European Bank
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What determines non-financial project success? Evidence from the EBRD

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Summary

This paper explores how various project- and client-related factors determine the non-financial success of EBRD investments. Non-financial project success is defined as the extent to which ex-ante transition objectives, such as the demonstration of new financing methods or the expansion of competitive markets, are realised ex-post. We use a unique dataset based on almost 1,600 EBRD projects completed between 2003 and 2016. The results suggest that the probability of success is higher for larger projects and for projects that are part of a framework. Projects with state clients are less likely to be successful and this is mainly the case because state ownership tends to significantly slow down project delivery.

Keywords: transition, project success, multilateral development banks.

JEL Classification Number: O12, O19, O22.

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1. Introduction

Multilateral development banks (MDBs) have been under increasing pressure to show that they achieve the financial and non-financial results for which they were originally set up, due to ever-shrinking financial resources being available for them to invest with. This has put the spotlight on how MDBs select projects and ensure that their investments comply with their institutional mandates and that their results meet their founding purpose.

All of this interest has led to an expansion of research into the factors driving project success in MDBs. The existing literature in this field is heavily focused on the World Bank's analyses. Factors most frequently found to matter for project success are project size, speed of project delivery and project novelty, among others.

This paper focuses on a unique dataset from the EBRD to investigate what factors drive the success of its projects. Unlike other development banks, the EBRD's principle mission is to help countries transition towards fully functioning, sustainable market economies. Thus, the Bank is committed to include transition-related objectives in its project lending criteria and to report on their delivery.

The Bank derives ex-ante transition impact objectives in a way that allows the subsequent evaluation of project success at completion. In the broader context, a Bank project could contribute to: the structure and extent of the markets (for example, greater competition in the project's sector); the institutions and policies that support markets (such as more widespread private ownership); and market-based conduct, skills and innovation (for example, transfer and dispersion of skills, setting standards for corporate governance and business conduct).

Based on the project-level data from almost 1,600 EBRD investments completed between 2003 and 2016, we carry out an empirical analysis of various factors behind project design and structure as well as client-related characteristics in order to determine which channels influence the likelihood of non-financial success. The key factors were chosen based on extensive literature review as well as the nature of the EBRD's projects, as explained in the next section.

The findings show that the probability of transition success is more likely with larger sized projects, although the robustness of this finding is challenged due to the potentially endogenous nature of project size, which was discovered based on Lewbel's (2012) method using a heteroscedasticity-based instrument. The results also show that projects that are part of a broader framework of operations are more successful than standalone projects. This "framework" factor is found to be mediated through project size, which channels approximately 17 per cent of its total effect on project success. Lastly, we show that projects with state clients are less likely to be successful; this variable is also found to mediate the impact of project implementation speed ("effectiveness delay") on the likelihood of success.

This paper contributes to the relevant literature in several ways. First, project selection bias is directly addressed with the use of Heckman selection techniques. Second, client-related success factors are explored. This is possible due to the unique nature of EBRD investments which target private sector clients. This links to another contribution – the very focus on EBRD projects which provides a useful value added to the existing literature. Lastly, from a broader perspective, this paper contributes to the deeper understanding of how project design and structure affect delivery in an organisation which targets non-financial success. Still,

further analysis is required as there are obvious trade-offs, as well as complementarities between financial and non-financial objectives which any hybrid organisation like the EBRD faces, and these are likely to impact the project success factors.

The paper is structured as follows. The first section outlines the relevant literature behind project success (factors) in general as well as in relation to MDBs, which is used to derive the predictions for the key factors. The next section describes the data used, estimation techniques, data distributions and a few empirical set-up points. The results are then outlined. This is followed by a discussion, including the limitations of this paper as well as areas for further research. The final section concludes.

2. Literature review

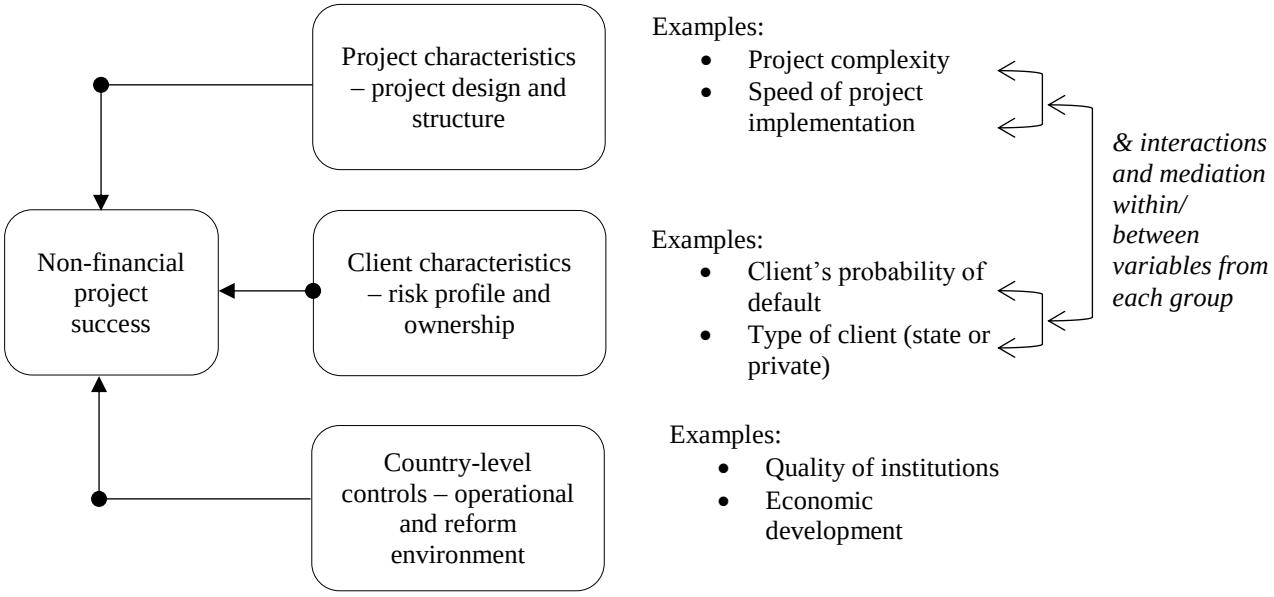
Identifying the reasons leading to project success could undoubtedly help in future project selection, and this is an important and recurring activity in many organisations, not just MDBs. Hence, many studies in the area of project management focus on reasons for project success which, as explained by Shenhar et al. (1997), is one of the most debated topics in this field and one of the least agreed upon.

The earliest research from this field dates back to the 1960s. It focuses on exploring project success criteria and claims that the main criteria for success are time, budget and project quality – the so-called "golden triangle". But, as described by Westerveld (2003), researchers fairly quickly established the impossibility of generating a checklist of project success criteria suitable for all projects. This is because success criteria could differ from project to project depending on various factors, such as project size, a project's uniqueness or complexity.

In response to this, many researchers, including Cooke-Davies (2002), separated the analysis of project success into two distinct topics – "project success criteria" and "project success factors". The success criteria relate to the measures by which the success of a project is judged, which refers here to project transition-related targets, whereas the success factors are those factors that could lead to the success of the project, for example, project- or client-related characteristics. This paper focuses on analysing the latter and it takes the former at its face value. It is also important to note the intentional focus placed on reasons influencing project success rather than project performance. This is because such reasons are likely to differ, as the former cannot be measured until after the project is completed, whereas the latter can be measured during the life of the project.

Belassi and Tukel (2006) claim that although many studies in the project management literature have generated lists of factors for project success, each list varies in its scope and purpose. It is often found that the success factors are listed as either general factors or specific factors affecting only a particular project. They suggest a new approach of grouping success factors and explaining interactions between them. This paper tests this approach through interaction terms and moderated mediation modelling. The reviewed literature (TableA1 in the Appendix) helped to derive a holistic approach of two groups of factors: project and client characteristics, as well as a range of country-level controls (see Chart 1).

Chart 1: Summary of the main factor groups of interest



Source: Author (2017).

