Killing two birds with one stone? Sound investment with social impact *

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Abstract

This paper uses a novel dataset on investments by the European Bank for Reconstruction and Development to quantify a (sizeable) trade-off between environmental, social and governance (ESG) and financial objectives of a large investor. Each investment is assigned an impact score alongside a probability of default score, when a concept of a transaction is first reviewed by the investment committee. These scores are updated at the approval stage, with around 55 percent of concepts translating into signed deals. We show that this approach delivers simultaneous selection of investments on the quality of credit and ESG impact and that a meaningful trade-off between pursuing commercial and development objectives exists. For commercially riskier investments, ESG characteristics have a greater impact on the probability of a project going ahead. We further use machine-learning-based analysis to show that ESG impact of some investment projects is strengthened prior to project approval.

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1 Introduction

Institutional investors, banks and various foundations increasingly declare focus on environmental, social or governance objectives (referred to as ESG impact) alongside traditional goal of profit maximization when making investment decisions. In part, this is driven by increasing realization that maximizing shareholder welfare is not necessarily equivalent to achieving highest return on equity (Hart and Zingales, 2017).

ESG impact strategies vary. For instance, in January 2020, Goldman Sachs, a major investment bank, announced that it will only support initial public offerings of clients with at least one diverse board member, rising to two such members from 2021. Some sovereign wealth funds opt out of fossil-fuel related investments, in particular in the coal sector. Other investors earmark a certain fraction of portfolio to green bonds (bonds with certified use of proceeds for green-economy purposes) and / or commit to reporting on the carbon footprint of their portfolios.

As such ESG filters and enhanced reporting on social and environmental outcomes become increasingly common, the question arises if investors can take a step further and pursue both the financial performance and ESG impact without explicitly subordinating one goal to the other. This paper argues that, in doing so, investors will need to confront the trade-off between different investment objectives by quantifying ESG impact – similar to ways in which credit quality of different borrowers is routinely quantified.

To see why, experience of development banks, and, in particular, multilateral development banks may be insightful as these institutions have been investing under multiple-objectives mandate for decades. Some of them, for instance, the International Finance Corporation (IFC) and the European Bank for Reconstruction and Development (EBRD) have explicit focus on private-sector investments, similar to many banks and investment funds. The mandate of the EBRD, which started operations in the early 1990s, specifically stresses that projects need to both satisfy sound banking (achieve financial return) and deliver development impact by facilitating transition of economies where the bank invests to sustainable market economies (EBRD was originally set up to facilitate transition from central planning in post-communist economies).

The way in which a development bank has been selecting and designing investment projects under its dual-objective mandate may thus hold valuable lessons for investors declaring ESG goals. This paper distills stylized facts about project selection and project design at the EBRD taking advantage of the unique data collected at two distinct stages in the investment cycle.

EBRD is unique in that it records ex ante assessments of expected development impact of investments and the associated commercial risk (credit rating) several times: first, at the time of the initial review of the project concept by the investment committee, subsequently at the stage of the final review by the investment committee, and then regularly during the lifetime of the project culminating in an assessment upon completion.

This dataset enables us to track characteristics of investments that were advanced from

concept stage to implementation and compare them to the attributes of projects that were considered but did not materialize. In addition, records of the initial project review include features of project design needed to improve or substantiate a project's development impact. It is thus possible to zoom in on projects where work has been requested on project design between concept and final stages to strengthen the development impact of bank's financing.

A number of studies looked at the determinants of success of projects supported by multilateral development banks (MDBs), including country, client and project characteristics (see, for instance, Dollar and Levin (2005); Bulman et al. (2015); Denizer et al. (2013); Desai et al., 2017). While these studies yield useful insights about patterns of MDB investments they leave open the question about the mechanics of decision making underpinning these outcomes and trade-offs between financial and developmental objectives. Earlier studies generally lacked information on project selection needed to evaluate this trade-off. For instance, Kilby (2015) uses length of project preparation at the World Bank as a proxy for the depth of World Bank contribution to project design.

The analysis reveals that projects are simultaneously selected on the quality of credit and ESG impact and, rather than being complementary, these objectives involve a trade-off. In addition, the ESG impact of some projects is strengthened between the concept and final stages of approval. In particular, requests are made to work on strengthening client's corporate governance in connection with more than a fifth of project concepts and such corporate governance work targets projects with otherwise weaker expected ESG impact.

To the best of our knowledge, this is the first study to quantify the (sizeable) trade-off between ESG and financial objectives of a large investor. In particular, the system implemented at the EBRD relies on a sufficient statistics of ESG impact of a project assigned at an early stage of consideration. Investment committee includes separate officers that are responsible for risk management and ESG impact. As a result, decision making process internalizes both objectives. Investments with lower commercial risk and stronger ESG impact are more likely to go ahead.

In addition, the probability of investments going ahead is to a greater extent affected by their ESG impact in case of commercially riskier propositions. Controlling for project characteristics such as sector and country, a weakening of investment risk profile by 0.4 of a standard deviation is offset by strengthening of the expected ESG impact by 0.6 of a standard deviation, with unchanged probability of a project being implemented. This is a sizeable trade-off casting doubt on the widespread view that financial and development objectives can be complementary.

The paper contributes to the growing literature on the private-sector impact investment (see, for instance, Renneboog et al. (2008, 2011), Barber et al., 2017). The findings provide empirical evidence of the trade-off between financial and ESG objectives. They also suggest a way to meaningfully incorporate ESG objectives, and the associated trade-offs, into decision making of an investor by working with a sufficient statistic of ESG impact from early stages of project consideration, similar to approaches used to manage commercial risk. This finding echoes conclusions from a theoretical model developed by Opp and Oehmke (2020). ESG assessments can also strengthen incentives

to design projects in a way that increases their impact, in addition to selecting projects with stronger ESG credentials (in the spirit of theoretical argument by Gollier and Pouget, 2014). Finally, the paper also contributes to the literature on the impact of development bank projects by shedding light on how this impact materializes through project selection and project design work within the investing institutions.

The rest of the paper is structured as follows. Section 2 reviews earlier studies on impact investing. Section 3 introduces a simple model illustrating decision making by socially responsible investors, including project selection and project design and derives testable implications. Section 4 presents the key features of the data and outlines the estimation strategy. Section 5 discusses the empirical results. Concluding remarks follow.

2 Investing to achieve ESG impact

2.1 ESG impact of investment projects

Recent studies looked at various properties of impact investing – private-sector investments with stated social and environmental objectives in addition to the profit maximization goal (see, for instance, Barber et al. (2017) for a discussion and overview of 161 funds that state dual objectives in their motivations). Early evidence suggests that impact investing funds generally find it somewhat easier to raise capital than conventional funds and investors may be willing to accept lower financial performance in these funds although evidence on the existence and extent of return-impact trade-off is not conclusive (see, for instance, Renneboog et al., 2008, 2011; Hartzmark and Sussman, 2019; Zerbib, 2019; Pedersen et al., 2019). Gantchev et al. (2020) argue that while mutual funds initially aimed to improve their sustainability ratings to make it easier to attract funds, this led to deteriorating performance of assets with high sustainability rating and subsequently reduced demand for sustainability assets. Bolton and Kacperczyk (2020) report that stocks of polluting companies are associated with higher returns while Albuquerque et al. (2020) found that stocks of more environmentally conscious companies fared better during the early phase of the Covid-19 crisis.

