865	0.764	0.865	0.890	0.802	0.907	0.934

(4)			(5)			(6)			(7)			(8)		
alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0	alpha = 1	alpha = 0.5	alpha = 0
113.78	22.57	16.29	100.67	22.36	16.16	86.75	21.28	15.61	181.59	70.70	51.12	190.93	65.90	48.05
0.43	0.48	0.36	0.45	0.48	0.36	0.43	0.46	0.35	0.39	0.67	0.57	0.23	0.60	0.53
-228.60	-62.16	-46.45	-216.38	-61.42	-46.04	-170.15	-59.32	-44.83	-133.95	-54.07	-45.64	-127.50	-49.30	-42.55
85.17	55.45	40.13	80.56	54.76	39.77	95.30	53.03	38.78	-1.09	4.08	3.92		3.83	3.71
4.33	163.29	119.08		161.38	118.04		155.64	114.93	196.37	360.80	294.90	214.59	335.37	277.88
-147.78	74.02	60.18	-73.94	72.30	59.11	-176.68	67.05	56.56	-246.19	161.55	156.45	-172.70	152.91	147.24
14.43	194.69	142.66	64.91	191.15	140.77	64.38	185.27	137.26	168.60	345.45	293.86	164.45	325.92	278.53
-269.56	112.93	95.08	-251.94	112.79	94.72	-100.80	108.90	92.02	-132.60	158.22	163.02	-59.76	143.23	150.34
0.18	0.42	0.32	0.28	0.42	0.32		0.40	0.31	0.02	0.40	0.38	0.16	0.35	0.35
130.86	-9.29	-8.69	127.00	-9.47	-8.74	102.19	-9.96	-8.86	-0.08	-0.00	0.00	-0.06	-0.00	0.00
	76.87	62.83		77.45	62.90	-319.52	72.08	60.21	365.37	217.74	177.82	338.76	201.24	166.37
144.18	70.12	57.33	169.96	69.90	57.09	548.83	66.02	54.97	-224.72	106.51	116.35	-159.86	97.91	108.04
1.05	9.95	7.70		9.54	7.50		9.04	7.24						
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8/13	11/13	11/13	8/13	11/13	11/13	7/13	11/13	11/13	12/13	12/13	12/13	11/13	12/13	12/13
No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N/A	N/A	N/A	4/8	4/8	4/8	3/8	4/8	4/8	4/8	8/8	8/8	7/8	8/8	8/8
No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
N/A	N/A	N/A	N/A	N/A	N/A	8/9	8/9	8/9	N/A	N/A	N/A	9/9	9/9	9/9
41	41	41	41	41	41	41	41	41	150	150	150	150	150	150
0.800	0.905	0.932	0.782	0.885	0.911	0.713	0.808	0.831	0.811	0.918	0.944	0.816	0.924	0.951

Other Issues for Discussion: Factors Before First Disbursement and Benchmarks

Analyzing the project's life cycle in greater detail, evidence based on the estimates of equation (2) show that there are significant differences between different segments of the disbursement curve. Thus far we have not discussed what happens before the first disbursement, but if we break down the start-up among the various milestones we find time lags between the date of approval and legal effect, and sometimes between the latter and eligibility. The usual story, which supposedly explains these variations, is that once the Bank has approved the projects and before they can begin to be implemented, certain legal requirements and procedures have to be complied with in the countries, so that the loan contract with the IDB can take legal effect (entry into force). As might be expected, these processes vary depending on each country's national legislation. This means that the signing of the contract and its approval/ratification are carried out in a particular timeframe.[10] As the estimates showed, these variables affect disbursement times: legislative ratification increases the time required, and this is only partially offset when the ruling party has a legislative majority. Close elections are usually associated with longer times, but with little or no significance. The question is how distinguishable they can be to explain in themselves the time gaps between the milestones.

To corroborate the foregoing, we undertook estimates between the milestones preceding the first disbursement. The aim was to determine whether, between the period of approval and legal effect, it is possible to separate clearly those factors that only intervene in that interval. To this end we took the two time-gap variables—between approval and legal effect, and between approval and eligibility, ijt and ΔTijt , respectively. In other words,

$$\Delta T_{ijt}^{k} = \Delta(\delta_t) + \Delta(\lambda_s) + \Delta(X^{\gamma}\beta) + \Delta(G^{\gamma}\gamma) + \Delta(e_{ijt}). \qquad (5)$$

The hypothesis is that the aggregate factors should have a weak influence between milestones, and only those factors related to the country's internal regulations should show significance. In other words, it might be expected that equation (3) would be reduced to

$$\Delta T_{ijt}^{k} = \delta_t + X^{\gamma}\beta + G^{\gamma}\gamma + \Delta(e_{ijt}), \qquad (6)$$

where the time controls persist in the case of those years in which there is no intersection between the two milestones, the factors common to both functional forms are eliminated, and all that remain are those independent variables that are valid to explain the time gap between milestones.