Based on the reviewed literature, we expect the following factors to be associated with successful projects:

- smaller project size
- longer "effectiveness delay" in project implementation
- being part of a framework
- presence of co-financing
- the client's characteristics (such as client's risk profile and its ownership type)

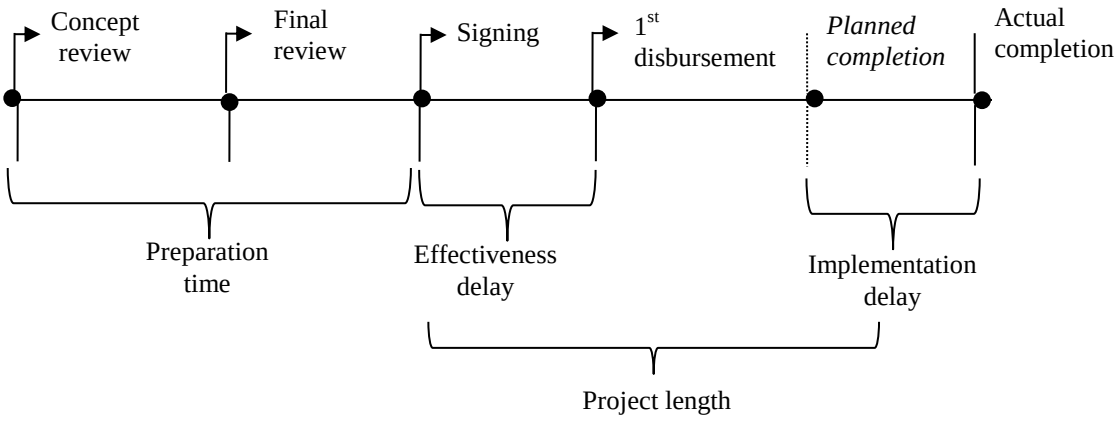
First, "project size" matters for success and it can be used as one of the potential proxies for project complexity, according to Bulman et al. (2015). Although there is considerable empirical evidence for the relationship between project complexity and its success, very little has been achieved in identifying the exact channels of this relationship, as argued by Antoniadis et al. (2011). They explain that it is often presumed that as complexity increases, the likelihood of project success decreases. Some scholars justify this relationship from a purely conceptual level. For instance, Galbraith (1974) claims that the greater the project complexity is, the greater the amount of information that must be processed among decision-makers during project execution in order to achieve a given level of project success. Only a few scholars go beyond this level and investigate the nature of the project complexity-success nexus further.

The causality of project size-success is in line with the project complexity-success argumentation. As project size increases, a greater risk is introduced to the project as claimed by Pinto and Kharbanda (1996). Specifically, the bigger the size of a project, the wider its implications which, in turn, increase the degree of risk involved. They also point out that diminishing returns on the resources invested are often present in larger projects, which is likely to lower the probability of project success.

Within the existing literature, only one paper focused exclusively on EBRD projects. Dobrescu et al. (2008) investigate the determinants of EBRD project success in building infrastructure in the economies where the Bank invests, and they find that project size plays no statistically significant role. In contrast to this, the preliminary statistical analysis of the studied sample used in this paper found that the project size increases the likelihood of project success. Thus, "project size" needs to be studied carefully through both direct and indirect modelling.

Second, the reviewed literature often refers to various project timeline-related variables which may matter for project success. Chart 2 illustrates a selection of such variables applied to the EBRD project lifecycle.

Chart 2: Illustration of selected variables in relation to a typical EBRD project lifecycle



Source: Author (2017).

As explained by Bulman et al. (2015), the "effectiveness delay" variable could capture delays in the project lifecycle and matters for project success. This variable measures the time from signing the loan to the time that all conditions of the loan agreement are fulfilled for the disbursements to be made. The authors find that longer effectiveness delays contribute towards project success. They explain that a potential channel for this effect is that in some countries, experienced executing agencies may wait to fulfil all conditions until detailed project designs are completed. This then reduces later delays for which special "commitment" charges may be levied by the lender. The observed "delay" to declaration of effectiveness, thus, indicates positive interventions which then enhance the speed of subsequent project implementation.

Third, the uniqueness of the project can affect the project manager's competence, as claimed by Belassi and Tukel (1996), and therefore reduce the probability of project success. Finding a right proxy for project novelty could be challenging, as proved by Denizer et al. (2013) who could not find any direct proxy for project novelty for studied World Bank investments. As an alternative, they identified the sequences of projects that are follow-ups of previous investments, and so presumably are less novel than the original project in the sequence. Their argument is that repeat projects are less complex than non-repeat projects. They find a positive relationship between repeat projects and their likelihood of success.

Other scholars have extended the definition of "project novelty" towards "portfolio interdependency", which describes the interdependency between projects both in terms of

scope and content – that is, the extent to which projects depend on the results of other projects and need to be aligned with each other, as defined by Voss and Kock (2013). From a theoretical perspective, higher interdependency may be negatively correlated with success due to the higher complexity of the associated processes, but some studies suggest the opposite, as argued by Cusumano and Nobeoka (2015). A proxy for portfolio interdependency, as well as overall project novelty, used in this paper is "framework" mapping, that is, whether the project is part of an existing framework (a "repeat' project") or standalone operation (a "non-repeat" project) and a positive relationship between "repeat" projects and success probability is expected to be found.

Fourth, based on the reviewed literature we investigate whether the presence of project co-financing affects the probability of project success through project size. IMF (2014) defines co-financing as the joint financing of projects through loans or grants to countries provided by commercial banks, credit agencies, or other official institutions in association with other agencies or MDBs. Kotchen and Negi (2016) study the determinants and impacts of co-financing based on the data from the Global Environmental Facility and they find that greater co-financing increases the probability of a project's success. They also find that co-financing tends to favour projects that are larger.

In contrast, Dobrescu et al. (2008) find that project co-financing could have a negative effect on project success. This could be because other parties involved in the project reduce their efforts when the EBRD plays a major role, which is consistent with the expectation that parties involved in a project may free-ride on each other. From a theoretical perspective, the number of co-financing partners could have a non-linear effect on project success – that is, the higher the number of co-financing partners, the more likely are the chances of free-riding and higher maintenance costs, hence lower chances of success.[1]

Due to these contractionary literature findings, we focus on testing the significance of the indirect relationship between project size and co-financing regardless of the direction of influence between co-financing and project outcome.

Lastly, there is no existing literature evidence for the role of client-related factors in driving project success among MDBs. This could partly be because existing studies focus heavily on World Bank projects, which lend to countries rather than to the private sector. The private sector focus is one of the unique characteristics of EBRD projects. Two client-related variables are used to investigate the significance of client-related factors in project success with the aim of contributing towards yet unexplored areas in the literature.

First, client risk, which is not only the function of the environment in which the client operates, but also of the internal structure of the firm, could have a substantial effect on the likelihood of project success (for example, corporate governance, strength of management, financial performance). A large part of the client risk analysis, which is carried out by the EBRD's credit department, is focused on the client, contrary to financial additionality, which puts emphasis on the overall environment in which the client is seeking financing. The overall client's probability of default (PD) is derived by comparing the counterparty PD rating of the borrower with that of the guarantor and selecting the better (that is, lower risk, as

[1] The distribution of the number of co-financing partners among the EBRD projects was tested. Due to limited data variation, it was decided to use a dummy of co-financing presence rather than the quantitate count of co-financing partners.

indicated by the counterparty risk rating) of the two. From a purely theoretical perspective, the higher the client's PD, the more likely it is to be associated with a lower probability of project success. Due to data availability, there are no alternative measures of client risk that could be tested in this paper.

Second, the Bank focuses on increasing private sector participation in the economies where it invests. However, the Bank also deals with state clients. Although the transition potential of dealing with a state client could be higher, so are the risks of project failure. Therefore, state-client ownership is likely to be negatively associated with the probability of project success, but there is no literature evidence to support this prediction.

3. Methodology

3.1 Data and estimation techniques

The analysis is based on project-level data from the EBRD covering all of the economies in which the Bank invests as at the studied period (35 economies). All of the analysed projects with a completed transition assessment between 2003 and 2016 are included in the uncensored sample (1,573 observations). The analysis begins from 2003 because it was the first year in which the EBRD used its transition impact monitoring system (TIMS) to measure and track a project's transition performance in a universal fashion during project implementation. Before that date, only an ex-ante project assessment of transition was carried out.

To understand the data on project outcomes used in this paper, some institutional background knowledge is helpful. Unlike the World Bank and other regional development banks that lend to governments in exchange for sector or economy-wide policy reforms, the EBRD's main vehicle to fulfil its mission of building market economies is its investment portfolio. For this reason, the unit of observation in this analysis is an investment project. For each project, a transition impact (TI) score is derived, the so-called expected transition impact (ETI), defined as the combination of a project's ambition (TI potential) and likelihood of success (TI risk) – please refer to Chart A1 in the Exhibit A1. These scores are derived based on the detailed ex-ante transition assessment of each project from which transition objectives are set. These can target the following three broad economic areas:

- improving the structure and extent of the market (expansion of competitive market interactions)
- developing market-supporting institutions (private ownership, market-supporting policies, laws and institutions)
- market-based behaviour, skills and innovation (transfer of skills, demonstration effect of replicable products, processes, restructuring, financing, setting standards of corporate governance and business conduct).