A model by Opp and Oehmke (2020) suggests that to achieve meaningful impact working side-by-side with commercial investors, impact investors need to base their decision on a measure of ESG impact ("social responsibility index"). This index needs to reflect ESG counterfactual outcomes thus potentially allowing for investment in dirty (or sin) industries (industries otherwise shunned by a range of investors (see Hong and Kacperczyk, 2009). Indeed, green investments and investments in greener firms need not be the same. For instance, Ormazabal et al. (2020) show that investments by Blackrock, Vanguard and State Street Global Advisors are likely to target companies with higher emissions but are at the same time associated with faster reductions in emissions of investee companies relative to their listed comparators. The index also needs to place value on ESG impact irrespective of whether a given investor is involved in a project. The measure of ESG impact used in this paper is broadly in line with both these conditions.

2.2 Impact of projects conducted by development banks

While the rapid rise in private impact is a relatively recent phenomenon, multilateral development banks have been around for decades (the World Bank was set up at the end of the Second World War). Yet relatively little is known about ways in which development banks select and design their projects.

Evidence from evaluations of development impact of projects conducted by the World Bank and other development institutions has been mixed as well as incomplete. In general, country characteristics matter for project development outcomes. Examples include the quality of democratic institutions and the extent of civil liberties (Isham et al., 1997) and macroeconomic and political instability (see Guillaumont and Laajaj, 2006). Project characteristics also matter. For instance, Khwaja (2009) demonstrates the value of community participation in road projects in Pakistan.

The importance of both project and country effects were documented, for instance, by Dollar and Levin (2005) for World Bank projects for the period 1990-99; by Bulman et al. (2015) for more than 3,800 World Bank projects since 1995 and more than 1,300 Asian Development Bank (ADB) projects since 1973 (see also Kryg (2018) for evidence from the EBRD projects and Geli et al., 2014, for World Bank projects). Broccolini et al. (2019) provide evidence on the ability of multilateral development banks to mobilize private finance. Winter (2019) shows that work priorities of the World Bank (such as environmental work) respond to public pressures in the US, its largest shareholder, in a non-linear way (and this indirectly should have an impact on project selection and design). More variation in terms of project outcomes can be found within countries than between countries (Denizer et al. (2013), based on 6,000 World Bank projects during the period 1983-2011). Larger projects are typically associated with higher impact although findings vary from study to study. Private sector participation may improve the outcomes of infrastructure projects (Dobrescu et al., 2008, based on projects implemented by the EBRD). Early supervision of donor-funded projects may further boost outcomes (Kilby, 2000).

Evidence on trade-offs between financial and impact performance of development bank projects remains scarce. Desai et al. (2017), for instance, find that financial returns of the projects by the IFC are typically unrelated to projects' ratings in terms of environments and social objectives.

In this context, an important advantage of the approach of this study is to look at any trade-offs between commercial risk and ESG impact of potential investments in a framework of decision making by an investment committee. In doing so, the analysis zooms in on the information available to the committee at the pre-investment stage. In particular, these are measures of the probability of default of a client or guarantor (credit rating) and a numerical assessment of the expected ESG impact of projects.

2.3 Improvements in corporate governance and their impact

To illustrate how ESG impact of projects can be enhanced during the project selection stage, the analysis focuses on corporate governance of investee companies. In particular, many of the projects of the EBRD with private-sector and public-sector clients feature action plans aimed at improving the standards of corporate governance or standards of disclosure. This work is conducted in close cooperation with a specialized unit within the legal department of the EBRD, the Legal Transition Team, and it is often backed by donor-funded technical assistance.

Underpinning this work are regular assessments of corporate governance legal frameworks across the economies in which EBRD invests. The latest such assessment was made by the EBRD in 2016 and 2017 (see EBRD, 2019). These assessments cover the quality of the legal framework in place as well as the capacity of regulators and courts to enforce legislation. In addition, the analysis reviews corporate governance disclosures of the 10 largest companies in each economy.

A large number of studies document the positive impact of strong corporate governance and board diversity on financial performance of firms (see, for instance, Bernile et al., 2018, Brealey et al., 2014). Good corporate governance helps to mitigate the agency problem – issues arising from delegation of decision making by shareholders to boards and management, whereby managers may have superior information about firm's operations but their incentives and objectives may differ from those of shareholders (see, for instance, Shleifer and Vishny, 1997; Jensen and Meckling, 1976). Strengthening corporate governance may be a particularly important task at state-owned enterprises, where corporate governance is often weaker (OECD, 2018, see also Fan et al., 2014).

3 The model

3.1 Commercial investors

Consider a very simple model of impact investing, which builds on the insights from the framework developed by Opp and Oehmke (2020). In this model, risk-neutral entrepreneurs seek full debt financing for projects of a unit cost. Entrepreneurs differ in terms of their probability of default p, $0 < p < 1$. With probability $1–p$, a project yields a revenue of $y > 0$, where y is distributed with a density function $f(y)$ and cumulative probability function $F(y)$. With probability p, a project yields nothing but still requires an effort on the part of entrepreneur.

The entrepreneur promises an income of x to an investor (which could be thought of as interest payment) and has a utility function of $U_e = (y–x)(1–p)–w^*$ where w^* is the reservation wage (the cost of entrepreneur's time). An entrepreneur agrees to go ahead with the project as long as $x \leq y–\frac{w^*}{1-p}$.

Consider a risk-neutral commercial investor without any capital or liquidity constraint who faces cost of funds r^*. The expected return to the investor is $x(1–p)$. The utility of

a commercial investor is the expected return net of cost of funds: $U_i = x(1–p)–r^*$.

The investor is willing to finance a project as long as the interest payment covers the cost of funds adjusted for the probability of default, expressed as $x \geq \frac{r^*}{1-p}$. Provided the realised value of the project net of the reservation wage and accounting for the eventuality of default is sufficient to pay such a return, or $y–\frac{w^*}{(1-p)} \geq \frac{r^*}{(1-p)}$, the investor and the entrepreneur can agree a rate of interest x in a way that a project gets financed. This yields:

$y \geq \frac{w^*+r^*}{1-p} = y^*(p)$

Assume further that the realization of project outcome y becomes known after due diligence is conducted. Thus ex ante a concept of a project has a certain likelihood of going ahead, which depends on the probability of default p. The higher the probability of default, the higher the reservation value of income $y*$ required for the project to go ahead, and thus the lower the ex ante likelihood of a project being signed.

3.2 Project selection by socially responsible investors

Now consider that the same project yields an observable ESG impact value $s \in [0; r^* + w^*)$, which is ignored by entrepreneurs and commercial investors (an assumption similar to the one in Opps and Oehmke, 2020). This impact could arise, for instance, from reducing a negative externality associated with a project (such as pollution). It is assumed to be realized even if a project fails financially (for example, road traffic may not be sufficient for tolls to cover the construction costs of a road that can still be used by residents).

Consider socially responsible investors who are also unconstrained when it comes to raising capital at the same cost of funds r^*. These investors internalize environmental and social cost in their decision making, with utility function of $U_s = x(1–p)–r^* + s$.

Socially responsible investors can finance a project as long as its realised value satisfies $y \geq \frac{w^*+r^*-s}{1-p} = y^{**}(p, s)$, $y^{**}(p, s) \in [0; y^*]$

The probability of a project going ahead is given by $P^{**}(p, s) = 1–F[\frac{w^*+r^*-s}{1-p}]$

First, it is clear that the reservation value of realized income, y^{**}, is lower than y^*. This means that there will be projects yielding a commercial value between y^{**} and y^* that are socially optimal but are foregone unless there are socially responsible investors willing to finance them.