The results presented in Table 14, confirm this: per capita GDP, the risk premium, inflation, and the weather event dummy variable have lost statistical significance in the period between approval and legal effect. This is not the case with the political environment factors and the legislative approval/ratification factor. As the hypothesis assumed, legislative approval/ratification prolongs the waiting time, and a government majority in the legislature only modestly offsets the negative effect. The role of the fiscal deficit is interesting, since it does not lose statistical significance. This suggests that fiscal conditions are important in progressing towards the legal effect stage, which in various cases requires legislative approval. Another interesting factor is the performance of the public management indicator. Since the MfDR index properly summarizes the set of subindices to a large extent, we only use this variable[11]

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10 Bank practice establishes 90 days to comply with approval of the loan contract for countries that do not require prior legislative ratification and 12 months for those that do. The countries that require legislative approval before the signing of the contract are Belize, Bahamas, Barbados, Brazil, Colombia, Guatemala, and Venezuela. The countries that only require ratification after the signing of the contract are: Bolivia, Costa Rica, Dominican Republic, Honduras, and Paraguay. El Salvador requires legislative approval before the signing of the contract and ratification after the signing.

11 The results of the estimates are maintained when the different subcomponents of the index are tested. For the sake of simplicity, only the aggregate index is presented.

TABLE 14: DETERMINANTS OF GAPS BETWEEN MILESTONES BEFORE THE FIRST DISBURSEMENT

Time between Milestones before First Disbursement		
	Approval and legal effect	Approval and eligibility
GDP growth	1.277	-2.198
	(0.34)	(-0.46)
Country risk	0.0387*	-0.0113
	(1.78)	(-0.40)
Fiscal def. % GDP	-12.66**	-12.09**
	(-2.54)	(-2.03)
Inflation	-0.761	-1.839
	(-0.45)	(-0.83)
Weather event	18.89+	32.23**
	(1.53)	(2.03)
Elections	-26.72*	-17.69
	(-1.68)	(-0.88)
Legis. approval	128.0**	115.5**
	(9.66)	(6.89)
Legis. majority	-7.804	-34.65+
	(-0.43)	(-1.49)
MfDR Index	-38.38**	-69.88**
	(-3.61)	(-5.36)
Observations	1030	1030
Time dummies	Yes	Yes
Adjusted R-squared	0.530	0.694
t statistics in parentheses		
+ p<0.15, * p<0.10, ** p<0.05		

The previous section showed the importance of evaluating project performance using a life stages approach. There are factors that can influence performance well before the start-up stage. While this is interesting for the purposes of this study, thus far the premise of the analysis has been to contrast the factors that could be determining the length of the projects' lives. While the disbursement speed is attractive because of its ease of interpretation, the estimates disregard other matters that might be interesting. For example, a review of the database reveals that there are certain projects that, under certain criteria, could be classified as well-performing in terms of their speed. This is not confined to one sector or country: it happens throughout the IDB at least once in every sector. This means that in every IDB sector there is at least one "good case" that can be retrieved to study or use as a benchmark.

Further, as this document has pointed out, careful examination of the database shows that there are investment projects that are fully or close to 90 percent completed in less than 400 days. Nonetheless, there is significant variance between projects. For example, there are 10 kinds of instruments, some of them fast-disbursing when they are part of a conditional transfer program or in the case of an emergency loan. In any case, after controlling for these varieties of loans, close to 50 IDB investment projects have been disbursed in a relatively short period (for example, considering less than 90 days and between 10 percent and 50 percent disbursed, with at least 66 percent in infrastructure). Moreover, there is at least one project with these characteristics in each sector: see Figures 3 (a) and (b). This suggests that even within each sector there are projects that attain practically complete execution in short periods.

To verify the robustness of the results already obtained, we propose to estimate the distance between each of the project's datapoints and a benchmark created from a set of best-performing projects of the IDB. Defining a benchmark parameter is not simple, and at times it can be based on arbitrary criteria. We propose two methods to carry out this task. The first consists of using the Bank's most efficient decile in the sample. In order to do this, we estimate a trend curve using a machine learning algorithm that minimizes the root-mean-square error (RMSE). The functional form can vary depending on the year for which this task is conducted, though in general it ranges between cubic and quadratic. We then generate the confidence interval that covers 70 percent of the data that lies above the trend line. The group that remains above that

upper interval is identified as "the most efficient 30 percent". The second method is based on the Data Envelope Analysis (DEA) principle originally proposed by Banker et al. (1984). This method is based on the principles of simplex optimality (linear programming), using the percentage disbursed as a result variable, and linear, quadratic and cubic time effects as control variables. For further refinement, we also include country and sector identifiers. The two boundaries are presented in Figure 1.

