Blended Finance*

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Abstract

Blended finance—the use of public and philanthropic funding to crowd in private capital—is a potential way to finance a more sustainable world. We provide a conceptual framework that formalizes the decision-making of development finance institutions (DFIs) that engage in blended finance, and provide empirical evidence using deal-level data from a major DFI. Consistent with our conceptual framework, we find that DFIs provide higher concessionality for projects with higher sustainability impact. Moreover, the concessionality is higher for projects in countries with higher political risk and information asymmetries. In such cases, the blending tends to also include risk management provisions.

Keywords: blended finance; catalytic capital; development finance institutions (DFIs); sustainable finance; sustainable development goals (SDGs); public-private partnerships.

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1 Introduction

Climate change and biodiversity loss pose existential threats to our way of life—indeed to all life on Earth—and are tightly intertwined with other systemic challenges such as poverty and social inequality. Historically, the mitigation of these grand societal challenges has been primarily financed through public funding and private philanthropic giving. Yet, a large financing gap remains, especially in the Global South, to effectively address the climate and biodiversity crises, social inequality, poverty, and other grand societal challenges.[1] With the aim of closing this financing gap, the practice of blended finance has emerged in recent years. In blended finance, private capital is "blended" with public or philanthropic capital, whose aim is to subsidize and de-risk private capital. As such, the blending can serve as a catalyst for private capital investments in projects that create societal value but would otherwise not be financed. Blended finance has helped fund a broad range of projects on renewable energy, climate technology, nature-based solutions, and social inclusion, among others.

While blended finance is not novel, it is still in its infancy and not well understood. Indeed, there is a near complete lack of academic research studying blended finance. In this paper, we aim to fill this gap. First, we provide a conceptual framework that characterizes the trade-offs faced by development finance institutions (DFI) when providing blended finance solutions. Second, we provide empirical evidence on blended finance using data on the blended finance deals of a major DFI, namely the World Bank's International Finance Corporation (IFC).

To fix ideas, let us first describe an example of a blended finance deal. In a deal that was finalized on October 7, 2023, the IFC provided a concessional loan that helped finance a €100 million project whose goal is to promote sustainable cocoa sourcing in Côte d'Ivoire. The

[1] According to the Inter-American Development Bank, the financing gap to meet the objectives of the United Nations' Sustainable Development Goals (SDGs) is several trillions of dollars per year (IDB 2023).

project is conducted by the Ivorian subsidiary of the company Sucden (Sucres et Denrées), who received the funding in the form of a €100 million syndicated loan. The IFC's share was a loan of €40 million at a concessional rate (that is, a below-market interest rate), while the remaining €60 million was provided by other lenders at market rates. In their description of the deal, the IFC notes that "[w]ithout the support of the blended finance co-investment, the Project will not go ahead due to heightened project risk, political risk, and low expected return. As a result, the Project would not be carried out as planned and the subsequent benefits for the smallholder farmers, as well as on the market competitiveness will not be achieved." This deal is representative of blended finance deals in that it combines (i.e., blends) concessional funding with private capital, with the explicit objective of improving the risk-return profile of private capital. By doing so, the concessional funding serves as a catalyst for private investments in a project that creates societal value but would otherwise not be financed. In this example, the blending is done in the form of a loan at a below-market interest rate. This is one of many ways in which blended finance deals can be structured. Others include the provision of a junior equity tranche, the provision of risk management facilities (such as cross-currency swaps, first loss guarantees, risk-sharing facilities, and interest rate buy-downs), and the provision of performance-based incentives (in which additional payments are made conditional on the achievement of key performance indicators). Blended finance deals can include multiple blending provisions (e.g., a concessional loan combined with cross-currency swaps to hedge currency risks).