Proposition 1. $\frac{\partial P^{**}}{\partial p} < 0$*;* $\frac{\partial P^{**}}{\partial s} > 0$*; and for sufficiently high values of s,* $\frac{\partial^2 P^{**}}{\partial p \partial s} > 0$.

For derivations see Annex.

As in the case of commercial investors, higher probability of default makes it less likely that a project concept – considered before its value y is verified – will translate into an actual project. On the contrary, the higher the ESG value of project, s, the greater the likelihood of an investment being financed by a socially minded investor.

Furthermore, for commercially riskier projects (those with a higher probability of default), the ESG value of a project plays a greater role in decision making by the socially responsible investor. This holds if the ESG value of the project is high enough to compensate the socially responsible investor for the cost of funds and the entrepreneur for their effort. For some distributions of project outcomes the second mixed derivative is always positive, for instance, when payoffs are uniformly distributed between 0 and $\hat{y}$, a sufficiently large maximum return.

Proposition 2. There exists a trade-off whereby an increase in ESG value of a project and an increase in the probability of default keep the likelihood of a project being implemented unchanged.

Proposition 2 is another way of looking at the risk-return trade-off. It implies that a socially responsible investor could finance higher-risk projects if higher ESG impact justifies such a transaction.

3.3 Project design by socially responsible investors

Assume now that socially responsible investor can also put in an effort e that raises the ESG impact of a project by λe. In other words, social investor can work on project design – for instance, lowering the emissions of a new facility. This effort is also costly for the entrepreneur. For simplicity, assume the required effort is μe. In this case the utility functions can be rewritten as

$$U_s = x(1–p)–r^* + s + (\lambda–1)e$$

$$U_e = (y–x)(1–p)–w^* - \mu e$$

Both the entrepreneur and the socially responsible investor can put in the required effort as long as

$$\frac{r^*-s-(\lambda-1)e}{1-p} \leq x \leq y-\frac{e+w^*}{1-p}$$

This yields a cut-off point for the realization of income of projects that can be financed.

$$y \geq \frac{r^*+w^*-s-(\lambda-\mu-1)e}{1-p} = y^{***}(p,s,e) < y^{**}(p,s)$$

The new cut-off is lower than effort-free cut-off as long as $\lambda \geq \mu + 1$, that is, the ESG value of project design work outweighs the cost of the joint effort of entrepreneur and socially responsible investor. This effort (for instance, aimed at improving corporate governance or environmental footprint of an investee company) can thus further expand the universe of projects that can be financed.

Available effort is likely to be finite, linked to staff time and expertise. If a socially responsible investor faces effort constraint but no funding constraint, project design efforts will target projects with otherwise lower probability of being implemented. In this case projects with lower assessed ESG impact and higher probability of default are more likely to undergo project design work with assistance from a socially responsible investor.

4 Data and estimation strategy

4.1 Projects considered by the EBRD

The analysis is based on the universe of EBRD projects considered by the EBRD during 2010-18. A project first gets recorded when its concept is reviewed by the Bank's investment committee. At that stage, a project is given a rating in terms of its expected impact, referred to as expected transition impact, on a scale from 0 to 100 (rescaled 0 to 1 throughout the analysis). The terminology reflects EBRD's history. The institutions was set up in 1991 to facilitate transition of economies with central planning towards well-functioning market economy. The latter is broadly understood to be competitive, well-governed, inclusive, resilient, integrated and green.

The sample comprises more than 2,600 project concepts reviewed during 2010-18, for which expected impact and other data are recorded. Projects that came for a concept review later are excluded as their "survival" was too early to assess at the time of writing; projects that passed concept stage earlier do not have the assessed probability of default recorded in the data.

The universe of investments done by the EBRD is fairly varied. Around 15 per cent are equity projects, the rest are debt or hybrid instruments, typically with a tenor of 5-7 years, although this varies from short-term facilities to loans with tenors in excess of 20 years. The loan amounts vary greatly with a sample average amount of €27 million. Some projects are backed by provision of technical assistance by the EBRD (for instance, analyzing corporate governance standards of a client and developing a corporate governance action plan to address the identified areas of weakness).These are typically financed by donor funds, including those set aside from retained profits of the bank.

Around 20 per cent of projects are with sovereign borrowers or are guaranteed by the Ministry of Finance. Of non-sovereign projects, some are with state-owned enterprises and banks; the vast majority are with private-sector clients. A significant minority of projects involve co-financing with outside investors (mostly in the form of syndicated loans led by the EBRD). The sector scope of projects is broad and generally balanced (see Figure 1).

The analysis takes into account a wide range of project characteristics. In addition to the characteristics listed above, the analysis looks at the currency of the transaction (local versus foreign) and the date of signing (to account for any seasonality effects). Controlling for the Banking sub-team (interaction between sector and geographical region) ensures that identification comes from comparing projects that are responsibility of the same director or senior banker who signs off on project details and takes part in various internal discussions. Table 1 presents the descriptive statistics.

Importantly, records also include the name of the economist reviewing each project. This enables us to control for reviewer fixed effects (and thus the set of reviewer skills and attitudes) when it comes to analyzing requests related to project design with the view to achieve higher impact.

4.2 Project assessment throughout the project preparation cycle

Projects presented at the concept review need to pass several tests. First, they need to adhere to sound banking. The Risk Management department assesses the probability of default of a client on a scale approximating risk agencies' scale with around 20 notches (from highest quality credit to equivalent of default). If a project has a guarantee attached, for example from apparent company abroad, the analysis looks at the strongest score of the borrower and guarantor (typically, that of a guarantor). Probability of default is generally viewed as a sufficient statistic for allocating capital based on commercial return (see, for instance, Besley et al., 2020). In addition, projects need to be acceptable from the integrity point of view.

Projects are also assessed in terms of their expected impact. Historically, the first block of this assessment looked at the extent to which a project contributed to improving the structure of markets by boosting competition or linkages in the value chain. Second, the assessment credited efforts to develop market-supporting institutions such as new legal frameworks for public-private partnerships. The third block comprises development of new skills, innovation in terms of products, production processes and financing instruments and improvements in terms of quality of management and corporate governance. Additional consideration is given to a project's visibility and potential to be replicated across the economy.

Over time, the assessment has evolved to subsume traditional development objectives such as economic inclusion, economic integration, financial resilience, the environmental impact, competitiveness and high-quality governance. This interpretation was formalized in 2016. To the extent that the scoring methodology has undergone revisions over the years, these could be captured by year fixed effects in the regression analysis.

When reviewing a project concept, the team of economists assigns an impact rating on a 0 to 100 scale. This scale is largely ordinal (higher scores correspond to projects with greater expected impact) and the distribution of scores has a mode at 60. Economists also record actions required to improve or substantiate a given rating. These are typically features of project design such as the type of end-borrowers or loans for a credit line to a financial institution (for instance, targeting smaller clients, energy efficiency projects or providing financing in local currency rather than US dollars). The reviews often flag a need for increased transparency in terms of corporate disclosure or a corporate governance action plan to strengthen the protection of rights of minority shareholders, appoint independent directors to the board and address other weaknesses in terms of corporate governance.

Many projects do not return to final review due to poor risk-return profile based on client's credit quality rating, low perceived ESG impact of the intervention, integrity concerns or for a variety of idiosyncratic reasons. Other projects (around 55 per cent of the total in the sample) advance to the final review by the investment committee, approval by the Bank's Board of Directors and signing.