Based on the relative performance of the historical portfolio and these efficiency boundaries, we study the same set of variables used earlier: δt is the time control, λs represents the sectorial dummies, X is the matrix of macroeconomic controls and exogenous factors, G represents the management capacity controls, M represents the project-level controls, and eij is the error series. Once again, k is the superscript that corresponds to k = {Start – up, M idlif e, C ompletion}. The general specification to be estimated subtracts from the boundary, T Fijt, real time (T k) and takes the following form:

$$T F k - T k = \delta t + \lambda s + X X\beta + GX\gamma + M X\pi + eij . \qquad (7)$$

The estimates of the distance from the boundary, for both the most-efficient-segment method and the DEA, yield very similar results, and thus we opt to present those related to the most efficient set. In general terms, the lessons imparted are in line with the findings of the estimates in previous sections. The outputs of the three stages are presented in Tables 15,16 and 17.

The estimates for the start-up stage show that there is a significant correlation between economic activity and the differences between the performance of the best projects and the rest. This is the case except when controlling by type of executing agency. The fiscal deficit retains the sign but the significance is lost. In contrast, the statistical weight of the risk premium and inflation increases. Weather factors or legislative approval seem to increase the gap with the most efficient projects. This could be consistent with the fact that the fastest projects are usually conditional transfers and resources deployed as support for development banking institutions, which are not affected by these kinds of variables. In contrast, the remainder of the projects are likely more prone to changes in such factors. Once again, the MfDR index stands out. This is consistent with the usual recommendations that ex-ante planning is beneficial, together with financial management. Technical cooperation resources are also interesting, since they seem to help reduce the time gaps with a reasonable degree of statistical significance. The preparation cost variable remains with the same sign as before and is highly significant. The factors most closely related to preparation, such as project designs and land ownership, preserved their sign but are no longer significant. Despite this, the direction of previous findings was confirmed. Thus, if we consider that the comparison with a benchmark serves to validate the previous estimates on the basis of the speed of execution, we can conclude that both exercises validate each other. Similar conclusions can be drawn from the results for the midlife and completions stages. Execution in both stages is highly correlated with economic activity. The risk premium retains significance except when controlling by instrument and executing agency. In contrast, the fiscal deficit is statistically significant, especially in the completion stage. The case of inflation is paradigmatic: in the estimates with controls it is sometimes significant but with a negative sign. That is, price rises are associated with improvements in the performance of the investment portfolio as the final stages of the project approach. Although this seems to go against the findings of previous sections, they do not necessarily conflict. It is clear that inflation is associated with a longer project life. What these outputs suggest is that, relative to the most efficient projects, price increases could be inducing team leaders to place more emphasis on management in an effort to move forward. Preparation costs display weak significance in the midlife stage and no significance in the completion stage, indicating that the efficiency gains of preparation are to be found at the beginning of the project life. A similar behavior is observed in the technical assistance variable, which helps reduce disbursement times in midlife stage but not in the completion stage. In contrast, in the latter phase, land ownership and project designs seems to gain importance, a fact that is not apparent in the initial stages. Finally, note that although we do not present the coefficients related to instruments and executing agencies, these seem to drive some of the explanatory power and also seem to be consistent with the previous findings.

TABLE 15: TIME GAPS IN THE PROJECT START-UP PHASE

Time Gap for Disbursement in the Project Start-up										
	Macro	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP growth	35.51**	68.47**	45.77**	42.71**	46.80**	45.84*	30.19	21.37**	21.37**	21.37**
	(3.48)	(8.21)	(4.76)	(4.19)	(2.09)	(1.79)	(1.08)	(2.34)	(2.34)	(2.34)
Country risk	0.308**	0.478**	0.275**	0.353**	0.473**	0.467**	0.429*	0.145+	0.145+	0.145+
	(3.07)	(5.28)	(3.17)	(3.70)	(2.22)	(2.11)	(1.76)	(1.63)	(1.63)	(1.63)
Fiscal def. % GDP	-7.741	-25.11+	-11.87	-15.67	-33.68	-30.56	-11.12	-7.236	-7.236	-7.236
	(-0.42)	(-1.56)	(-0.69)	(-0.86)	(-1.17)	(-0.89)	(-0.30)	(-0.53)	(-0.53)	(-0.53)
Inflation	28.53**	19.16**	18.64**	16.85**	22.23**	22.44**	23.74**	13.53**	13.53**	13.53**
	(4.30)	(3.47)	(4.03)	(3.14)	(2.53)	(2.42)	(2.31)	(3.02)	(3.02)	(3.02)
Weather event	12.63	185.2**	131.7**	124.8**	306.3**	326.5**	344.5**	43.76	43.76	43.76
	(0.22)	(3.21)	(2.33)	(2.09)	(2.28)	(2.17)	(2.02)	(0.84)	(0.84)	(0.84)
Elections	13.85	21.57	-1.480	11.17	-171.0	-144.4	-116.2	-14.69	-14.69	-14.69
	(0.20)	(0.31)	(-0.02)	(0.16)	(-1.08)	(-0.88)	(-0.69)	(-0.23)	(-0.23)	(-0.23)
Legis. approval	199.8**	300.2**	248.4**	201.6**	97.13	112.0	143.6	159.3**	159.3**	159.3**
	(2.88)	(5.65)	(4.64)	(3.63)	(0.69)	(0.75)	(0.89)	(2.91)	(2.91)	(2.91)
Legis. majority	177.4**	32.42	48.75	-16.15	-104.0	-107.1	-104.3	7.580	7.580	7.580
	(2.41)	(0.49)	(0.78)	(-0.24)	(-0.69)	(-0.64)	(-0.58)	(0.12)	(0.12)	(0.12)
MfDR Index	-130.5**									
	(-4.78)									
Life cycle-related variables										
Approved amount				-0.221+	-0.812**	-0.823**	-1.030**	-0.271*	-0.271*	-0.271*
				(-1.65)	(-2.16)	(-2.10)	(-2.06)	(-1.79)	(-1.79)	(-1.79)
Prep. cost % balance				-0.289**	-0.121**	-0.107**	-0.105**	-0.011	-0.010	-0.001
				(-2.36)	(-3.63)	(-3.10)	(-2.34)	(-1.40)	(-1.40)	(-1.40)
Designs				67.46	-151.6	-110.2	-136.9	-91.35	-91.35	-91.35
				(0.84)	(-0.86)	(-0.56)	(-0.64)	(-1.25)	(-1.25)	(-1.25)
Land				-69.33	-36.89	-49.01	-24.85	-53.35	-53.35	-53.35
				(-0.71)	(-0.17)	(-0.21)	(-0.10)	(-0.60)	(-0.60)	(-0.60)
TC %					-7.112+	-8.834**	-9.424*			
					(-1.53)	(-2.11)	(-1.91)			
Risk classification										
Environmental A								564.7**	564.7**	564.7**
								(6.30)	(6.30)	(6.30)
Observations	401	463	463	418	102	102	102	418	418	418
Sectoral Division Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Instrument Dummies	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Executing Unit Dummies	No	No	No	No	No	No	Yes	No	Yes	Yes
Adjusted R-squared	0.751	0.740	0.769	0.766	0.798	0.796	0.785	0.817	0.817	0.817
t statistics in parentheses										
+ p<0.10, * p<0.08, ** p<0.05										