In this paper, we first introduce a conceptual framework that formalizes the decision-making of DFIs that engage in blended finance. Our framework takes the perspective of a DFI (such as the IFC) that has a limited budget obtained from governments and philanthropic donors. The DFI invests in projects with the objective of adding the greatest possible societal value. By providing concessionality (e.g., in the form of loans at below-market interest

rates), the DFI is able to crowd in private capital in projects that create societal value, but whose private returns would otherwise not be competitive enough to attract private investments. In selecting projects, the DFI faces a trade-off between societal impact and concessionality. The main prediction from this framework is that the higher the project's sustainability impact, the more the DFI is willing to provide concessionality. Intuitively, since concessionality is costly to DFIs, the societal returns need to be sufficiently high to justify the cost. Another prediction from our framework is that the higher the risk of the projects (e.g., due to political risks or information asymmetries in the country of the projects), the higher the concessionality that DFIs need to provide to appeal to private investors. Moreover, as risk management is likely more effective in mitigating project risk, we expect risk management provisions (e.g., first loss guarantees) to be more prevalent among riskier projects.

We then provide empirical evidence on blended finance. One challenge of studying blended finance is the scarcity of the data, as financial institutions rarely disclose information on their blended finance deals. A notable exception is the IFC. The IFC is the private-sector arm of the World Bank, whose mission is to advance sustainable development by investing in for-profit and commercial projects. In recent years, the IFC started disclosing detailed information about their blended finance deals. As part of their disclosure, they report the degree of concessionality. The latter is computed by the IFC as the subsidy from the blending (taking into account all blending provisions), expressed as a percentage of the total project cost. For example, a concessionality of 5% implies that the subsidy from the blending is 5% of the total investment cost. The degree of concessionality is the key information that we use in our empirical analysis.[2]

[2]To our knowledge, the IFC is the only blended finance provider that discloses information on concessionality levels, which was part of the IFC's recent effort to enhance their disclosure. As the IFC notes, "[i]n 2019, IFC announced it would hold itself to the highest standards of transparency when deploying concessional resources: IFC now discloses in its Summary of Investment Information, the subsidy levels for each proposed project along with justification for why it is necessary. IFC is the only DFI or blended finance implementer taking this step to date" (IFC 2024).

Our dataset consists of 173 blended finance deals from 2018 to 2023. About half of these deals finance projects in Africa (50.9%). The remaining projects are primarily in Asia and the Pacific (22.0%), Latin America and the Caribbean (11.6%), Eastern Europe (6.9%), and the Middle East (5.2%). These projects span various industries, both in the industrial and financial sectors. Within the industrial sector, the more prevalent industries are agribusiness and forestry (15.6% of the deals), infrastructure (8.7%), and manufacturing (7.5%).

We find evidence for a positive association between the project's sustainability impact, as measured by the number of Sustainable Development Goals (SDGs) to which the project contributes per $M of project cost, and the degree of concessionality. Specifically, our estimates imply that a one-standard deviation higher sustainability impact corresponds to a blending subsidy that is higher by 1.9 to 2.3 percentage points. When we distinguish between different types of SDGs, we find that this positive relationship holds for the society- and environment-related SDGs, while no relationship is found for the economics-related SDGs. This indicates that the degree of concessionality depends on the environmental and social impact of the project, as opposed to economic considerations. In additional analyses, we use an alternative measure of sustainability impact based on the IFC's qualitative assessment of the social and environmental risks of the projects. Using this alternative metric, we confirm that the degree of concessionality is significantly lower for projects that are less likely to deliver social and environmental impact. As a whole, these findings indicate that DFIs provide a higher degree of concessionality for projects that have a higher sustainability impact, which is consistent with the main prediction from our conceptual framework.

We further examine how the concessionality varies depending on political risk and information asymmetries in the country of the projects. To the extent that private investors worry about political risk and information asymmetries, DFIs may need to provide higher concessionality when financing projects in high-risk countries. We find that this is indeed the

case. That is, the degree of concessionality is significantly higher for projects in countries with a higher degree of political risk (measured using data from the World Bank's world development indicators) and information asymmetries (measured using data from the Open Data Inventory). We further document that the deal structure is significantly more likely to include risk management provisions for projects that are conducted in these countries. These findings are again consistent with our conceptual framework that predicts higher concessionality, and a higher reliance on risk management provisions, for riskier projects.