At the final review stage, the impact of the projects is again assessed by the team of in-house economists, based on the initial rating and any enhancements to project design achieved since. The overall project assessment cycle is schematically summarized in

Figure 2.

4.3 Recording corporate governance-related objectives of projects

The analysis in this paper seeks to identify projects that sought to address issues related to clients' corporate governance. This information is not automatically recorded in information management systems and the assessment was based on the reading of economists' project notes at concept and final review stages. These notes, addressed to the investment committee, accompany impact ratings assigned to the projects and specify key elements of the expected impact alongside any concerns and suggestions regarding ways to strengthen a project's impact (for instance, by opting for environmentally friendlier technologies).

The review notes were processed in two stages. First, analysts working in the Office of the Chief Economist of the EBRD read the review notes and recorded whether a project presented for concept review at the investment committee during 2013-18 needed additional work on corporate governance. This was coded as a dummy variable, with a value of one where corporate governance work needed to be strengthened as part of economists' assessment.

The classification of concept reviews from the earlier years and those that were reviewed under various streamlined procedures was based on automated text analysis building on machine learning (see Devlin et al., 2018). In particular, the algorithm read through all final review notes and assigned a probability to a project addressing a particular set of issues, such as corporate governance or inclusion. The basic training of the software involved reading a public corpus of articles such as those on Wikipedia and BookCorpus (collection of text of 500 thousand books), a total of 110 million data points.

The basic training was further complemented by training specific to review of EBRD projects by economists. This refinement was based on manual reviews by human analysts (1,184 projects reviews in total). Of these, 125 were randomly set aside to measure goodness-of-fit out-of-training-sample and the rest were used for training. Infrequently, projects may have multiple concept or final reviews (if further actions are needed before a review is passed). In these cases all reviews were independently coded while the analysis in the paper focuses on the first concept review (when a project is first presented) and the last final review (where final decision is taken).

The probabilities assigned to a review suggesting work on corporate governance were converted into the respective dummy variables (one if the probability exceeded 0.5). Results are robust to alternative choices of threshold. In fact, most assessed probabilities are below 0.1 or exceed 0.8 (that is, they are clustered close to zero or one).

Machine-based and human-based coding of Concept reviews agreed 94.8 per cent of the time (in the testing subsample the agreement was observed approximately 88 per cent of the time). The machine-based coding was calibrated in a way that balanced a reasonably low likelihood of assigning a certain feature to a project which was not assigned by a human ("false positive" observed with a conditional probability of 5.4 per cent) and a moderate rate of false "negatives" (situations where human coders thought

improvements in corporate governance were requested but machine-based coding did not support this view, 4.9 per cent conditional probability). The calibration generally favored avoidance of false positives at the expense of higher rate of false negatives in the training sample (8 out of 28).

Overall, work on corporate governance was requested at the time of the review of a project concept in around 21 per cent of cases. This percentage is similar (within one percentage point) based on project coding by analysts and by an algorithm in a substantially larger sample.

5 Results

5.1 Determinants of a project being signed

The first part of the analysis looks at the determinants of a project being signed conditional on its concept having been presented for a review. The dummy variable corresponding to signing (*Signed*) is linked to a project's expected impact (ESG), the assigned probability of default rating (PD) and a number of other project characteristics (X_i) such as the ownership of the client. Variants of the model also allow for a varying marginal impact of the probability of default on the likelihood of signing by including the corresponding interaction term between the expected ESG impact and the probability of default, in line with the stylized facts derived from the model. Equation 1 and its variants (without the interaction term) are estimated as a probit model as well as linear probability model.

$$P(Signed_i = 1) = \Phi(\alpha_i + \beta_1 ESG_i + \beta_2 PD_i + \phi ESG_i * PD_i + \beta_3 X_i + \epsilon_i) \qquad (1)$$

Project concepts with higher expected impact are more likely to be signed, unconditionally (see Figure 3). The results presented in Table 2 further indicate that project with higher ESG impact have a higher probability of being signed (for ease of discussing marginal effects Table 2 reports the results obtained using the linear probability model, probit results are similar and reported in Table 5). In fact, the estimated coefficients may understate the association between ESG impact and probability of signing to the extent that certain elements of impact observed directly are also included in the regressions. Such project characteristics include, for instance, equity investments that allow for deeper work on corporate governance, transparency and environmental performance.

As expected, riskier projects, on average, have a lower probability of being signed (a one standard deviation reduction in probability of default is associated with a 5 percentage point drop in the likelihood of a project being signed). This relationship holds when controlling for impact or unconditionally (see Figure 4).

Adding an interaction term between the expected ESG impact and the probability of default allows for the marginal impact of probability of default on project signing to be

a function of a project's commercial risk, in line with the stylized facts derived from the model. As predicted, the coefficient on this interaction term is positive and statistically significant.

Taken together, the estimates suggest that ESG impact is of greater importance for the probability of signing of commercially riskier projects (see representation of the joint impact of probability of default and ESG impact on the probability of signing, Figure 5). In other words, riskier projects are substantially more likely to get implemented if they carry stronger impact.

Another way of looking at the interplay between ESG impact and commercial risk of a project is to interact the expected impact with the dummy variables for lower and higher values of probability of default. This specification allows for a direct comparison of different marginal impacts of ESG considerations on selection of projects with higher and lower probabilities of default. Alternatively, separate specifications can be estimated for high-risk and low-risk projects (right-most columns of Table 2).

$$P(Signed_i = 1) = \Phi(\alpha_i + \beta_{1H} ESG_i * PDHigh_i + \beta_{1L} ESG_i * PDLow_i + \beta_2 PD_i + \beta_3 X_i + \epsilon_i) \tag{2}$$

The results confirm that the expected impact has a higher bearing on the probability of signing for riskier investments (those with a probability of default assessed as median or higher, approximately corresponding to the rating of B or weaker on a standard scale used by rating agencies such as Fitch).

The marginal impact of the expected ESG impact in the subsample of high-risk projects is highly economically significant. A project at the 90th percentile of distribution of expected impact is 12 percentage points more likely to be signed than a project at the 10th percentile of that distribution. In contrast, in a subsample of low-risk projects, the coefficient on the expected impact remains positive but it is considerably smaller and not statistically significant. The difference between the coefficients in low-risk and high-risk subsamples is statistically significant (see Annex Table A1).

Another way of looking at the trade-off between the risk management and impact perspectives is to compare investment concepts with an identical probability of being signed. Consider a typical project, one with a median expected impact and a median probability of default. If probability of default rating weakens by a notch (around 0.4 of a standard deviation), probability of signing remains unchanged should ESG impact be around 0.08 points higher (around 0.6 of a standard deviation). Similarly, a project with stronger credit rating and a weaker impact rating can also have the same probability of being signed. A relatively high estimated trade-off ratio is consistent with the EBRD dealing with higher-risk projects in less developed economies, as discussed in the previous section.