5. Conclusions

The analysis presented in this document seeks to identify the most important factors affecting the execution of projects in the past. We used a project life cycle approach in an effort to arrive at possible actions or recommendations that are positive for each disbursement stage in the future. The study has identified different macroeconomic, political, and project management variables that are associated with delays in the execution of IDB's investment projects. Moreover, the quantitative analysis reveals the importance of monitoring execution throughout the project's disbursement stages, the significance of the aggregate country factors, and the value of IDB actions to expedite the stages. This allows us to question whether there are sufficient grounds to outline the "rules for success" from the time of the project approval, as long as the explanatory factors are exogenous to the IDB. In this case, the Bank's role could consist of incorporating these matters into its strategic planning. In contrast, other factors that are within the IDB's control could be addressed if there were incentives to do so. One of these actions is the encouragement of the prompt undertaking of pre-investment or strategic planning activities of the projects. Finally, there is a strong component related to the country's management capacities, irrespective of the metric used. This means that regardless of the IDB's actions to expedite execution, there is a significant restriction on the side of the country that will be important to address.

Significant conclusions can be drawn from this study's findings. First, it is clearly important to secure a sound macro-fiscal environment in the countries, and to continue to work on efforts to improve their management and planning capacities. This turns out to be an important factor throughout the life of projects across the region. Conditioned by this, it is striking how strengthen- ing the ex-ante planning and assessment of projects in each country, through their public investment systems, is important in the start-up phases of execution. Poor strategic planning capacity, together with weak procurement systems, negatively affects execution. Perhaps this is an area for collaboration in which the IDB can contribute to the countries' efforts to strengthen their capacities. From the perspective of the IDB's sphere of action, during the planning stage there are tasks that may result in delays if not undertaken at the moment when the project is eligible for disbursements. For example, the estimates indicate that having final designs or ownership of land in infrastruc- ture projects or in projects with planned physical works before approval reduces the time between eligibility and the first disbursement by an average of 5.3 months. There is evidence of factors that are probably related to pre-investment during the preparation phase that determine whether a project progresses swiftly towards completion. Finally, the analysis herein suggests that the IDB's strategic planning should account for political cycles and legislative ratification requirements, or seek mechanisms (perhaps multiannual) that allow for these constraints to be addressed.