While our main analysis focuses on differences in concessionality among blended finance deals (that is, the intensive margin of blending), another relevant dimension is the decision to blend vs. not to blend (that is, the extensive margin). Since the IFC also invests in projects at market rates without partnering with others, we can contrast their blended vs. non-blended deals. When doing so, we obtain results that mirror those at the intensive margin. Specifically, we find that blended finance deals are more prevalent among projects that have a higher sustainability impact, and in countries with a higher degree of political risk and information asymmetries.

We caution that, while our results indicate that higher concessionality is granted to projects with higher sustainability impact, this need not imply that DFIs select the most impactful projects. For example, donor-imposed restrictions (e.g., in terms of SDGs or regions) may distort the project selection. These considerations are beyond the scope of our study, since we do not have data on the pool of projects that are available to DFIs (including those they are not pursuing). Relatedly, another caveat is that our measures of sustainability impact are ex-ante measures. Assessing the ex-post (i.e., realized) sustainability impact of the projects would require post-completion data, which are not available since the projects in our sample are still ongoing.

This study makes several contributions to the literature. First, by exploring how blended

finance can contribute to the financing of a more sustainable world, our study adds to the literature on sustainable finance (e.g., Bolton and Kacperczyk 2021, 2023; Coqueret, Giroux, and Zerbib 2025; Flammer 2021; Garel, Romec, Sautner, and Wagner 2024; Giglio, Kuchler, Stroebel, and Zeng 2024; Hong, Karolyi, and Scheinkman 2020; Pastor, Stambaugh, and Taylor 2022; Sautner, van Lent, Vilkov, and Zhang, 2023), as well as the literature that studies investors' attitude toward sustainability (e.g., Gibson Brandon, Glossner, Matos, Krueger, and Steffen 2022; Heeb, Kölbel, Paetzold, and Zeisberger 2023; Ilhan, Krueger, Sautner, and Starks 2023; Krueger, Sautner, and Starks 2020). This literature focuses on the role of pure private capital (in the form of equity and fixed income investments), but does not consider the role of DFIs and private-public partnerships.

Second, our study contributes to the nascent literature that studies blended financing structures. In this regard, the most closely related papers are Flammer, Giroux, and Heal (2025) and Kotchen and Vogt (2023). Flammer, Giroux, and Heal (2025) examine how private capital can help finance the protection and restoration of biodiversity. They compare biodiversity projects that are financed by pure private capital vis-à-vis blended financing structures. Kotchen and Vogt (2023) examine the co-financing objectives of environmental multilateral funds such as the Global Environment Facility (GEF) and the Green Climate Fund (GCF). They show that co-financing objectives can backfire, as they may tilt the project selection toward projects with higher co-financing ratios as opposed to higher environmental impact.

Our paper differs from these two studies in several ways. First, in contrast to Flammer, Giroux, and Heal (2025), we study investment decisions from the perspective of DFIs as opposed to private investors. The decision-making of DFIs is inherently different, as their objective is to finance public goods and provide catalytic capital to crowd in private investments. Second, we delve into the "black box" of blended finance deals and characterize

their degree of concessionality. Third, our study is broader in scope than the aforementioned studies as it goes beyond the mitigation of climate change and biodiversity loss. Instead, we consider blended finance solutions that contribute to the full range of SDGs.

The remainder of this paper is organized as follows. Section 2 presents our conceptual framework. Section 3 describes the data and provides a characterization of the blended finance deals. Section 4 describes the methodology. Section 5 presents the results. Section 6 compares blended vs. non-blended deals. Finally, Section 7 concludes.