Another indicator – portfolio transition impact (PTI) – is a measure that tracks the evolution of ETI across the life of a project, including the ex-post transition actually achieved, which is used to derive the dependent variables used in this paper. The technical details behind ETI and PTI scores are presented in Exhibit A1 in the Appendix.

In simple terms, the dependent variable is derived by comparing ex-ante ETI with ex-post PTI scores in order to categorise the project's success into the following binary variable (1,0), which is used to derive the probability of project success in the probit models:

- "Success achieved" (1): projects preserve or outperform their original transition scores at the completion stage (ETI $\leq$ PTI)
- "Success not achieved" (0): projects underperform on their original transition scores by either fully or partially failing (ETI > PTI).

There are a few reasons why a binary (1,0) dependent variable is used. First, the categorisation of the PTI-ETI scores greatly simplifies the statistical analysis and leads to easy interpretation and presentation of results. Second, although dichotomisation of the

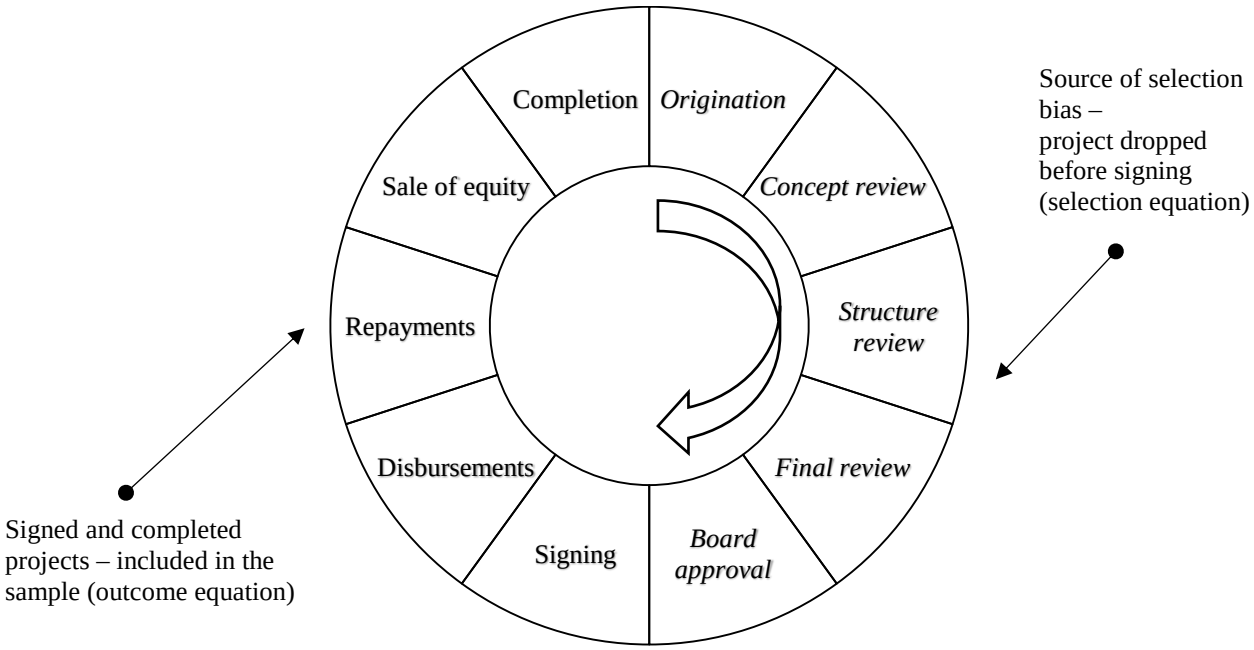
dependent variable could lead to some information loss on PTI-ETI trends, the distribution of the ETI and PTI scores tends to draw a clear categorisation among them. This is partly caused by the design of the ETI/PTI matrix which does not deliver a fully continuous distribution in its true meaning, but rather tends to allocate the scores in certain buckets. In addition to this, on average, ETI equals PTI among the Bank's portfolio. Thus, the categorisation of PTI-ETI does not come with a high information loss. Moreover, a more useful message for the sake of future projects is likely to refer to factors that lead to a project's full success rather than in reference to an increase in its PTI-ETI delivery. Lastly, the presence of a binary dependent variable is crucial to handle selection bias modelling, which is explained later.

It is important to note that the transition rating of an EBRD project is meant to take account of all the information available about the project and is carried out by economists at the Bank. This information includes characteristics related to the context where the project is implemented, the transition challenges facing the client, sector or economy, and the way the project is legally and financially structured to address those transition challenges. Since this paper is focusing on "completed" projects, the quality of transition ratings is taken as given, as ratings have been agreed and signed off by the Board and then rigorously monitored and assessed until the completion stage of the project. Also, it is worth noting that the initial level of ex-ante transition potential was taken into account in the regressions, but had to be dropped due to strong multicollinearity with other variables that were kept for the sake of hypothesis testing.

Before outlining the data, it is important to introduce the issue of selection bias which is at the heart of this analysis. Chart 3 aims to illustrate this concept. Such bias originates from a potential risk of looking only at the projects signed and approved by the Board (that is, left-hand side of the cycle – outcome equation) and not controlling for the rejected projects (right-hand side of the cycle – selection equation).

In more technical terms, selection bias, as defined by Cuddeback et al. (2004), could arise from the fact that "treated" projects (that is, all signed projects) differ from the "non-treated" (projects never signed) for reasons other than "treatment status" (project signing). As explained by Tucker (2011), selection bias occurs because project selection decisions are not always random and the outcomes of choices not made are never observable.

Chart 3: Potential sources of selection bias in an EBRD project lifecycle



Source: Author (2017).

It is vital to address selection bias because it could be a threat to the internal validity of this paper's findings in that project- or client-related variables could be correlated with a distribution term as theoretically proven by Cook and Cambell (1979). Selection bias can also threaten external validity because a final, biased sample might not be generalisable to the intended population (that is, all EBRD projects).

In the reviewed literature on the determinants of project success across MDBs, there is limited reference to selection bias and almost no universal solution to address it (see the final column in Table OA1 in the Online Appendix). For instance, Denizer et al. (2013) highlight the issue of selection bias in their research and mention that the instrumental variables (IV) method could have been used but, due to data limitations, they could not address it. Kilby (2012) studied the role of project preparation on project success, and was able to use the IV method by instrumenting for preparation time using country-level measures of political influence of donors on recipients. However, in addition to the usual concerns about justifying the validity of the exclusion restriction, which requires that political influence matters for project outcomes only through project preparation time, there is a further drawback of this approach, as claimed by Denizer et al. (2013). They claim that by relying on country-level variation in the instrument, one cannot account for the substantial within-country across-project variation in project outcomes.

In this paper, the Heckman selection model is used to address selection bias and this choice shapes the form of the estimation techniques applied in this paper. This is explained in more detail in Exhibit OA1 in the Online Appendix.

Table 1 provides summary statistics behind each of the explanatory and control variables used in the empirical analysis. Multiple diagnostic tests have been carried out in order to

ensure that the most robust data and models are selected for reporting on results. They ranged from simple normality diagnostics, multicollinearity as well as heteroscedasticity testing, among the others, and are available upon request.

Table 1: Summary statistics

Variable name	n	Mean	Median	Minimum	Maximum	Standard deviation
Project-level variables						
Project size (ln)	1,573	16.3	16.3	10.1	21.2	1.3
Effectiveness delay (srt)	1,514	1.8	1.4	0	10.5	1.3
Preparation time (srt)	1,573	3.2	2.8	0	12.2	1.7
Framework (1=yes, 0=otherwise)	1,573	0.3	0	0	1	0.5
Associated technical co-operation (1=yes, 0=otherwise)	1,573	0.2	0	0	1	0.4
Co-financing with other MDBs (1=yes, 0=otherwise)	1,514	0.2	0	0	1	0.4
Equity financing instrument (1=yes, 0=otherwise)*	1,573	1.1	1	0	1	0.3
Number of TI objectives	1,442	1.9	2	1	5	0.9
Client-level variables						
Client's PD score	1,573	6.1	6	2	8	0.9
Client as state (1=yes, 0=otherwise)	1,573	0.1	0	0	1	0.3
Country-level controls						
GDP per capita growth	1,573	5.1	5.3	(14.6)	33	4.9
Domestic credit	1,555	33.5	32.8	0.2	101.3	17.6
Bureaucracy quality index	1,357	1.7	1	1	4	0.8
Change in foreign exchange rates	1,573	(0.0)	0	(2.0)	0.9	0.1

Source: Author's calculations (2017).
Notes: This table shows summary statistics for the explanatory and control variables used in the empirical analysis on measured project success sample (n=1,573). All variable definitions and data sources are provided in Table A1 in the Appendix. Equity financing instrument is tagged only under projects which used equity for 100 per cent of its project financing.