TABLE 16: TIME GAPS IN THE PROJECT MIDLIFE PHASE

	Macro	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP growth	35.39**	114.6**	67.02**	74.97**	91.54**	68.11*	40.19	18.32*	18.32*	18.32*
	(2.72)	(12.02)	(5.49)	(6.34)	(2.62)	(1.70)	(0.80)	(1.73)	(1.73)	(1.73)
Country risk	0.373**	0.627**	0.356**	0.411**	0.380+	0.318	0.222	0.0996	0.0996	0.0996
	(3.85)	(6.42)	(3.65)	(3.88)	(1.47)	(1.11)	(0.68)	(1.09)	(1.09)	(1.09)
Fiscal def. % GDP	-13.31	-109.2**	-69.13**	-71.36**	-56.92*	-43.58	-4.665	-7.985	-7.985	-7.985
	(-0.67)	(-7.41)	(-4.59)	(-4.80)	(-1.77)	(-1.14)	(-0.10)	(-0.56)	(-0.56)	(-0.56)
Inflation	19.94*	-13.90**	-8.451**	-9.976**	0.0144	-0.236	1.177	-3.335	-3.335	-3.335
	(1.77)	(-3.18)	(-2.39)	(-2.66)	(0.00)	(-0.05)	(0.22)	(-0.96)	(-0.96)	(-0.96)
Weather event	-58.16	232.6**	115.0*	138.3**	183.6	141.1	17.49	-18.79	-18.79	-18.79
	(-0.86)	(3.70)	(1.72)	(2.09)	(1.07)	(0.73)	(0.08)	(-0.32)	(-0.32)	(-0.32)
Elections	8.843	44.81	-1.595	-9.941	-38.06	93.16	-111.2	20.87	20.87	20.87
	(0.10)	(0.50)	(-0.02)	(-0.13)	(-0.17)	(0.39)	(-0.44)	(0.34)	(0.34)	(0.34)
Legis. approval	19.04	178.8**	109.1+	84.76	202.3	146.2	247.8	50.72	50.72	50.72
	(0.25)	(2.67)	(1.61)	(1.32)	(1.11)	(0.72)	(1.13)	(0.82)	(0.82)	(0.82)
Legis. majority	217.9**	80.64	68.17	60.58	118.6	227.6	211.4	53.49	53.49	53.49
	(2.37)	(0.90)	(0.82)	(0.69)	(0.63)	(1.05)	(0.89)	(0.71)	(0.71)	(0.71)
MfDR Index	-287.4**									
	(-8.36)									
Life cycle-related variables										
Approved amount				-0.281*	-0.891**	-0.697	-1.037*	-0.116	-0.116	-0.116
				(-1.73)	(-2.09)	(-1.45)	(-1.68)	(-0.66)	(-0.66)	(-0.66)
Prep. cost % balance				-0.0354**	-0.112**	-0.074+	0.006	-0.0185*	-0.0185*	-0.0185*
				(-5.08)	(2.12)	(1.46)	(1.06)	(-1.67)	(-1.67)	(-1.67)
Designs				242.5**	99.32	133.7	79.41	68.12	68.12	68.12
				(2.74)	(0.40)	(0.53)	(0.28)	(0.88)	(0.88)	(0.88)
Land				-8.514	165.2	295.4	333.5	19.62	19.62	19.62
				(-0.05)	(0.44)	(0.79)	(0.94)	(0.16)	(0.16)	(0.16)
TC % disbursements					-3.825**	-3.960**	-3.443**			
					(-5.59)	(-4.24)	(-3.31)			
Risk classification										
Environmental A								800.6**	800.6**	800.6**
								(7.04)	(7.04)	(7.04)
Observations	365	416	416	367	95	95	95	367	367	367
Sectoral Division Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Instrument Dummies	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Executing Unit Dummies	No	No	No	No	No	No	Yes	No	Yes	Yes
Adjusted R-squared	0.791	0.735	0.769	0.832	0.821	0.819	0.817	0.881	0.881	0.881