2 Conceptual framework

In this section, we provide a conceptual framework that formalizes the decision-making of a development finance institution (DFI) that provides concessional capital in a blended finance deal in order to crowd in private capital. The concessional capital is used to finance projects that create societal value, in keeping with the DFI's mission. In what follows, we first provide the intuition in the form of figures, and then formalize this intuition in a model.[3]

2.1 Intuition

Let us consider a set of investment projects indexed by i. Each project has a private return R_i and a societal return S_i. Both dimensions are displayed in Panel A of Figure 1, in which the X-axis plots the societal returns, and the Y-axis the private returns. The figure also displays the 45-degree line. Projects that are above the 45-degree line have negative externalities ($R_i > S_i$), while projects that are below have positive externalities ($R_i < S_i$). The figure displays the private investors' hurdle rate H (horizontal dashed line), such that private investors only invest in projects with $R_i \geq H$. Similarly, the figure displays the DFI's

[3]This conceptual framework draws from the practitioner literature that discusses the considerations and trade-offs faced by DFIs when undertaking blended finance investments (IMF 2013, IDB 2023).

societal hurdle rate D (vertical dashed line) that captures the minimum societal return a project needs to deliver to meet the DFI's mission statement.

—— Insert Figure 1 about here ——

The relevant set of projects for blended finance are those that (a) have positive externalities (that is, projects that are below the 45-degree line), (b) are not financed by private markets (that is, projects whose private returns are below the private investors' hurdle rate H), and (c) have societal returns above the DFI's societal hurdle rate D. In other words, the set of relevant projects for blended finance is given by the shaded area spanned by the 45-degree line (dotted line), the private investors' hurdle rate H (horizontal dashed line), the DFI's societal hurdle rate D (vertical dashed line), and the X-axis. This area is marked as "set of relevant projects for blended finance" in the figure.

How do DFIs select and finance projects within the relevant set? To illustrate their decision-making, let us assume that a DFI has identified three potential projects within the shaded area. These three projects are displayed in Panel B of Figure 1. To crowd in private capital, the DFI needs to provide concessional funding that would enhance the project's private return from R_i to H. The extent of concessionality needed until the project is commercially viable is given by the return shortfall $\Delta_i = H - R_i$, which is represented by the orange arrows in the figure. If the DFI faces no budget constraints, the DFI would invest in all three projects, as each of them fulfills the relevant criteria for blended financing. However, DFIs only have limited budgets due to the scarcity of donations, government grants, and other sources of concessional capital. If the projects are of the same size and the DFI only has budget for two of the projects, the DFI would optimally select projects 1 and 2. This is because project 3 is strictly dominated by projects 1 and 2, as project 3 has both a lower societal return and a lower private return (and hence requires a higher degree of concessionality to be commercially viable).

If the DFI only has budget for one of the three projects, the DFI will pick between project 1 and project 2. This decision entails a trade-off between societal impact and concessionality. That is, project 2 has higher societal returns, but also requires a higher degree of concessionality. In contrast, project 1 requires less concessionality, but delivers lower societal returns. Ultimately, the decision between projects 1 and 2 depends on the extent of the societal benefits relative to the concessionality requirements. Accordingly, a testable prediction is that, all else equal, DFIs provide a higher degree of concessionality for projects that have higher sustainability impact. This is the main hypothesis that we examine empirically.

In Panel C of Figure 1, we consider a situation in which the risk of the three projects increases (e.g., due to an increase in political risk or higher information asymmetries in the country of the projects). As private investors worry about these risks, they require a higher hurdle rate, which corresponds to an upward shift of the horizontal dashed line in the figure. As a result, the concessionality requirements (represented by the orange arrows) increase. Intuitively, the higher the risk of the projects, the higher the degree of concessionality DFIs need to provide to appeal to private investors. This provides another testable prediction that we explore in the empirical analysis.