It is important to clarify the division between the explanatory and control variables applied in this paper. The majority of the existing literature relates to public sector projects funded by the World Bank individually or in comparison to other MDBs and, thus, puts a greater focus on country-related factors than project-related factors as well as differences between the two sub-groups.

For instance, Bulman et al. (2015) compare the correlation of project success in the World Bank with those in the Asian Development Bank (ADB). They find that project success rates vary more within countries than across countries. In terms of specific country-level factors, they identify GDP growth as well as a sound policy environment as the most important factors affecting project success. The authors do not find any evidence to their claim that the magnitude of the relationship between these country- and project-level correlates and project outcomes is the same across the World Bank and ADB.

Denizer et al. (2013), more importantly, have aimed to bridge the visible gap between the country-level and project-level literature approaches. They build their argument on the observation that, while country-level factors are important for project outcomes, these outcomes vary more across projects within countries than they do between countries. They explain that much of the previous literature has relied on country-level variables to explain

project-level success, even though country-level variation accounts for only about one-fifth of the variation in project outcomes. They added that, from the policy perspective, this observation is particularly useful, given most aid donors' focus on country-level factors for determining conditionality and eligibility for their aid programmes.

From the EBRD perspective, however, the opposite applies. The core of the Bank's business model is lending to private sector projects and the Bank is committed to fully factoring in project-level, not country-level, transition lending criteria and tracking their delivery. For this reason, project-related factors are of main importance in this paper, which brings a value-added to the existing literature.

There are a few important practical caveats to note about the selected variables. First, several country-level controls had to be dropped due to limited variation within countries, such as Freedom House indices. This is also a general weakness in the country-level controls actually used, particularly for indices where year-on-year change is often not substantial.

Second, there is only one good proxy for client's strength that can be used in this paper, namely, a client's PD. This shortage of good proxies originates from the fact that the EBRD does not store financial information of its clients in an aggregated and consistent manner. One potential solution could be to externally source financials of the Bank's clients. This was carried out, but failed to deliver a robust coverage for the sample used in this paper.[2] Still, a client's PD is a strong proxy for the client's strength.

Lastly, the time-lagged variables – for example effectiveness delay – all displayed signs of Poisson distribution and, thus, required square root transformations. In addition to this, project length variables tend to vary across sector and countries. This contributes to a difficulty in deciding what data point to use for the country-level variables as well as client's PD, which could be measured at various stages of the project lifecycle. Different approaches are assessed under the robustness checks in order to validate the initial findings.

3.2 Data distribution

Overall, 67 per cent of studied projects were successful; they achieved, or overachieved on their ex-ante transition objectives. However, less than 10 per cent of projects failed, which could indicate solid project selection and management mechanisms already at work at the Bank. It is worth noting that the vast majority of projects have a high ex-ante transition risk with good transition potential. Most projects in the sample are of small to medium size of up to €50 million, and there is a noticeable trend of a higher probability of success with an increase in project size, which goes against the literature evidence. The average project length is 65 months. Infrastructure projects record the highest average length of 91 months. Projects from the financial sector, however, are much shorter with an average duration of 60 months. Overall, the Bank's projects became less lengthy over time across all sectors. This trend is in

[2] The manual mapping of EBRD client names against the Bureau van Dijk (BvD) database was carried out under the lead of the EBRD's OCE (Office of the Chief Economist) department, Cagatay Bircan (OCE) and Markus Biesinger (Equity Participation Fund), who kindly shared the mapped BvD codes with the author (2017). Based on the pull of mapped client names against the sample used in this paper, less than 75 per cent of the Bank's clients were identified with multiple missing values, particularly for smaller countries (such as Turkmenistan and Tajikistan) as well as smaller companies which are common among the Bank's investments. Thus, these could not be used.

line with the reduction in the "effectiveness delays", which drastically decreased from nine months in the early 2000s to just under two months in more recent years. Such trends are consistent across all sectors.

There is substantial regional variation in project outcomes with the CEB[3] region standing out with the highest success probability, while CA[4] has the lowest. This justifies further the importance of exploring geographical differences among projects rather than applying country fixed effects, for instance. Almost one-third of the sample is part of a framework. Those projects appear more likely to be successful than standalone operations. There is no strong geographical concentration for such projects. A vast majority of the sample is using debt financing (82 per cent) and they also tend not to be co-financed with other MDBs or require technical assistance. Lastly, the majority of the Bank's projects are carried out in financial institutions or corporate sectors and they tend to target the maximum of two transition objectives, frequently "market expansion" and "demonstration of setting standards of corporate governance and business conduct".

3.3 Empirical set-up

There are three core econometrics issues identified in the studied sample which require special attention, namely: (i) selection bias; (ii) indirect effects; and (iii) potential endogenous regressors. They are outlined here and explained in more depth in Exhibit OA1 in the Online Appendix. Their order dictates the sequence for the results discussion, which follows.

First, the selection bias issue is addressed with the help of Heckman techniques. Such techniques work well with the binary set-up of the dependent variable and they address the selection bias causes by unobservable factors impacting project selection. Second, indirect channels through which certain explanatory variables may impact project success are investigated with the help of interaction terms and moderated mediation modelling. Interaction terms are widely used among scholars, but they do not quantify the exact magnitude of indirect effects. A moderated mediation technique, on the other hand, provides a robust way of exploring conditional indirect effects, although it has not been widely used in the existing literature. Lastly, Lewbel's model is used to address the potentially endogenous nature of the project size variable with the help of a heteroscedasticity-based instrument due to the absence of good external instruments.

[3] CEB stands for central Europe and the Baltic states and includes the following countries: Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia.
[4] CA stands for Central Asia and includes the following countries: Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan and Uzbekistan.

4. Empirical results

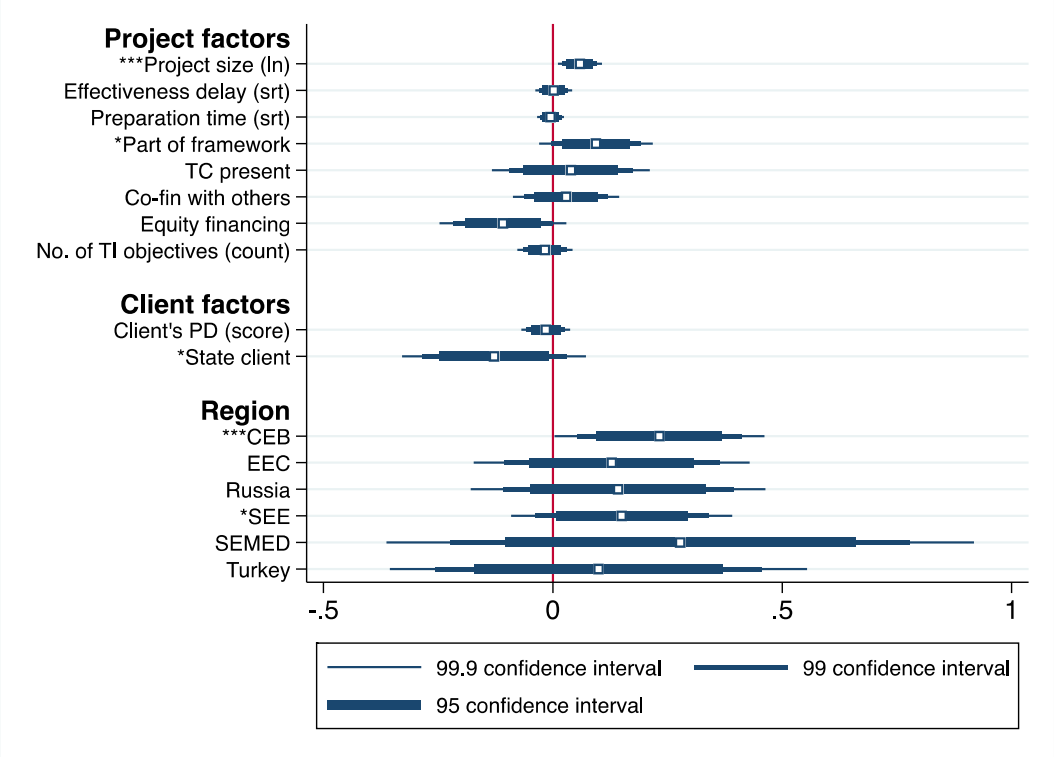
4.1 Selection bias results

The selection bias results are outlined first (see Table OA2 in the Online Appendix for details). Based on the four tested approaches, there is no strong evidence to reject the null hypothesis of independence of selection and outcome equations. Hence, it is safe to proceed with the modelling of the outcome equation with no controls for selection bias, which is reassuring considering the importance of such controls as explained earlier in this paper. In terms of specifics, the reported rho statistics are not significant in any of the applicable models (Models A and B).[5] Similarly, the inverse Mills ratio is not significant under two-stage Heckman Model C. Model D, which includes additional country-level controls, provides an extra robustness check by varying the controls in the specification, and further re-confirms the results of no selection bias.