t statistics in parentheses

+ p<0.10, * p<0.08, ** p<0.05

TABLE 17: TIME GAPS IN THE PROJECT COMPLETION PHASE

	Macro	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP growth	47.14**	143.5**	87.53**	111.3**	105.5*	66.56	-38.19	57.96**	57.96**	57.96**
	(2.20)	(9.04)	(4.40)	(3.99)	(1.84)	(1.26)	(-0.39)	(2.53)	(2.53)	(2.53)
Country risk	0.352**	0.668**	0.315**	0.291*	0.0345	0.0427	-0.624	-0.0771	-0.0771	-0.0771
	(2.56)	(4.27)	(2.15)	(1.73)	(0.05)	(0.06)	(-1.32)	(-0.50)	(-0.50)	(-0.50)
Fiscal def. % GDP	-2.535	-131.2**	-81.12**	-109.8**	-164.6*	-141.1	-183.2	-58.42**	-58.42**	-58.42**
	(-0.07)	(-4.80)	(-3.00)	(-3.54)	(-1.86)	(-1.41)	(-1.34)	(-2.09)	(-2.09)	(-2.09)
Inflation	31.31**	-11.04+	-8.519+	-14.24**	45.27	48.16	48.59	-6.651*	-6.651*	-6.651*
	(3.78)	(-1.49)	(-1.61)	(-3.22)	(0.63)	(0.60)	(1.03)	(-1.68)	(-1.68)	(-1.68)
Weather event	12.76	325.3**	133.9	127.4	-114.2	-250.7	-706.5+	45.95	45.95	45.95
	(0.10)	(2.87)	(1.10)	(1.27)	(-0.37)	(-0.71)	(-1.83)	(0.49)	(0.49)	(0.49)
Elections	143.3	60.23	130.1	-120.5	-232.9	-71.46	293.4	-141.4	-141.4	-141.4
	(1.06)	(0.49)	(1.02)	(-0.87)	(-0.74)	(-0.24)	(0.76)	(-1.03)	(-1.03)	(-1.03)
Legis. approval	-43.11	48.93	0.914	59.50	124.9	267.3	324.0	55.60	55.60	55.60
	(-0.42)	(0.51)	(0.01)	(0.55)	(0.27)	(0.50)	(0.86)	(0.51)	(0.51)	(0.51)
Legis. majority	195.5*	-142.5	-17.83	-9.387	-68.71	-2.873	0.0622	1.209	1.209	1.209
	(1.93)	(-1.14)	(-0.15)	(-0.08)	(-0.29)	(-0.01)	(0.00)	(0.01)	(0.01)	(0.01)
MfDR Index	-299.0**									
	(-8.00)									
Life cycle-related variables										
Approved amount				0.236	0.660	1.089	1.398	0.343	0.343	0.343
				(1.21)	(0.68)	(0.85)	(1.19)	(1.28)	(1.28)	(1.28)
Prep. cost % balance				0.00156	96.72	103.6	110.7	-0.0355	-0.0355	-0.0355
				(0.09)	(1.43)	(1.22)	(0.84)	(-1.42)	(-1.42)	(-1.42)
Designs				308.0**	-45.76	28.99	-356.6	92.76	92.76	92.76
				(2.25)	(-0.16)	(0.08)	(-0.60)	(0.62)	(0.62)	(0.62)
Land				-17.62	1018.8**	1036.8*	1526.0**	243.3	243.3	243.3
				(-0.07)	(2.31)	(2.10)	(4.63)	(1.03)	(1.03)	(1.03)
TC % disbursements					-0.702	-11.66	2.425			
					(-0.03)	(-0.33)	(0.05)			
Risk classification										
Environmental A								576.7**	576.7**	576.7**
								(2.37)	(2.37)	(2.37)
Observations	281	316	316	150	41	41	41	150	150	150
Sectoral Division Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Instrument Dummies	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Executing Unit Dummies	No	No	No	No	No	No	Yes	No	Yes	Yes
Adjusted R-squared	0.775	0.716	0.747	0.879	0.895	0.884	0.933	0.901	0.901	0.901

t statistics in parentheses

+ p<0.10, * p<0.08, ** p<0.05

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Appendices

TABLE 18: TIME ELAPSED BETWEEN MILESTONES BY SECTOR

Sector	Statistic	Days to first disbursement				Days between:		No. projects
		From approval	From legal effect	From eligibility		Approval-legal effect	Legal effect-eligibility	
CMF	Average	448.1	236.9	52.8		211.2	184.1	1
	Sum	-	-	-		-	-	58
	Std. dev.	326.3	214.3	81.9		181.9	191.4	0
	Min	14.0	5.0	1.0		2.0	1.0	1
	Max	1610.0	839.0	346.0		911.0	811.0	1
CTI	Average	488.5	218.8	33.3		269.7	185.6	1
	Sum	-	-	-		-	-	36
	Std. dev.	444.8	157.5	42.8		393.0	145.6	0
	Min	86.0	24.0	0.0		23.0	16.0	1
	Max	2528.0	804.0	178.0		2305.0	769.0	1
EDU	Average	375.6	195.3	38.1		180.4	157.1	1
	Sum	-	-	-		-	-	56
	Std. dev.	209.6	115.6	46.0		162.8	92.0	0
	Min	21.0	7.0	1.0		1.0	6.0	1
	Max	1169.0	550.0	182.0		799.0	460.0	1
ENE	Average	507.7	323.8	131.1		184.0	192.7	1
	Sum	-	-	-		-	-	52
	Std. dev.	326.9	250.1	205.3		165.8	120.9	0
	Min	34.0	29.0	0.0		5.0	28.0	1
	Max	1503.0	1439.0	1083.0		779.0	778.0	1
FMM	Average	482.3	254.6	71.5		227.7	183.1	1
	Sum	-	-	-		-	-	114
	Std. dev.	301.7	167.3	120.0		241.6	119.6	0
	Min	105.0	23.0	0.0		6.0	20.0	1
	Max	1573.0	1104.0	924.0		1413.0	575.0	1
GDI	Average	378.0	187.5	17.5		190.5	170.0	1
	Sum	-	-	-		-	-	4
	Std. dev.	96.0	76.1	17.1		159.9	66.6	0
	Min	292.0	75.0	1.0		62.0	74.0	1
	Max	493.0	238.0	41.0		418.0	228.0	1
HUD	Average	498.3	252.1	86.8		246.2	165.4	1
	Sum	-	-	-		-	-	36
	Std. dev.	439.5	269.9	151.1		301.8	176.3	0
	Min	68.0	46.0	1.0		12.0	35.0	1
	Max	2021.0	1448.0	653.0		1712.0	1070.0	1
ICS	Average	452.6	241.0	62.8		211.6	178.2	1
	Sum	-	-	-		-	-	114