Finally, concessionality can be provided in a variety of ways. One way is to co-invest at below-market rates. Another way is to use concessional capital to finance risk management provisions (e.g., first loss guarantees). As risk management is likely more effective in mitigating project risk, we expect risk management provisions to be more prevalent among riskier projects. This provides an additional testable prediction that we explore empirically.

2.2 Model

In what follows, we formalize the intuition from Section 2.1 in a model. In keeping with the setup outlined above, we consider a set of possible investment projects that are indexed

by i, $i \in [0, I]$. We assume that each project costs $\$C$. The societal return on project i is $S(i)$ and the private return is $R(i)$, where $S(i) \geq R(i)$. We are only considering projects with positive externalities. We assume that projects are ranked by the index i in decreasing order of private returns, so that $dR(i)/di \leq 0$. All projects have the same societal return $S(i) = S$. Finally, the private hurdle rate is H, so that the private sector will invest in any project for which $R(i) \geq H$. We assume that $S \geq H$. We let i^* be the value of i at which $R(i^*) = H$, that is, project i^* is the marginal privately-profitable project. Projects with $i > i^*$ will only be executed if additional incentives are provided to private investors, which can be achieved through blended finance.

Let us assume that a DFI, or a sustainable investment fund, has a total sum of $\$K$ to invest and wants to invest this capital to add the greatest possible societal value. The DFI will clearly not invest in any project for which $i \leq i^*$ for the private sector will invest in these. It will focus on projects for which $i > i^*$ and will seek a strategy that leads to the maximum number of these being executed. It could just invest in the first K/C projects for which $i > i^*$ but it can do better than this by leveraging private investment and using its capital to raise the return on projects for which $i > i^*$ up to the hurdle rate.

There are several ways in which the DFI can raise the returns to private investors. We discuss the various tools of blended finance in Section 3.2.2. For the purpose of this model, we assume that the DFI uses concessional capital to co-invest at a below-market rate (that is, a rate that is less than the private hurdle rate).[4] For simplicity, and without loss of generality, we assume that the concessional capital used for the co-investment seeks a zero rate of return.

Consider project i' with $i' > i^*$ and hence $R(i') < H$. We let $\Delta(i') = H - R(i')$ be the shortfall between the commercial hurdle rate and the private return on project i'. Suppose

[4]As we document in Section 3.2.2, the provision of concessional capital at a below-market rate is the more prevalent form of blending in our sample of blended finance deals.

the DFI provides an amount of capital $K(i')$ to this project at a zero rate of return. Then the modified return $R_m(i')$ to a commercial investor who provides the balance of $C - K(i')$ is

$$R_m\left(i'\right) = R\left(i'\right)\frac{C}{C - K\left(i'\right)}$$

and for this modified return to equal the hurdle rate the provision of concessional capital has to satisfy

$$K^*\left(i'\right) = C\left[1 - \frac{R\left(i'\right)}{H}\right] = C\left[\frac{H - R\left(i'\right)}{H}\right] = C\frac{\Delta\left(i'\right)}{H}. \tag{1}$$

The concessional contribution has to equal the cost ($\$C$) times the shortfall as a proportion of the hurdle rate. So if, for example, the shortfall is 20% of the hurdle rate, the concessional contribution has to be 20% of the project cost.

The optimal policy for the DFI is to spend its capital K leveraging private funds in this fashion. It will fund projects from i^* to $\hat{i}$ where $\hat{i}$ is given by

$$\int_{i^*}^{\hat{i}} K^*(i)\,di = K,$$

that is,

$$\int_{i^*}^{\hat{i}} K^*(i)\,di = \frac{C}{H}\int_{i^*}^{\hat{i}} \Delta(i)\,di = K.$$