4.2 Regression results

As the analysis finds no evidence for selection bias, the main focus is placed on probit modelling of the outcome equation (full details in Table A2 in the Appendix). A variety of specifications is reported to indicate the robustness of the findings. First, Model 1 is reported, which has been selected based on a range of diagnostic checks carried out on various model specifications. This is the model without interaction terms and its coefficients are plotted under Chart 4.

Chart 4: Average marginal effects based on Model 1



[5] Rho statistics are negative under all of the tested methods. This indicates that unobservables are negatively correlated with one another. However, since these results are missing statistical significance, this means that there is no robust indication of project selection at work in the specification.

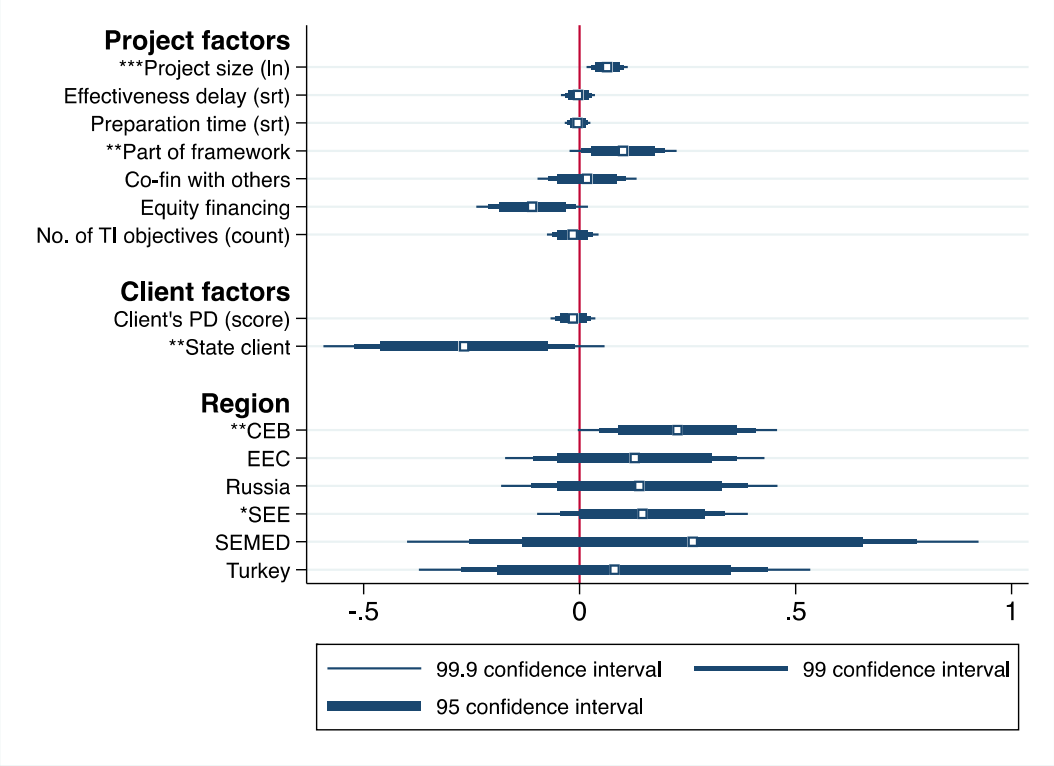
Source: Author's calculations (2017).
Notes: This chart plots the coefficients from Model 1 (details in Table A2 in the Appendix). The dependent variable is the probability of project success, which is plotted on the x-axis. The following coefficients are omitted from graphical display: sectors, country-level controls, constant, signing years dummies. Confidence intervals are plotted as per legend description. Statistical significance is indicated at the beginning of the variable name as follows: *p<0.05, **p<0.01, ***p<0.001.

As can be noted from Chart 4, only two project-related factors produce significant results, namely the "project size" variable and "framework" dummy. From the client-related factors, the client's state ownership stands out as the only significant result, albeit with relatively wide standard errors. Two regional dummies display significant results, namely CEB and SEE.[6]

As explained earlier, special attention is paid to indirect effects. A series of models is tested in which the core variables, in particular "project size", are interacted with other explanatory variables. Based on the test results, the only significant coefficients within 95 per cent confidence interval are: (i) "project size" versus TC dummy; and (ii) "effectiveness delay" versus client ownership.

As confirmed through the diagnostic checks, adding the interaction terms has slightly improved the robustness of Model 1. Specifically, as can be seen from Chart 5 as well as Table A2 in the Appendix, the client as state dummy has gained in significance. "Project size" has recorded a slightly stronger magnitude, as has the framework dummy and a few regional dummies. Sectoral dummies, on the other hand, as well as co-financing and TC dummies, all have slightly reduced their respective magnitudes (see chart notes below).

Chart 5: Average marginal effects based on Model 2



[6] SEE stands for south-eastern Europe and includes the following countries: Albania, Bosnia and Herzegovina, Bulgaria, FYR Macedonia, Kosovo, Montenegro, Romania and Serbia.

Source: Author's calculations (2017).
Notes: This chart plots the coefficients from Model 2 (see details in Table A2 in the Appendix). The dependent variable is the probability of project success, which is plotted on the x-axis. The following coefficients are omitted from graphical display: sectors, country-level controls, constant, signing years dummies, TC dummy (due to large standard errors), interaction terms. Confidence intervals are plotted as per legend description. Statistical significance is indicated at the beginning of the variable name as follows: *p<0.05, **p<0.01, ***p<0.001.

Model 3 reported in Table A2 addresses the issue of potential endogenous bias. Specifically, the standard IV method could not be used to assess the treatment of "project size", which is the core potential endogenous variable, as explained earlier, due to lack of valid instruments for "project size". Lewbel's (2012) method which uses heteroscedasticity to identify the endogenous regressor is applied with the Stata application for probit modelling.[7]

In terms of specifics behind Model 3, the bootstrapping is reduced to 45 replications in order to allow for model convergence. The vce clustering option, which has been applied in all models, is not allowed here. Similarly, no interaction terms are allowed due to model set-up requirements. The "y2 hat" (that is, fitted value of project size) produces a positive, but not statistically significant, coefficient, as can be seen from Table A2. There is no change in the majority of the coefficients' magnitudes, signs or significance levels as noted in the last column in Table 2. "Framework dummy" and "client as state" are the only two reported coefficients that record significance losses but retain their magnitude and positive signs.

It is important to note that the identifications under Model 3 are based on higher moments, and, thus, as explained by Lewbel and College (2010), are likely to give noisier, less reliable estimates than identification based on standard exclusion restrictions. Still, it is a useful application as there is no robust instrument to use for "project size".

In sum, most of the reported significant results confirm the initial factor predictions, albeit with a few exceptions: for example, "project size" delivers significantly positive rather than negative coefficient in all models except Model 3 where its fitted value loses its significance, which could confirm the suspected endogenous character of this variable. "Being part of a framework" is found, as expected, to be a factor that increases the likelihood of project success (as confirmed in all models except Model 3). Client's characteristics matter for project success – that is, "client as state" is one factor which may reduce the chances of a project's transition success. Surprisingly, the client's PD does not produce significant results, although its sign is in line with the expectation of its negative influence on project success. Two regional dummies, namely CEB and SEE, maintain their positive significant coefficients across all models. The estimated indirect effects of "project size" versus TC dummy and "client as state" dummy versus "effectiveness delay" are modest under Model 2 but only at the lowest level of statistical significance. This calls for deeper analysis of indirect effects.

4.3 Moderated mediation analysis

Lastly, a more in-depth assessment of all of the potential indirect effects at work in the analysed probit models is carried out through moderated mediation modelling. The goal of such analysis is to investigate alternative causal mechanisms by examining the roles of

[7] The modelling base is Model 1, as ivreg2 cannot handle interaction terms. Also, ivreg2 only works if the endogenous variable is continuous, which works well with the tested "project size" variable.

intermediate variables that lie in the causal paths between the explanatory variables and project success probability as explained in Exhibit OA1 in the Online Appendix.