	Std. dev.	327.8	178.8	117.0		252.9	129.9	0
	Min	7.0	6.0	0.0		1.0	3.0	1
	Max	2024.0	1052.0	819.0		1512.0	806.0	1
INT	Average	498.6	164.9	14.4		333.8	150.5	1
	Sum	-	-	-		-	-	8
	Std. dev.	314.8	142.1	15.9		232.5	142.9	0
	Min	168.0	37.0	0.0		42.0	25.0	1
	Max	946.0	366.0	47.0		695.0	364.0	1
LMK	Average	473.9	284.5	51.3		189.4	233.1	1
	Sum	-	-	-		-	-	15
	Std. dev.	196.5	171.9	74.2		128.6	148.8	0
	Min	187.0	60.0	2.0		37.0	44.0	1
	Max	852.0	727.0	231.0		442.0	687.0	1
RND	Average	450.7	240.2	52.3		210.4	188.0	1
	Sum	-	-	-		-	-	146
	Std. dev.	305.0	146.9	91.6		229.5	111.5	0
	Min	43.0	23.0	0.0		3.0	15.0	1
	Max	2191.0	770.0	672.0		1752.0	644.0	1
SPH	Average	382.4	202.7	35.4		179.7	167.4	1
	Sum	-	-	-		-	-	114
	Std. dev.	256.2	164.4	73.0		161.7	133.3	0
	Min	6.0	2.0	0.0		0.0	1.0	1
	Max	1329.0	888.0	630.0		1049.0	838.0	1
TIN	Average	509.9	253.5	36.1		256.5	217.4	1
	Sum	-	-	-		-	-	13
	Std. dev.	242.4	93.9	37.4		231.0	89.2	0
	Min	175.0	83.0	4.0		25.0	72.0	1
	Max	962.0	407.0	141.0		600.0	392.0	1
TIU	Average	496.3	410.5	100.5		85.8	310.0	1
	Sum	-	-	-		-	-	6
	Std. dev.	291.0	277.9	148.9		56.4	225.6	0
	Min	184.0	154.0	4.0		7.0	131.0	1
	Max	831.0	755.0	391.0		169.0	722.0	1
TSP	Average	485.9	276.0	83.6		210.0	192.3	1
	Sum	-	-	-		-	-	134
	Std. dev.	334.8	216.7	153.8		220.2	136.2	0
	Min	15.0	1.0	0.0		1.0	0.0	1
	Max	1913.0	1468.0	1293.0		1185.0	918.0	1
WSA	Average	580.5	342.2	109.8		238.3	232.5	1
	Sum	-	-	-		-	-	105
	Std. dev.	355.5	213.1	165.4		275.4	131.0	0
	Min	117.0	68.0	0.0		2.0	41.0	1
	Max	1885.0	1086.0	729.0		1493.0	797.0	1