To simplify, we assume that $R(i)$ is a linear function of i with slope coefficient $-\beta$, $\beta > 0$. Moreover, since we are not interested in projects for which $i < i^*$, we set $i^* = 0$. Then the shortfall $\Delta(i) = \beta i$ and

$$\frac{C}{H}\int_{i^*}^{\hat{i}} \Delta(i)\,di = \frac{C}{H}\int_{0}^{\hat{i}} \beta i di = \frac{C}{2H}\beta\hat{i}^2 = K,$$

so that the last project funded, the $\hat{i} - th$, is given by

$$\hat{i} = \sqrt{\frac{2HK}{C\beta}}.$$

The main insight from this analysis is that it establishes a relationship between the degree of concessionality and the deficit from the hurdle rate, $K^*(i') = \Delta(i')\frac{C}{H}$, as conveyed in equation (1). We can think of the deficit from the hurdle rate as a measure of the extent to which the societal benefits from the project are non-monetizable, that is, the extent to which they are positive externalities or public goods. Accordingly, a testable prediction is that the more public or external the benefits of a project, the more will DFIs be willing to provide concessionality through blended finance. As mentioned above, this is the main hypothesis that we will bring to the data.

2.3 Extensions

2.3.1 *Project risk*

In the model of Section 2.2, we assume that all projects are subject to the same hurdle rate H. Since the hurdle rate captures the compensation that private investors require for bearing the risk of the projects, this implicitly assumes that all projects in the DFI's opportunity set have the same risk σ.

Under this assumption, we can assess how an increase in project risk (e.g., due to an increase in political risk or higher information asymmetries in the country of the projects) would affect the concessionality requirements. As investors require a higher hurdle rate for riskier projects, we can express H as a function of σ such that $dH(\sigma)/d\sigma \geq 0$. Using the

expression from equation (1), we then obtain:

$$\frac{dK^{*}\left(i'\right)}{d\sigma} = \frac{CR\left(i'\right)}{H^{2}} \frac{dH\left(\sigma\right)}{d\sigma} \geq 0,$$

which implies that the degree of concessionality increases in σ. Intuitively, the higher the risk of the projects, the more the DFI needs to enhance the projects' appeal through concessionality, which provides another testable prediction that we will bring to the data.

2.3.2 *Risk management*

In the analysis so far, we assumed that concessional capital is used to provide co-financing at a below-market rate. In practice, however, it is common for blended finance deals to also include risk mitigation mechanisms. In particular, as we document in Section 3.2.2, concessional capital is often used to finance risk management provisions (e.g., first loss guarantees) that reduce the risk that is borne by private investors.

In Appendix A, we extend our model to account for the DFI's use of risk management provisions. To do so, we model the distribution of the project returns, and model risk management as a way to induce a mean-preserving contraction of the return distribution. We then build on the notion of first- and second-order stochastic dominance to characterize the DFI's optimal decision-making.

In this setup, the DFI has two levers to improve the project's risk-return profile: 1) it can increase the private returns (by using a higher share of concessional capital at a below-market rate), and 2) it can induce a mean-preserving contraction of the return distribution (by using concessional capital to finance risk management provisions). Both approaches are costly in that they require concessional funding from the DFI's budget.

Ultimately, the optimal mix between the two depends on the DFI's cost-effectiveness in

implementing both approaches. As risk management is more effective in reducing risk (while the provision of co-financing at below-market rates is more effective in increasing returns), we expect risk management provisions to be more prevalent among riskier projects. This provides an additional testable prediction that we explore empirically.[5]

3 Data and summary statistics

3.1 Data

The data on blended finance deals are obtained from the International Finance Corporation (IFC). The IFC is the private-sector arm of the World Bank. The IFC's mission is to advance sustainable development by investing in for-profit and commercial projects. While the IFC invests in a variety of ways, several of their investments are in the form of blended finance investments.

In their blended finance practices, the IFC follows five principles, known as the "DFI enhanced principles for blended concessional finance for private sector projects" (IFC 2023). These principles aim to ensure that the financing is "additional" (that is, it contributes to projects that would otherwise not be funded), that it contributes to the crowding-in of private capital, and that the project adheres to high standards in terms of corporate governance, social and environmental impact, transparency, and disclosure.[6]

[5] In Appendix B, we further extend our setup to account for "deep uncertainty" (that is, ambiguity) in the return distribution. As we show, accounting for ambiguity yields similar predictions. This is because risk management reduces both uncertainty in returns and uncertainty in the return distribution.