A broad combination of potential mediating variables and treatment variables is assessed together with respective sensitivity analyses. Table 3 presents only the significant results from this testing. "Project size" displays some indication of mediating properties for four treatment variables. "Effectiveness delay" is found to be partially mediated by the equity financing instrument as well as client's ownership which confirms the earlier findings from interaction terms. Lastly, co-financing with other MDBs seems to be mediated through equity financing.

Table 3: Results from moderated mediation analyses

Treatment variable (type)	Mediating variable (type)	Average direct effect	Average mediation [95% CI]	Total effect mediated (%)
Framework (binary)	Project size (continuous)	0.05	.01 [.001 to .02]	16.6
Technical assistance* (binary)	Project size (continuous)	0.01	-.02 [-.03 to -.005]	22.3
Co-fin with other MDBs (binary)	Project size (continuous)	0.05	.01 [.001 to .02]	15.6
Equity instrument (binary)	Project size (continuous)	0.09	.02 [.01 to .04]	21.9
Effectiveness delay* (continuous)	Client as a state (binary)	-0.002	.003 [.001 to .006]	19.4
Co-fin with other MDBs (binary)	Client as a state (binary)	0.05	-.006 [-.02 to -.0002]	-11.6
Effectiveness delay (continuous)	Equity instrument (binary)	0.01	.004 [.0001 to .01]	24.2

Source: Author's calculations (2017).
Notes: This table summarises the results from causal mediation analyses (medeff). Only significant and valid results are displayed, that is, results with no zero in the confidence interval for average mediation as well as passed sensitivity tests (medsens). The definitions of treatment and mediating variables, average direct effects, average mediation and total effect are all provided in Exhibit OA1.2 in the Online Appendix. '*' against treatment variable name indicates the underlying specifications which displayed significant results with the interaction terms between treatment and mediating variables under Model 2. Average mediation results are provided together with the 95 per cent confidence intervals. Total effect mediated is expressed in percentage terms.

Specifically, 22 per cent of the total effects of the technical cooperation dummy on project success is mediated through project size. Similarly, 19 per cent of the total effect of effectiveness delay on project success is mediated through client's ownership. In addition to this, the "framework" dummy displays some moderated mediation effects which should be considered in addition to the results from Models 1 and 3. Seventeen per cent of the reported total effect of the framework dummy is mediated through project size. None of the other moderated mediation channels can be reported on as their respective treatment variable's coefficients were not statistically significant under Models 1 and 3.

4.4 Additional robustness checks

A range of further sensitivity checks is carried out in order to check the validity of the reported results. The first test is to re-run Models 1 and 3 without outliers. Outliers are selected as the projects being outside the outer fence (as identified by the inter-quartile range

multiplied by three) and they are removed from the sample. It is found that some of the results, particularly from Model 3, do not continue to hold, but this could potentially be justified by the fact that Lewbel's method has a tendency to produce less reliable estimates, as explained earlier.

In addition to the outliers testing, the core variables from Models 1 and 3 are adjusted to further test the results. Specifically, "project size" is derived as deflated using a US GDP deflator as at the project's signing year. Also, the client's PD as well as country-level controls are taken as at the project's completion year. Following these checks, some of the reported coefficient on the client's PD has gained in significance, but none of the previously reported variables have lost it, which is reassuring. Lastly, to provide an extra robustness check, the country-level controls are enriched with, for example, the addition of a proxy for banking sector efficiency (net interest margins) or stock market capitalisation ratios – the inclusion of which does not substantially change the reported results.

Additional testing of the moderated mediation models is carried out with the help of sensitivity analyses for moderated mediation (medsens) which re-confirm the validity of the reported findings, albeit at the low threshold of statistical significance, which indicates the need to treat the moderated mediation results with some caution.

5. Discussion

The empirical analysis delivers some valuable findings which could shed light on the nature of factors contributing to a project's non-financial success in transition delivery. The results are discussed here from the perspective of project success factors. They are then linked to the broader context of transition as well as the overall mandate of the Bank, which also cares about the financial sustainability of its projects. This may influence the degree to which certain success factors contribute towards transition delivery.

5.1 Project design and structure

The size of a project delivers some puzzling results. On the one hand, project size positively influences the probability of project success under a range of regression specifications, which goes against the literature. It also continues to provide robust results when interacted with other variables. For instance, it mediates 22 per cent of positive technical cooperation effect on project success. On the other hand, it displays some signs of endogeneity and, thus, needs to be treated with caution. Further analysis on this topic could benefit from an exploration of a good instrument to control for the endogenous nature of project size. Data availability meant this could not be achieved in this paper.

One project factor displays consistent and robust results. The project "being part of a framework" seems to increase the chances of project success, which confirms initial predictions. The sub-operation under existing frameworks is likely to require fewer resources due to, for instance, an established relation with the client as well as know-how acquired from the previous framework's activities. The results also indicate that 17 per cent of the framework's overall effect on success is mediated through project size.

It is worth noting that the range of explored project-related factors has been constrained due to data limitations. For instance, no consistent HR-level data on operation leaders in charge of the projects were available at the time of this research. Such data could provide fruitful lines of enquiries due to the significant role the project manager seems to play in project success, as found by other scholars. Potential factors could include the years of experience of the project manager, the average success probability of the previous projects the given project manager worked on, and so on.

5.2 Client's characteristics

The client's ownership structure seems to play a role in driving project success. Projects with a state client have, on average, fewer chances to succeed. It also impacts on certain project-related factors in their ways of influencing project success. For instance, 19 per cent of effectiveness delay is dependable on a client's ownership structure.

From a broader perspective, it is fair to argue that the characteristics of project success factors are likely to be a reflection of the transition progress in the economies where the EBRD works. The client's ownership structure is likely to be of greater importance in countries in the earlier stages of transition, such as Tajikistan, than in countries such as Poland, which is at the advanced stage of its transition advancement.

This links to the broader topic of the nature of transition impact, which is conditioned by time and context. Transition is a dynamic process and the impact of a project will depend on its

timing.[8] A project may come too early (that is, the economy is not ready to pick up the stimulus) or too late (the project's impact is marginal). Similarly, market structure conditions transition impact.[9] Where there are few competitors, a project's impact on competition may be particularly significant. But a high degree of concentration can slacken the project entity's own commitment and incentive to compete. One of the findings confirmed this, namely projects located in the most transition-advanced region, CEB, are more likely to achieve full transition success. Still, country-level assessment of project success factors is beyond the scope of this paper and it could be taken forward as the next line of enquiry.

5.3 Transition versus other project eligibility principles

This paper focuses on defining project success in terms of its transition-related delivery. However, transition is only one of three main project eligibility principles that the EBRD's projects follow, the other two being sound banking and additionality.[10] Having a multiple range of such principles is expected to create certain trade-offs between them, as well as some complementarities. These are likely to be rooted in the project design and structure characteristics, and, in turn, impact the project success as analysed in this paper.

For instance, one may expect that the application of sound banking principles has a positive transition impact on a project. The sound banking principle implies that in structuring and pricing its projects, the EBRD tries to ensure that each project is financially sustainable, which is likely to go hand-in-hand with the transition-related objectives. There are, however, cases where the project would satisfy sound banking principles, but would, nevertheless, have a negative transition impact (for example where the former arose in large part from an unregulated or protected monopoly position that was expected to persist). Further research could explore cases where transition and sound banking deliveries are complementary to each other. This would then serve as a valuable extension of this paper. Moreover, a wider range of factors could be explored which have not been applicable in this paper due to the restricted focus on transition-relation delivery.

From the broader perspective, the trade-off between the financial and non-financial impact can potentially direct the business strategies of many organisations in today's world (see, for instance, Alberti and Garrido, 2017). The term "hybrid organisation" has been gaining interest internationally as more organisations blur the boundary between for-profit (financial) and non-profit (non-financial) worlds in their business models. Hybrid organisations break the traditional customer-beneficiary dichotomy by providing products and services that produce social value (Battilana et al., 2012) and their increasing number creates a demand for a new stream of research into project success factors which are driving their multi-dimensional success delivery. For these reasons, the EBRD could provide an ideal case study for such analyses due to its unique operational mandate.

[8] All of the reported regressions controlled for the impact of timing through the year of project signing.

[9] All of the reported regressions controlled for the impact of market conditions through, for instance, a proxy for the level of banking sector development in a country as displayed earlier.

[10] The sound banking principle refers to the assurance that the Bank's investment is financially secure and provides an adequate financial return. The additionality principle implies that the Bank's support of the private sector should contribute beyond what is already accessible or in some form that is otherwise absent from the market.