As far as other variables are concerned, a project with a sovereign or a sovereign guarantee and those with public-sector clients are more likely to be signed, as are projects where investment is envisaged in local currency (see Table 3). Local-currency projects tend to have stronger risk profile as well as stronger ESG impact (development

of local capital markets and contribution to greater financial resilience of the sector tend to be credited as part of impact assessment). Concepts of equity investment, on the other hand, are less likely to be signed. Although they tend to carry a more favorable assessment of ESG impact (including rooted in potential improvements in corporate governance) these projects tend to be more complex and agreement on a price of entry may be more difficult to achieve than for a debt transaction. Larger investments are less likely to be signed, controlling for a threshold below which streamlined management and board approval processes apply (a separate dummy variable is included to account for such a threshold effect). Regressions also control for countries, seasonality (month of review), repeat clients (where projects may face fewer integrity issues) as well as the banking sub-team in charge of the project (interaction of sector and geographical region such as Central Asia). When it comes to country fixed effects, they tend to be lower in countries with higher per capita income: here impact considerations appear to dominate risk management ones. No strong seasonal patterns are revealed.

5.2 ESG impact assessment and corporate governance work

The analysis now moves from the selection of project concepts (probability of signing) to projects design, with particular reference to work undertaken to strengthen corporate governance and transparency of a client. This work typically takes form of a review of corporate governance practices of a potential client, which can lead to a corporate governance action plan being agreed. Such plans may target, for instance, creating a board of directors or introducing independent directors to the board, developing internal controls and anti-corruption mechanisms, changes to the way procurement is run, reorganization and / or disclosure of ownership structure, participation in the extractive industries transparency initiative in the case of large companies in the commodities sector, strengthening of internal and external audit functions and a number of other undertakings, in line with best international practices (see EBRD, 2017, for a discussion).

The basic model links the likelihood of a suggestion to work on client's corporate governance (CG_i, a dummy variable) made at the time of review of project concept to a variety of project characteristics including its expected impact and probability of default ratings. Suggestions regarding enhancements to the project design are made by the economists reviewing the ESG impact of the project and are recorded in the review notes alongside the impact score. These notes were analysed using machine-learning techniques, as described earlier. As before, the specification is estimated as probit or linear probability model.

$$P(CG_i = 1) = \Phi(\alpha_i + \mu X_i + \gamma ESG_i + \lambda PD_i + u_i) \tag{3}$$

The results (presented in Table 4) suggest that a request to work on a client's corporate governance is strongly negatively correlated with the assessed impact at the concept stage. A potential bias, if anything, runs in the opposite direction: work on corporate governance is taken into account as part of the review of project impact and thus could be mechanically associated with higher expected ESG impact.

Empirical evidence thus strongly suggests that corporate governance work is requested in the context of projects with an otherwise weaker assessed ESG impact, as well as higher risk. A one standard deviation reduction in the expected impact is associated with a 4 to 6 percentage point higher likelihood of corporate governance work being suggested, compared with the average request rate of around 21 per cent. This may be because, in the absence of corporate governance improvements, other dimensions of impact associated with the project do not justify the use of development bank's funds. Or this may be because weaknesses of corporate governance jeopardize the achievement of other impact dimensions such as environmental improvements. Indeed, projects with state-owned companies are more likely to carry a request to strengthen corporate governance. This analysis also controls for a combination of sector, geographical region and countries at the concept stage as well as a battery of fixed effects for economists reviewing each investment at the concept stage.

5.3 Discussion

The estimation suggest complex trade-offs between commercial risk and the expected impact of investment projects implemented by a development bank. Such trade-offs are routinely discussed at meeting of an investment committee which includes, separately, members with explicit responsibilities for risk management and ESG impact. In this setup, projects appear to be simultaneously selected on their impact and commercial risk profile.

Theoretical insights in Opp and Oehmke (2020) suggest that for impact investing to be effective in achieving desired environmental and social outcomes, investors need to base their decisions on a single project-level metric encompassing ESG impact. In addition, this metric needs to take into account the counterfactual situation in which a project does not go ahead. Empirical analysis in this paper shows that project selection at the EBRD appears to be guided by such a metric, generating meaningful risk-impact trade-offs.

Indeed, such trade-offs can be expected in equilibrium. Optimisation based on ESG impact and finanical performance would yield inferior financial outcomes compared with optimisation based on financial profile of investments alone. In transition, financial and ESG objectives may be aligned temporarily, to the extent that an increase in demand for impactful assets raises their prices and returns for early investors (for instance, Gantchev et al. (2020) document such dynamic effects and their reversal over time).

Investors committed to delivering impact may benefit from summarising the expected impact of an investment in a sufficient statistic, in the same way as credit quality of a client is commonly summarized in a credit rating. Advances in machine learning and artificial intelligence could help to minimize the overheads associated with such assessments. If meaningful risk-impact trade-offs become part of decision making of a large number of socially conscious investors, overall risk tolerance with respect to socially valuable projects may rise substantially. This should relax financing constraints for such projects but also lower returns for socially responsible investors (consistent with the findings of Luo and Balvers (2017) and a number of other studies). This may

somewhat reduce their appetite for foregoing financial return in search of impact. In the long run, however, this should also increase supply of projects with high ESG impact and lower supply of socially suboptimal projects. Socially minded investors can accelerate this shift by supporting design of socially attractive features.

As far as "traditional" multilateral development banks are concerned, the analysis suggests that project selection indeed plays an important role in helping to target – and achieve – ESG impact. At the same time, project design – concerted work on building desirable features into projects such as strengthening of the corporate governance of a potential client – also plays an important role. Going forward, development banks could document more precisely both the project selection and the project design parts of their work and further improve quantification of the impact achieved. The 17 sustainable development goals adopted by the United Nations (UN) is a possible framework for articulating and aggregating various impact dimensions into an index.

5.4 Robustness checks

In the baseline analysis, investments with median commercial risks were assigned into higher-risk part of the sample. The results hold if they are assigned to the lower-risk part (see Annex Table A1). All findings hold with probit estimations (see Tables 4, 5 and Annex Table A1).

To investigate the impact of machine-based coding of project reviews we repeat the analysis of the determinants of requests to work on corporate governance in three ways. First, we restrict the sample to projects where reviews were coded manually. Second, we use the same subsample of manually-coded projects but assign the variable capturing requests to work on corporate governance based on the text analysis performed by an algorithm instead. Third, we run the analysis on a broad sample using machine coding. Reassuringly, the results are qualitatively and quantitatively similar.

6 Conclusion

This paper used a novel dataset on project considered by the European Bank for Reconstruction and Development in 2010-18 as well as machine-learning-based text analysis to examine project selection and project design at a multilateral development bank. The analysis exploited the fact that details of each investment are recorded at least twice: when a concept is first reviewed by the investment committee and when the final particulars of a deal are approved, with around 55 per cent of project concepts eventually going ahead.

The analysis showed that investments considered by the EBRD are simultaneously selected on the quality of credit and their ESG impact. In addition, the ESG impact of some projects is strengthened between the concept and final stages of approval. In particular, more than a fifth of project concepts reviewed by EBRD include requests to carry out work to strengthen client's corporate governance and standards of disclosure.

These requests tend to target projects where the expected impact is otherwise weaker and clients are otherwise believed to have higher probability of default.

To the best of our knowledge, this is the first study to quantify the trade-off between ESG and commercial objectives of a large investor. The paper also points to a project rating system that can support decision making internalizing such trade-off. In particular, the system implemented at the EBRD relies on a single sufficient statistic of impact. Investment committee includes separate officers responsible for risk management and ESG impact. As a result, decision making process internalizes trade-offs between both objectives.

An increasing number of banks and institutional investors state multiple objectives covering environmental and social goals in addition to the goal of maximizing return on capital. The paper argues that investors will need to confront the associated trade-offs between different objectives by quantifying ESG impact in ways similar to quantification of financial risks. This is broadly consistent with a theoretical argument by Opp and Oehmke (2020) who model the impact of project choices by commercial and impact investors and highlight the role that a social responsibility index can play. This approach goes well beyond reporting on impact achieved while maximizing financial objectives (which may well be non-trivial) or filtering out investments that violate certain rules (such as emission intensity).