[6] More precisely, the five principles are (1) rationale for blended concessional finance (that is, the financing goes beyond what is available from the market and should not crowd out the private sector); (2) crowding-in and minimum concessionality (that is, the financing contributes to catalyzing market development and mobilization of private sector resources, with concessionality not greater than necessary); (3) commercial sustainability (that is, the impact achieved by each operation should aim to be sustainable and contribute toward commercial viability); (4) reinforcing markets (that is, the financing addresses market failures effectively and efficiently minimizes the risk of market distortion or crowding out private finance); and (5) promoting high standards (that is, adherence to high standards, including in areas of corporate governance, environmental impact, integrity, transparency, and disclosure). See IFC (2023) for details.

In keeping with these principles, the IFC discloses information on their blended finance deals on an ongoing basis.[7] We downloaded the deal information from the IFC website on November 15, 2023. To be included in our sample, deals needed to (a) be labeled as blended finance deals, (b) include information about the financing of the deal, and (c) include information about the level of concessionality (that is, the "subsidy" from the blended finance co-investment). These criteria yield a sample of 173 deals from 2018 to 2023.[8]

3.2 Descriptive statistics

3.2.1 *Deals by country and industry*

We start our empirical analysis with a characterization of the deals in our sample of 173 blended finance deals from 2018 to 2023. Table 1 provides a breakdown of the deals by countries. As can be seen, about half of the deals are in Africa (50.9%), followed by Asia and the Pacific (22.0%), Latin America and the Caribbean (11.6%), Eastern Europe (6.9%), and the Middle East (5.2%). The location of these projects is further illustrated in Figure 2. In that figure, the darker-shaded areas indicate countries with a higher number of blended finance deals.

—— Insert Table 1 and Figure 2 about here ——

In Table 2, we provide a breakdown of the deals by industries, using the industry classification of the IFC. As can be seen, about half of the deals are in the industrial sector (Panel A), while the other half is in the financial sector (Panel B).[9] Within the industrial sector, the

[7] This information can be accessed from the IFC website at `https://disclosures.ifc.org/`.

[8] In 2019, the IFC started disclosing information on the deals' concessionality level as part the IFC's efforts to "hold itself to the highest standards of transparency when deploying concessional resources", further noting that "IFC is the only DFI or blended finance implementer taking this step to date" (IFC 2024). Since we require data on the concessionality level, the pre-2019 deals are not included in our sample, except for one deal whose information was disclosed in 2018, but whose implementation started in 2019.

[9] Deals in industrial sectors are in the form of project finance, in which a private company invests in a specific project that yields sustainability benefits. Deals in the financial sector are investments in financial institutions who then provide financing to companies whose activities yield sustainability benefits.

more prevalent industries are agribusiness and forestry (15.6% of the deals), infrastructure (8.7%), and manufacturing (7.5%). Within the financial sector, the more prevalent industries are commercial banking with respect to general credits (12.7%) and trade and supplier credits (6.4%).

—— Insert Table 2 about here ——

3.2.2 *Types of blending*

Table 3 provides a breakdown of the blended finance deals by the type of blending. The blending can be in the form of a concessional loan (that is, a loan at a below-market interest rate), a junior equity tranche, a risk management provision (such as cross-currency swaps, first loss guarantees, risk-sharing facilities, and interest rate buy-downs), or performance-based incentives (in which additional payments are made conditional on the achievement of key performance indicators). These provisions can be cumulative. For example, the IFC can provide a concessional loan combined with cross-currency swaps to provide cheaper capital (through the concessional loan) while hedging the currency risk faced by private investors (through the provision of cross-currency swaps). While the type of blending can differ, the objective is always the same, namely to improve the risk-return profile of the project and hence help crowd in private capital.