6. Conclusion

Understanding the critical factors that influence non-financial project success enhances the ability of donors and EBRD bankers to ensure desired outcomes. In addition, it helps them forecast the future status of the project, diagnose the problem areas, and prioritise their attention and scarce resources to ensure successful completion of projects.

The aim of this paper was to show which factors contribute to the success of EBRD projects in relation to their transition delivery. It is the first paper of its kind to examine the success factors of all EBRD projects, and it therefore complements some of the research that fills the gap in the literature, which has so far been heavily focused on World Bank studies.

From the EBRD perspective, the paper can help us to better understand how and why certain factors may impact project selection, although it does not provide a one-size-fits-all. Based on the sample of almost 1,600 projects completed between 2003 and 2016, three core results stand out.

First, the probability of transition success is more likely with larger projects, although the robustness of this finding is questionable due to the potentially endogenous nature of this variable.

Second, projects that are part of a framework are more likely to be successful and this likelihood is mediated through project size with approximately 17 per cent of its total effect being conditional.

Lastly, results show that clients' characteristics matter; projects with state clients are less likely to be successful. This variable is also found to mediate the impact of "effectiveness delay" on the probability of non-financial success.

This paper's scope was constrained by data limitation at the time of research. Future research in this field could focus on a broader impact of potential trade-offs, or complementarities, between non-financial (transition-related) and financial returns on the project success factors. This could serve as an important contribution to the newly emerging field of project management and corporate strategies in relation to the hybrid organisations like the EBRD.

References

C. Ai and E. Norton (2003), "Interaction Terms in Logit and Probit Models", *Economics Letters* 80, no. 1, 123–29.

D. Antoniadis, F. Edum-Fotwe and A. Thorpe (2011), "Socio-Organo Complexity and Project Performance", *International Journal of Project Management*, 29, no. 7, 808–16.

C. Baum, Y. Dong, A. Lewbel and T. Yang (2012), "Binary Choice Models with Endogenous Regressors", SAN12 Stata Conference. Stata Users Group, 1 August 2012.

W. Belassi and O. Tukel (1996), "A New Framework for Determining Critical Success/Failure Factors in Projects", *International Journal of Project Management* 14, no. 3, 141–51.

D. Bulman, W. Kolkma and A. Kraay (2015), "Good Countries or Good Projects? Comparing Macro and Micro Correlates of World Bank and Asian Development Bank Project Performance", The World Bank Policy Research Working Paper, 21 April 2015.

G. Cawley and N. Talbot (2010), "On Over-Fitting in Model Selection and Subsequent Selection Bias in Performance Evaluation", *The Journal of Machine Learning Research* 11, 2079-2107.

L. Chauvet, P. Collier and A. Fuster (2015), "Supervision and Project Performance: A Principal-Agent Approach", DIAL Working Paper (Développement, Institutions et Mondialisation), February 2015.

T. Cooke-Davies (2002), "The "real" Success Factors on Projects" (2002), *International Journal of Project Management* 20, no. 3, 185–90.

G. Cuddeback, E. Wilson, J. Orme and T. Combs-Orme (2004), "Detecting and Statistically Correcting Sample Selection Bias", *Journal of Social Service Research* 30, no. 3, 19–33.

H. Demirgil, B. Dogan and V. Baydar (2014), "Firm Growth and Its Characteristics: Correction for Sample Selection Bias Using Heckman Selection Model", IIB International Refereed Academic Social Sciences Journal 5, no. 15, 215–28.

C. Denizer, D. Kaufmann and A. Kraay (2013), "Good Countries or Good Projects? Macro and Micro Correlates of World Bank Project Performance", *Journal of Development Economics* 105, no. C, 288–302.

G. Dobrescu, G. Friebel, P. Grosjean and K. Robeck (2008), "The Determinants of Performance in Building Infrastructure in Transition Economies", EBRD Working Paper no. 102.

D. Dollar and V. Levin (2005), "Sowing and Reaping: Institutional Quality and Project Outcomes in Developing Countries", SSRN Scholarly Paper, Rochester, NY.

D. Dollar and J. Svensson (2000), "What Explains the Success or Failure of Structural Adjustment Programmes?", *The Economic Journal* 110, no. 466, 894–917.

P. Geli, H. Nobakht and A. Kraay (2014), "Predicting World Bank Project Outcome Ratings", The World Bank Policy Research Working Paper, no. WPS 7001.

P. Guillaumont and R. Laajaj (2006), "When Instability Increases The Effectiveness Of Aid Projects', The World Bank Policy Research Working Papers, no. WPS 4034.

W. Greene (2010), "Testing Hypotheses about Interaction Terms in Nonlinear Models", *Economics Letters* 107, no. 2, 291–96.

J. Heckman and E. Vytlacil (2001), "Policy-Relevant Treatment Effects", *American Economic Review* 91, no. 2 (May 2001): 107–11.

J. Heckman (1990), "Varieties of Selection Bias", *American Economic Review* 80, no. 2, 313–18.

J. Heckman (1976), "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models", NBER Chapters National Bureau of Economic Research, Inc.

D. Honig (2014), "Navigation by Judgment: Organizational Autonomy and Country Context in the Delivery of Foreign Aid", Doctoral dissertation, Harvard University, Graduate School of Arts & Sciences.

J. Isham, D. Kaufmann and L. Pritchett (1997), "Civil Liberties, Democracy, and the Performance of Government Projects", *The World Bank Economic Review* 11, no. 2, 219–42.

A. Khwaja (2009), "Can Good Projects Succeed in Bad Communities?", Journal of Public Economics 93, no. 7–8, 899–916.

C. Kilby (2012), "Assessing the Contribution of Donor Agencies to Aid Effectiveness: The Impact of World Bank Preparation on Project Outcomes", Villanova School of Business Department of Economics and Statistics Working Paper Series.

C. Kilby (2000), "Supervision and Performance: The Case of World Bank Projects", *Journal of Development Economics* 62, no. 1, 233–59.

L. Metzger and I. Guenther (2015), "How to Assess the Effectiveness of Development Aid Projects: Evaluation Ratings versus Project Indicators", *Journal of International Development* 27, no. 8, 1496–1520.

M. Mubila, C. Lufumpa and S. Kayizzi-Mugerwa (2002), "A Statistical Analysis of Determinants of Project Success: Examples from the African Development Bank", African Development Bank Working Paper Series, no. 56.

G. Pohl and D. Mihaljek (1992), "Project Evaluation and Uncertainty in Practice: A Statistical Analysis of Rate-of-Return Divergences of 1,015 World Bank Projects", *The World Bank Economic Review* 6, no. 2, 255–77.

K. Preacher, D. Rucker and A. Hayes (2007), "Addressing Moderated Mediation Hypotheses: Theory, Methods, and Prescriptions", Multivariate Behavioural Research 42, no. 1, 185–227.

D. Roodman (2009), "Estimating Fully Observed Recursive Mixed-Process Models with Cmp", Center for Global Development Working Paper.

E. Westerveld (2003), “The Project Excellence Model: Linking Success Criteria and Critical Success Factors”, *International Journal of Project Management* 21, no. 6, 411–418.

C. Winship and R. Mare (1992), “Models for Sample Selection Bias”, *Annual Review of Sociology* 18, no. 1, 327–50.

M. Voss and A. Kock (2013), “Impact of Relationship Value on Project Portfolio Success - Investigating the Moderating Effects of Portfolio Characteristics and External Turbulence”, *International Journal of Project Management* 31, no. 6, 847–61.

O. Zwikael and S. Globerson (2006), “From Critical Success Factors to Critical Success Processes”, *International Journal of Production Research* 44, no. 17, 3433–49.