Internal assessment of ESG impact need not be prohibitively expensive. Machine learning and artificial intelligence, coupled with some human guidance, could provide meaningful ESG impact assessments in a cost-effective way.

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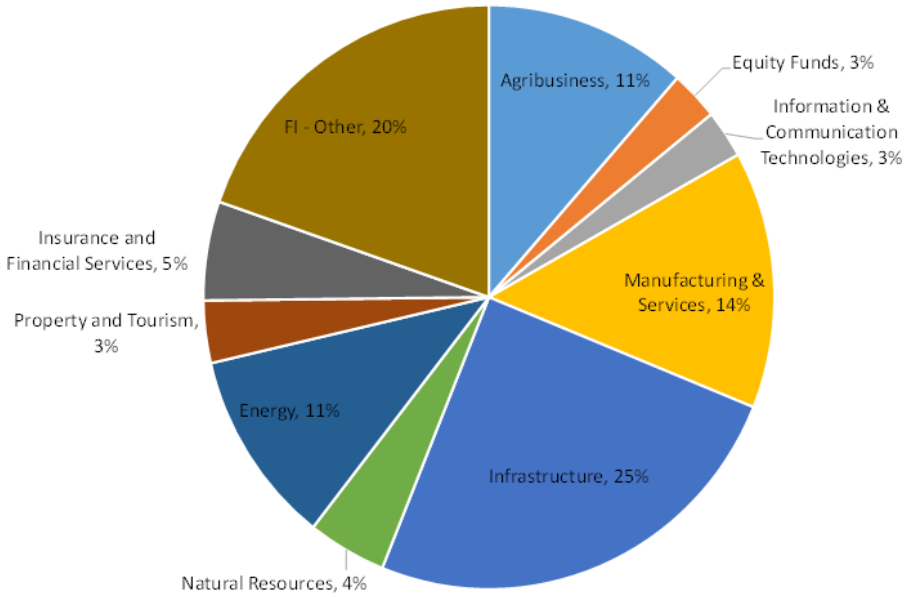
Data availability

Data on project characteristics used in the paper can be made available, subject to approval by the EBRD.

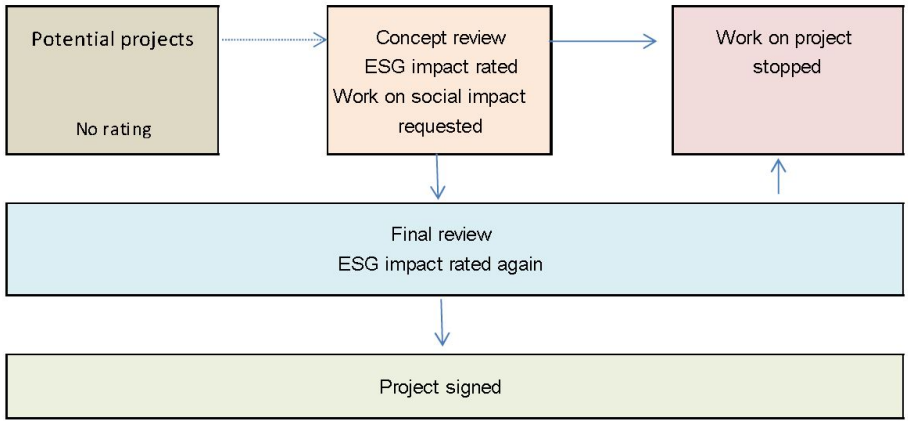
Figures and Tables

Figure 1: Distribution of project concepts by sector



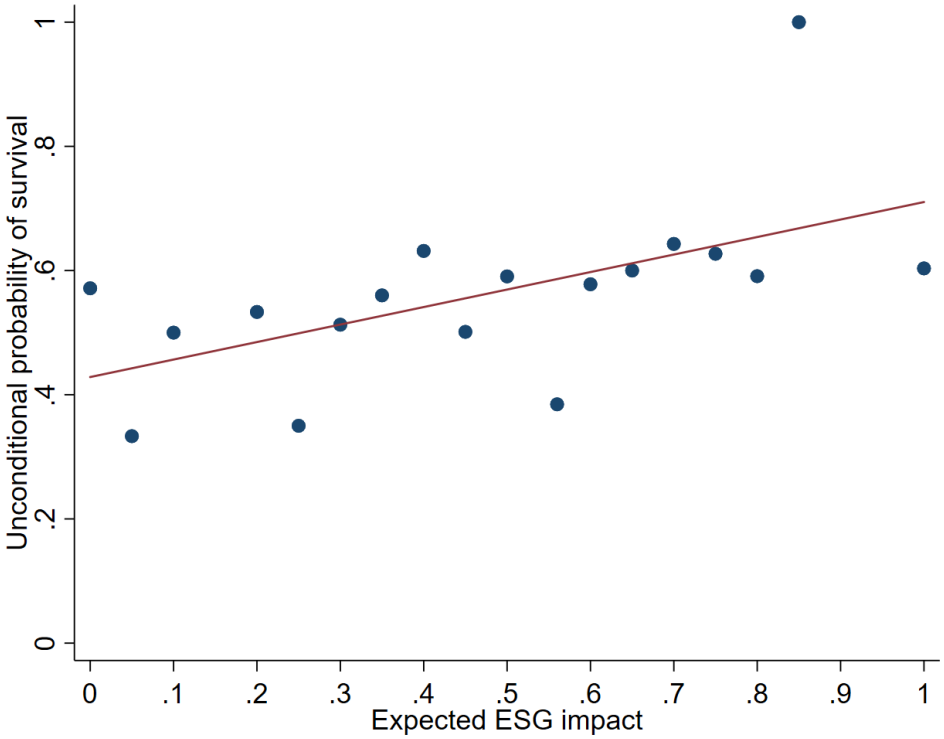
Sources: EBRD calculations.
Notes: Based on 2,665 projects that were presented for concept review during 2010-18.

Figure 2: Schematic representation of project assessment cycle



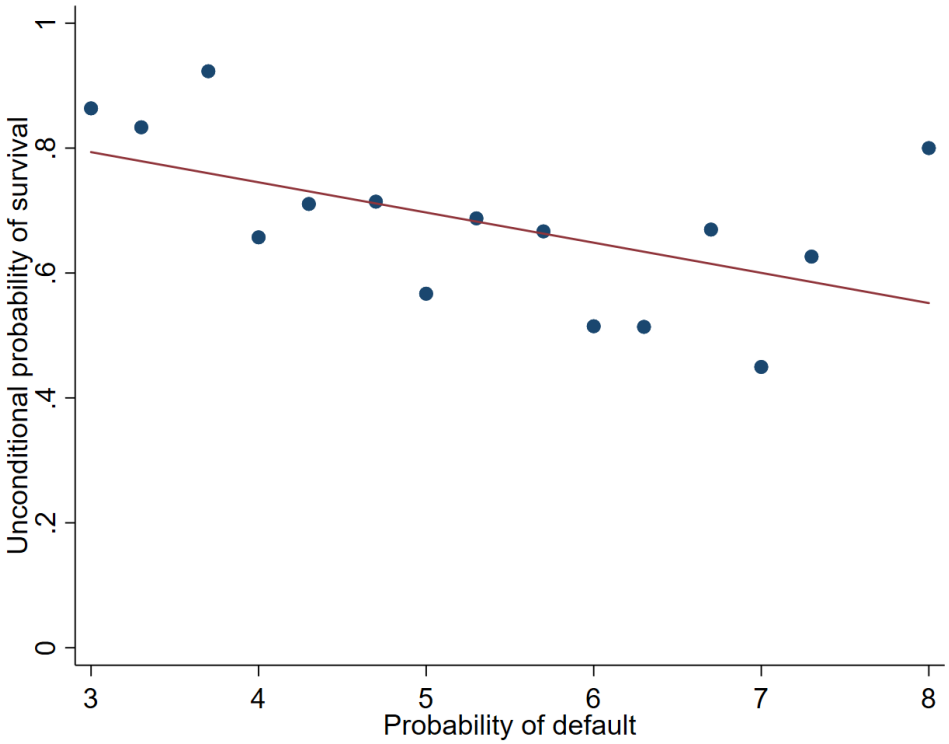
Sources: Authors' calculations.