TABLE 19: MACROECONOMIC, WEATHER, AND POLITICAL CYCLE VARIABLES

Year	Statistic	Per capita GDP	Inflation	EMBI	Deficit % GDP	Debt % GDP	Weather event	Legis. approval	% ruling party
2000	Average	9472.8	13.0	834.6	-2.5	54.9	0.3	0.4	59.3
	Median	7387.6	6.0	567.0	-2.4	44.4	0.0	0.0	59.3
	Std. dev.	3655.4	24.1	719.6	3.2	23.2	0.5	0.5	0.0
	Min	3456.1	1.0	366.4	-9.1	28.2	0.0	0.0	59.3
	Max	15015.2	91.0	2866.2	4.4	120.2	1.0	1.0	59.3
2005	Average	7572.7	7.2	691.3	-1.4	59.8	0.7	0.7	47.1
	Median	6119.8	7.7	409.3	-1.3	57.2	1.0	1.0	50.7
	Std. dev.	4244.4	3.7	588.3	2.5	27.5	0.5	0.5	12.8
	Min	1562.0	1.2	64.9	-8.5	7.0	0.0	0.0	11.3
	Max	26429.4	20.1	2566.4	4.5	127.5	1.0	1.0	96.4
2007	Average	9046.5	9.1	380.8	-0.1	40.4	0.5	0.6	46.6
	Median	8649.1	8.5	207.6	0.0	34.5	1.0	1.0	48.4
	Std. dev.	5254.0	4.4	302.4	2.6	22.0	0.5	0.5	14.0
	Min	1599.8	2.7	100.9	-4.3	3.9	0.0	0.0	16.2
	Max	31047.5	22.5	1067.3	7.9	123.2	1.0	1.0	96.4
2009	Average	9814.4	2.8	739.0	-3.0	43.7	0.4	0.5	43.7
	Median	9308.7	1.9	835.8	-3.0	40.0	0.0	1.0	43.1
	Std. dev.	5656.2	4.5	473.1	2.3	25.7	0.5	0.5	16.1
	Min	1613.1	-4.7	206.5	-11.4	5.8	0.0	0.0	16.2
	Max	30403.8	25.1	2192.7	0.0	145.2	1.0	1.0	96.4
2011	Average	11422.1	7.7	557.6	-2.0	40.8	0.5	0.6	45.8
	Median	11320.9	6.5	443.0	-2.5	35.7	1.0	1.0	45.1
	Std. dev.	6321.2	4.3	392.0	2.5	24.2	0.5	0.5	15.2
	Min	1562.3	2.3	0.0	-11.6	11.1	0.0	0.0	17.0
	Max	31012.7	27.6	1213.5	2.0	142.6	1.0	1.0	83.3
2013	Average	11799.7	6.5	549.7	-3.7	43.6	0.3	0.5	45.4
	Median	11887.7	4.8	376.9	-3.0	36.9	0.0	1.0	44.7
	Std. dev.	7056.5	9.0	393.5	3.2	22.5	0.5	0.5	15.6
	Min	1629.4	0.6	92.8	-14.3	12.7	0.0	0.0	17.0
	Max	31925.8	56.2	1218.1	0.7	143.5	1.0	1.0	76.3
2015	Average	11676.9	15.7	611.2	-5.7	48.0	0.4	0.6	39.5
	Median	12985.4	3.7	385.3	-4.0	42.2	0.0	1.0	40.4
	Std. dev.	7339.4	39.8	629.9	5.0	21.2	0.5	0.5	21.3
	Min	1651.2	-2.5	185.8	-23.1	17.4	0.0	0.0	7.0
	Max	31283.5	180.9	2773.5	-0.2	121.9	1.0	1.0	76.3
2016	Average	11942.8	17.0	544.9	-4.7	50.9	0.6	0.6	35.3
	Median	14023.7	4.2	394.6	-3.9	47.6	1.0	1.0	22.3
	Std. dev.	6879.8	52.7	529.0	3.9	21.9	0.5	0.5	22.0
	Min	1654.0	-0.9	197.3	-14.6	21.2	0.0	0.0	7.0
	Max	29579.0	274.4	2744.8	0.0	115.8	1.0	1.0	76.3

TABLE 20: MFDR INDEX FOR SELECTED YEARS

Year	Statistic	MfDR Index	Ex ante eval.	Procurement system	Mid-term vision	Strategic planning	Budgeting by results
2005	Average	2.0	2.4	2.1	3.2	2.3	1.5
	Median	1.8	2.6	2.1	3.6	1.9	1.3
	Std. dev.	0.7	1.3	1.0	0.8	0.8	0.9
	Min	0.5	0.0	0.3	1.1	0.2	0.2
	Max	3.9	4.9	4.6	4.2	4.2	4.4
2007	Average	1.9	2.2	2.1	3.0	2.3	1.5
	Median	1.8	2.6	2.1	3.1	2.1	1.3
	Std. dev.	0.7	1.3	1.0	0.9	0.8	0.9
	Min	0.5	0.0	0.3	1.1	0.2	0.2
	Max	3.9	4.9	4.6	4.2	4.2	4.4
2009	Average	2.1	2.2	2.3	3.0	2.5	1.8
	Median	2.0	2.6	2.1	3.1	2.3	1.5
	Std. dev.	0.8	1.3	1.1	0.7	0.8	1.0
	Min	0.7	0.0	0.4	1.2	0.2	0.3
	Max	4.0	4.9	4.7	4.2	4.2	4.5
2011	Average	2.3	2.3	2.5	3.1	2.7	2.0
	Median	2.1	2.7	2.4	3.0	2.5	1.8
	Std. dev.	0.8	1.2	1.0	0.6	0.8	1.0
	Min	0.8	0.0	0.6	1.2	0.2	0.3
	Max	4.1	4.9	4.8	4.3	4.2	4.6
2013	Average	2.3	2.2	2.6	3.1	2.9	1.9
	Median	2.3	2.0	2.2	2.9	2.9	1.8
	Std. dev.	0.8	1.3	1.0	0.7	0.8	1.1
	Min	0.9	0.0	0.7	1.3	0.2	0.3
	Max	4.2	4.9	4.9	4.3	4.2	4.7
2015	Average	2.5	2.3	2.7	3.2	3.1	2.0
	Median	2.3	2.6	2.4	3.0	3.2	1.8
	Std. dev.	0.9	1.3	1.0	0.7	0.7	1.2
	Min	0.9	0.0	0.7	1.3	0.2	0.3
	Max	4.2	4.9	4.9	4.3	4.2	4.7
2016	Average	2.5	2.4	2.8	3.2	3.1	2.1
	Median	2.3	2.6	2.5	3.0	3.2	1.8
	Std. dev.	0.9	1.2	0.9	0.7	0.8	1.2
	Min	0.9	0.0	0.7	1.3	0.2	0.3
	Max	4.2	4.9	4.9	4.3	4.2	4.7

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GLOBAL ECONOMIC GOVERNANCE INITIATIVE

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