Appendix

Table A1: Variable definitions and sources

Variable name	Definition	Source	Unit
Project-level variables			
Project size	Total volume of EBRD investment in the project.	EBRD	Euros
Effectiveness delay	The time from signing of the loan to the time when all conditions of the loan agreement are fulfilled for disbursement to occur.	EBRD	Months
Preparation time	The difference between project concept review date and signing date.	EBRD	Months
Framework	Dummy =1 if project is part of an investment framework.	EBRD	0/1
Associated technical cooperation	Dummy =1 if project had any associated technical cooperation at any stage of its life.	EBRD	0/1
Co-financing with other MDBs	Dummy =1 if project is co-financed with other MDBs.	EBRD	0/1
Equity financing instrument	Dummy =1 if project is fully financed with equity. Otherwise, it captures debt or debt and equity financing.	EBRD	0/1
Number of TI objectives	The count of the transition impact objectives under each project.	EBRD	Count
EBRD sector	Four dummy variables representing the EBRD sector in which the investment project is based: (i) financial institutions; (ii) industry, corporate and agriculture; (iii) infrastructure; (iv) energy.	EBRD	0/1
Client-level variables			
Client's PD	Score of the client's probability of default at the time of project's signing with the range from 1(=lowest) to 10 (=highest).	EBRD	Score
State owner	Dummy =1 if client is a state; otherwise it refers to private owner.	EBRD	0/1
Country-level controls			
GDP per capita growth	Annual percentage growth rate of GDP at market prices based on constant local currency.	World Bank DataBank	Per cent
Domestic credit	Domestic credit to private sector by banks as a per cent of GDP.	World Bank DataBank	Per cent
Bureaucracy quality	An index score which captures the institutional strength and quality of the bureaucracy with the range between 1 and 4. High scores are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. In these low-risk countries, the bureaucracy tends to be somewhat autonomous from political pressure and to have an established mechanism for recruitment and training.	International Country Risk Guide	Score
Change in foreign exchange rates	Domestic currency depreciation over project lifetime.	Datastream/ EBRD	Δ

Source: Author (2017).
Notes: This table shows variable definitions and data sources for all explanatory and control variables used in the empirical analysis (Models A-D, Models 1-3).

Exhibit A1: Deriving the dependent variable – technical details

ETI and PTI scores are used to derive the dependent variable, and its respective delivery assessment was used to categorise the project success into "success achieved" (including overachieved and achieved) and "success not achieved" (including failed and partially failed).

The ETI score consists of ex-ante TI potential and ex-ante TI risk, which are assessed at the concept review stage during the project lifecycle. The EBRD economists have the task of rating individual projects throughout the project approval cycle. These project ratings started on an experimental basis in 1999 and were formally implemented from May 2000. Since then, the TI potential and risk ratings have become a key component of the transition impact assessment and related decision-making practices at the EBRD.

ETI is an internal scoring system based on the transition impact assessment of investment projects. ETI incorporates both transition impact potential (setting the appropriate objectives for projects in the context of transition challenges in a country) and risks to achieving such objectives, thus reflecting the most likely "transition value" of a project. It has been calculated according to the ETI/PTI matrix which is presented below.

PTI, which is also derived using the below matrix, is used to monitor the progress of projects in the Bank's portfolio towards achieving their transition objectives. The EBRD scorecard contains an average PTI stock measure to benchmark the overall performance of projects in the Bank's portfolio from the perspective of achieving the originally set transition impact objectives. If the PTI at project completion is equal or greater than ETI, the binary DV used in this paper treats it as "success achieved" (1). If the PTI is smaller than ETI, then the DV would treat it as "success not achieved" (0). This is then used to calculate the probability of project success which is used in all probit models in this paper.

Chart A1: ETI/PTI matrix

		TI risk rating					
		Excessive	High/excessive	High	Medium	Low	Negligible
TI potential rating	Excellent*	25	60	100	x 1.3	x 1.8	x 2.2
	Strong Good*	10	45	80	100	x 1.25	x 1.5
	Good	5	25	60	75	85	90
	Moderate Good	5	20	45	55	60	60
	Satisfactory	0	10	30	35	40	40
	Marginal	0	0	0	5	10	10
	Unsatisfactory	0	0	0	0	0	0

Source: EBRD (2013).
Notes: The scores, expressed as an expected value of a project's transition impact, reflect the relative values of each pair of TI potential and TI risk ratings, which are based on incentive design and historical experience. Transition multipliers are based on Excellent/high= 100: Excellent up to x2.2 for Negligible risk; Strong Good up to x1.5. The shaded areas identify the TI potential/risk combinations within which most operations are expected to fail.

Table A2: Regression results

		Model 1		Model 2		Model 3	
		Raw	Margins	Raw	Margins	Raw	(Δ) Model 1
Project size (ln)		0.174***	0.0589***	0.208***	0.0637***	0.042	-
		(0.044)	(0.015)	(0.047)	(0.015)	(0.047)	-
Effectiveness delay (srt)		-0.005	-0.002	-0.026	-0.004	-0.001	*-0.005*
		(0.036)	(0.012)	(0.037)	(0.012)	(0.012)	*(0.025)*
Preparation time (srt)		-0.015	-0.005	-0.014	-0.005	-0.006	*-0.009*
		(0.027)	(0.009)	(0.027)	(0.009)	(0.008)	*(0.019)*
Framework (1=yes)		0.278*	0.0938*	0.300**	0.101**	0.085	*0.193*
		(0.112)	(0.038)	(0.112)	(0.038)	(0.062)	*(0.050)*
Technical assistance (1=Yes)		0.116	0.039	2.120	0.022	0.039	*0.077*
		(0.155)	(0.052)	(1.437)	(0.048)	(0.048)	*(0.107)*
Co-fin w/t others (1=Yes)		0.085	0.029	0.051	0.017	0.030	*0.055*
		(0.104)	(0.035)	(0.104)	(0.035)	(0.037)	*(0.067)*
Equity instrument (1=Yes)		-0.312**	-0.109**	-0.327**	-0.114**	-0.114*	*-0.198*
		(0.119)	(0.042)	(0.119)	(0.042)	(0.052)	*(0.067)*
Number of TI objectives		-0.051	-0.017	-0.048	-0.016	-0.017	*-0.034*
		(0.054)	(0.018)	(0.054)	(0.018)	(0.018)	*(0.036)*
Client's PD (at signing)		-0.0461	-0.0156	-0.0455	-0.0153	-0.0176	*-0.029*
		(0.048)	(0.016)	(0.047)	(0.016)	(0.020)	*(0.028)*
Client as state (1=Yes)		-0.380*	-0.128*	-0.796**	-0.179*	-0.128	*-0.252*
		(0.182)	(0.061)	(0.299)	(0.072)	(0.074)	*(0.109)*
Regions:	CEB	0.670**	0.232***	0.657**	0.226**	0.239**	*0.431*
		(0.223)	(0.070)	(0.224)	(0.070)	-0.0831	*(0.140)*
	EEC	0.355	0.128	0.355	0.128	0.123	*0.232*
		(0.253)	(0.091)	(0.254)	(0.091)	-0.0802	*(0.173)*
	Russia	0.395	0.142	0.386	0.138	0.144	*0.251*
		(0.272)	(0.098)	(0.272)	(0.097)	-0.0808	*(0.191)*
	SEE	0.418*	0.150*	0.408*	0.146*	0.151*	*0.267*
		(0.201)	(0.073)	(0.204)	(0.074)	-0.0756	*(0.125)*
	SEMED	0.824	0.278	0.776	0.262	0.313	*0.511*
		(0.690)	(0.195)	(0.699)	(0.201)	-0.198	*(0.492)*
	Turkey	0.274	0.099	0.223	0.081	0.102	*0.172*
		(0.387)	(0.138)	(0.384)	(0.138)	-0.153	*(0.234)*
Size x TC dummy		n/a	n/a	(0.126)	-	n/a	*n/a*
		-	-	(0.086)		-	-
Effectiveness x client as a state		n/a	n/a	0.164*	-	n/a	*n/a*
		-	-	(0.072)		-	-
Clusters (no.)		Sector x Sign yr. (65)		Sector x Sign yr. (65)		-	
Sector FE		Yes		Yes		Yes	
Year FE		Yes		Yes		Yes	
VCE		robust		robust		n/a	
Observations		1,125		1,125		1,126	
Pseudo R2		0.09		0.09		n/a	
Centered R2		n/a	n/a	n/a	n/a	0.10	
Uncentered R2		n/a	n/a	n/a	n/a	0.68	
Root MSE		n/a	n/a	n/a	n/a	0.45	
Wald chi2 (df)		481.6 (39)		446.8 (41)		n/a	
Prob > chi2 or F		0.0 (chi2)		0.0 (chi2)		0.0 (F)	
Log pseudolikelihood		-667.998		-664.886		n/a	

Source: Author's calculation (2017).

Notes: This table reports regression results from three probit models investigating factors driving the probability of project success. The dependent variable is binary success (0,1) in all specifications. The table reports marginal effects from probit regression for Models 1 and 2, but from Model 3 due to

model specification. Robust standard errors are clustered by sector-signing year in all models (except Model 3 where clustering is not allowed) and are shown in parentheses. Similarly, sector and signing year fixed effects are applied in all models except Model 3. The display of the following variables is omitted: sector dummies, country-level controls, constant. The “y2 hat”, that is the fitted value of “project size”, which applies in Model 3, is reported under the “project size (ln)” line. ***(**)(*) denote significance at the 1 (5) (10) per cent level.