Figure 3: Expected ESG impact assigned to a project concept and probability of a project being signed



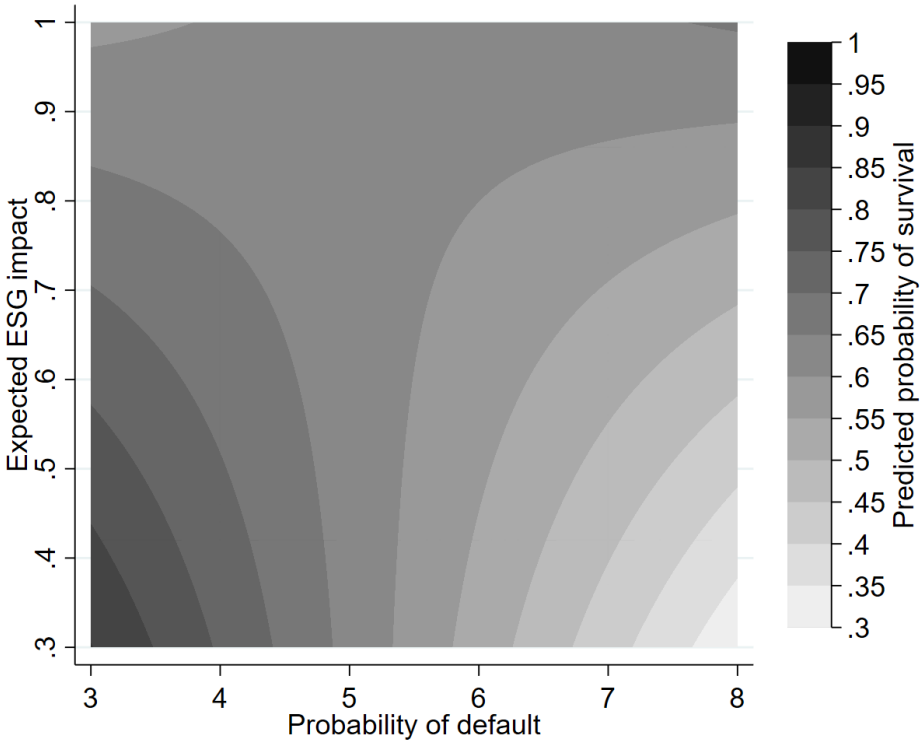
Sources: EBRD and authors' calculations.
Notes: Average likelihood of a project being signed for each 0.1-point interval of expected impact.

Figure 4: Probability of default assigned to a project concept and probability of a project being signed



Sources: EBRD and authors' calculations.
Notes: Average likelihood of a project being signed for each value of probability of default.

Figure 5: Estimated probability of a project being signed depending on the probability of default and the ESG impact assigned at the concept review stage



Sources: Authors' calculations.
Notes: Predicted probability of a project presented for a concept review being eventually signed based on the specification reported in Table 2 with interaction terms between probability of default and ESG impact.

Table 1: Descriptive statistics

Variables	Mean	Median	St. dev.	Min	Max
Project signed	0.565	1	0.496	0	1
ESG impact at concept review (rescaled 0-1)	0.581	0.6	0.150	0	1
Probability of default (PD)	6.099	6.3	0.835	2.3	8
State non-Sovereign	0.214	0	0.410	0	1
Sovereign	0.053	0	0.223	0	1
Repeat client dummy	0.583	1	0.493	0	1
Project in local currency	0.238	0	0.426	0	1
Operation amount (€mln)	38.115	22.5	43.044	0	452.1
Syndication (external co-financing)	0.158	0	0.365	0	1
Equity	0.170	0	0.376	0	1
Corporate governance work requested	0.198	0	0.399	0	1

Source: Authors' calculations.

Note: Based on 2,665 project concepts reviewed during 2010-18.

Table 2: Determinants of probability of a project being signed, by probability of default

LPM	All projects				PD below median	PD above median
Dep Var: Project signed	(1)	(2)	(3)	(4)	(5)	(6)
ESG impact	0.155***		0.162***	-0.894**	0.075	0.311***
	(0.056)		(0.054)	(0.433)	(0.116)	(0.086)
Prob. of default (PD)		-0.062***	-0.063***	-0.160***	-0.102***	0.010
		(0.019)	(0.019)	(0.044)	(0.023)	(0.047)
ESG impact*PD				0.173**		
				(0.069)		
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes
Banking team * Region FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.184	0.190	0.191	0.193	0.231	0.278
Observations	2,665	2,665	2,665	2,665	1,255	1,410

Source: Authors' calculations.

Note: Robust standard errors in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. The dependent variable is a dummy variable for signed projects. Estimated using linear probability model. All regressions include the transaction size, instrument, repeat client and other transaction-level controls as well as fixed effects as specified.

Table 3: Determinants of a project being signed

Dep Var: Project signed	(1) LPM	(2) LPM	(3) LPM	(4) Probit	(5) Probit	(6) Probit
ESG impact		0.162***	-0.894**		0.498***	-2.562**
		(0.054)	(0.433)		(0.151)	(1.306)
Prob. of default (PD)	-0.062***	-0.063***	-0.160***	-0.193***	-0.198***	-0.476***
	(0.019)	(0.019)	(0.044)	(0.060)	(0.060)	(0.135)
ESG impact*PD			0.173**			0.501**
			(0.069)			(0.210)
State non-Sovereign	0.067	0.079*	0.081*	0.171	0.206*	0.212*
	(0.044)	(0.044)	(0.043)	(0.125)	(0.124)	(0.123)
Sovereign	0.222**	0.236**	0.241**	0.611**	0.658**	0.672**
	(0.089)	(0.089)	(0.089)	(0.266)	(0.267)	(0.267)
Equity	-0.187***	-0.188***	-0.187***	-0.550***	-0.555***	-0.556***
	(0.032)	(0.032)	(0.033)	(0.092)	(0.092)	(0.093)
Guarantee instrument	0.183***	0.182***	0.179***	0.541***	0.541***	0.535***
	(0.055)	(0.054)	(0.055)	(0.177)	(0.176)	(0.177)
Local currency	0.103***	0.102***	0.103***	0.294***	0.292***	0.296***
	(0.035)	(0.035)	(0.034)	(0.105)	(0.103)	(0.103)
Repeat client	0.061	0.062	0.062	0.177	0.179	0.180
	(0.041)	(0.041)	(0.041)	(0.111)	(0.111)	(0.112)
Syndication	0.115***	0.115***	0.115***	0.339***	0.338***	0.336***
	(0.023)	(0.023)	(0.024)	(0.069)	(0.070)	(0.073)
Operation amount (log)	-0.031**	-0.028*	-0.030**	-0.096**	-0.088**	-0.093**
	(0.014)	(0.014)	(0.014)	(0.040)	(0.040)	(0.040)
Amount below €10m	0.026	0.028	0.025	0.072	0.076	0.067
	(0.036)	(0.036)	(0.036)	(0.105)	(0.106)	(0.105)
Constant	1.030**	0.959**	1.556***	1.689*	1.501	3.214**
	(0.427)	(0.453)	(0.534)	(1.022)	(1.070)	(1.356)
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes
Banking team*Region FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2 /Pseudo R^2	0.190	0.191	0.193	0.148	0.150	0.151
Observations	2,665	2,665	2,665	2,636	2,636	2,636

Source: Authors' calculations.

Note: Standard errors in parentheses are clustered at the country level. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. The dependent variable is a dummy variable for signed projects. Estimated using linear probability model and probit.

Table 4: Correlates of requests to work on corporate governance (CG) of prospective investee companies

Dep. Var:	Manually coded CG LPM	Algorithmic CG LPM	Manually coded CG Probit	Algorithmic CG Probit
ESG impact	-0.396***	-0.237***	-2.035***	-1.296***
	(0.112)	(0.053)	(0.530)	(0.265)
Prob. of default (PD)	0.042**	0.036***	0.217**	0.169***
	(0.020)	(0.010)	(0.096)	(0.052)
State non-Sovereign	0.053	0.043*	0.272	0.238**
	(0.040)	(0.023)	(0.184)	(0.114)
Sovereign	0.111	0.077*	0.460	0.367*
	(0.074)	(0.045)	(0.354)	(0.214)
Equity	0.280***	0.297***	1.175***	1.170***
	(0.041)	(0.022)	(0.178)	(0.097)
Guarantee instrument	-0.100	-0.048	-0.334	-0.320
	(0.083)	(0.043)	(0.444)	(0.278)
Local currency	-0.056	-0.030	-0.269	-0.142
	(0.042)	(0.023)	(0.186)	(0.112)
Repeat client	-0.043	0.000	-0.161	0.014
	(0.030)	(0.020)	(0.131)	(0.078)
Syndication	-0.004	-0.014	0.019	-0.061
	(0.038)	(0.021)	(0.172)	(0.100)
Operation amount (log)	-0.004	0.024**	-0.062	0.114**
	(0.020)	(0.011)	(0.092)	(0.053)
Amount below €10m	-0.017	-0.010	-0.065	-0.037
	(0.054)	(0.026)	(0.248)	(0.130)
Constant	0.270	0.017	-0.596	-2.858***
	(0.299)	(0.297)	(1.171)	(1.099)
Country FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes
Banking team*Region FEs	Yes	Yes	Yes	Yes
Economist FEs	Yes	Yes	Yes	Yes
R^2 / Pseudo R^2	0.294	0.244	0.258	0.243
Observations	1,053	2,653	868	2,444

Source: Authors' calculations.

Note: Standard errors in parentheses are clustered at the country level. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. The dependent variable is a dummy variable for requests to work on a client's corporate governance. Columns 1 and 3 include only projects where corporate governance work was coded manually; column 2 and 4 also include projects with corporate governance work coded based on software-based text analysis. All regression specifications include year effects, month effects, country effects and banking team-region fixed effects.

Table 5: Determinants of a project being signed, probit estimations

Probit	All projects				PD below median	PD above median
Dep Var: Project signed	(1)	(2)	(3)	(4)	(5)	(6)
ESG impact	0.455***		0.498***	-2.562**	0.249	0.972***
	(0.158)		(0.151)	(1.306)	(0.342)	(0.268)
Prob. of default (PD)		-0.193***	-0.198***	-0.476***	-0.337***	0.051
		(0.060)	(0.060)	(0.135)	(0.081)	(0.140)
ESG impact*PD				0.501**		
				(0.210)		
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes
Banking team*Region FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.143	0.148	0.150	0.151	0.165	0.200
Observations	2,636	2,636	2,636	2,636	1,195	1,342

Source: Authors' calculations.

Note: Robust standard errors in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using probit. The dependent variable is a dummy variable for signed projects. All regressions include the transaction size, instrument, repeat client and other transaction-level controls as well as fixed effects as specified.

Annex A. Derivations

Proposition 1. $\frac{\partial P^{**}}{\partial p} < 0$*;* $\frac{\partial P^{**}}{\partial s} > 0$*; and for sufficiently high values of* s*,* $\frac{\partial^2 P^{**}}{\partial p \partial s} > 0$*.*

$\frac{\partial P^{**}}{\partial p} = -f(\frac{r^*+w^*-s}{1-p})\frac{r^*+w^*-s}{(1-p)^2} < 0$

$\frac{\partial P^{**}}{\partial s} = f(\frac{r^*+w^*-s}{1-p})\frac{1}{1-p} > 0$

$\frac{\partial^2 P^{**}}{\partial p \partial s} = \frac{f(y^{**})+f'(y^{**})y^{**}}{(1-p)^2}$

The second mixed derivative of the probability of a project going ahead is positive as long as

$\frac{f'(y^{**})}{f(y^{**})} > -\frac{1}{y^{**}} = -\frac{1-p}{r^*+w^*-s}$

The above condition holds for sufficiently high values of ESG impact s.

When payoffs are uniformly distributed between 0 and $\hat{y}$:

$\frac{\partial^2 P^{**}}{\partial p \partial s} = \frac{1}{(1-p)^2 \hat{y}} > 0$

Proposition 2. There exists a trade-off whereby an increase in ESG value of a project and an increase in the probability of default keep the likelihood of a project being implemented unchanged.

This trade-off is given by

$dy^{**} = \frac{\partial y^{**}}{\partial s} ds + \frac{\partial y^{**}}{\partial p} dp = 0$

This yields

$\left|\frac{ds}{dp}\right|_{(y^{**}=const)} = \frac{r^*+w^*-s}{1-p} > 0$

Annex B. Annex tables.

Table A1: Determinants of a project being signed, by different thresholds of probability of default

Dep Var: Project signed	High PD if ⩾ 6.3 LPM	High PD if ⩾ 6.7 LPM	High PD if ⩾ 6.3 Probit	High PD if ⩾ 6.7 Probit
Prob. of default (PD)	-0.077***	-0.087***	-0.242***	-0.275***
	(0.018)	(0.018)	(0.056)	(0.060)
ESG impact*LowPD	0.127**	0.129**	0.392**	0.395**
	(0.058)	(0.055)	(0.168)	(0.157)
ESG impact*HighPD	0.189***	0.248***	0.578***	0.770***
	(0.058)	(0.063)	(0.163)	(0.181)
State non-Sovereign	0.081*	0.073	0.212*	0.185
	(0.044)	(0.043)	(0.124)	(0.123)
Country FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes
Banking team * Region FEs	Yes	Yes	Yes	Yes
R^2 / Pseudo R^2	0.192	0.193	0.151	0.152
Observations	2,665	2,665	2,636	2,636

Source: Authors' calculations.

Note: Standard errors in parentheses are clustered at the country level. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using linear probability model and probit. The dependent variable is a dummy variable for signed projects. All regressions include the transaction size, instrument, repeat client and other transaction-level controls as well as fixed effects as specified.