—— Insert Table 3 about here ——

Since blended finance deals can have multiple concessionality provisions, the percentages in Table 3 add up to more than 100%. As can be seen, about half of the deals receive concessional funding, either in the form of a concessional loan (33.5% of the deals) or a junior equity tranche (16.2%). About one third of the deals have risk-management provisions (34.1%), out of which the more prevalent ones are cross-currency swaps (15.0%) and first

loss guarantees (13.3%). Finally, about one fourth of the deals have performance-based provisions (24.3%).

3.2.3 *Contribution to the Sustainable Development Goals*

In their description of the deals, the IFC provides information on the sustainability impact of each project. Using this information, we determine to which of the United Nations' 17 Sustainable Development Goals (SDGs) each project contributes.[10]

In Table 4, we report the number and percentage of blended finance deals that contribute to each of the 17 SDGs. Note that, since blended finance projects typically contribute to multiple SDGs, the percentages add up to more than 100%.

—— Insert Table 4 about here ——

We refer to two of the SDGs as "economics-related SDGs" (namely, SDG #8 on decent work and economic growth, and SDG #9 on industry, innovation, and infrastructure), while we refer to the other 15 SDGs as "society- and environment-related SDGs." As can be seen from Table 4, many blended finance deals contribute to the economics-related SDGs (39.3% and 58.4% of the deals contribute to SDGs #8 and #9, respectively), in keeping with the IFC's objective to contribute to economic development in low-income countries. Importantly, they also contribute to the society- and environment-related SDGs. The more prevalent ones are SDG #5 on gender equality (31.8%), SDG #13 on climate action (31.2%), and SDG #7 on affordable and clean energy (13.9%). As these are typically public goods, their benefits are more difficult to monetize.[11]

[10] Appendix Table A provides a description of each SDG based on United Nations (2023).

[11] Note that, by definition, all blended finance projects contribute to SDG #17 on "partnerships for the goals," as they all strengthen the means of implementation for sustainable development and foster global partnerships to this end.

3.2.4 *Deal characteristics*

In Table 5, we provide summary statistics for various deal characteristics. As can be seen, the average deal size (total project cost) is \$107.9M.[12] The upper panel of Table 5 provides a breakdown of how the project cost is being financed. On average, 8.6% of the project cost is financed through concessional loans and 2.5% through concessional equity (that is, a junior tranche) provided by the IFC. It is common for the IFC to also provide financing at market rates in the form of regular (that is, non-concessional) debt and equity. On average, 44.3% and 3.5%, respectively, of the project cost is funded in this fashion. Summing up these numbers, 58.9% of the project cost is financed by the IFC. The remaining 41.1% is financed through private markets.

—— Insert Table 5 about here ——

The next rows in Table 5 provide statistics on the other blending provisions. Each provision is coded as a 0/1 dummy. As can be seen, 33.5% of the projects have risk management provisions, and 24.3% have performance-based provisions, as noted in Section 3.2.2.

The next variable is the project's concessionality, which captures the "subsidy" from the blending (as a percentage of the total project cost). This variable is computed by the IFC, taking into account the various blending provisions. For example, if the blending is in the form of a concessional loan, the concessionality captures the interest rate subsidy relative to the market rate, expressed as a percentage of the project cost. The calculation is more involved for projects that feature other blending provisions. For example, if the project also includes a first loss guarantee, the IFC uses their own pricing model to quantify the expected payment, adding it as part of the subsidy. We caution that, since the algorithm used to compute the subsidy is proprietary to the IFC, we do not know for sure how it is

[12] Some of the deals are quoted in Euros, which we convert into U.S. dollars using annual exchange rates from the Federal Reserve Economic Data (FRED) of the St. Louis Fed (`https://fred.stlouisfed.org/`).

computed.[13] That being said, even if the underlying model is inaccurate, this metric does capture the degree of concessionality from the perspective of the DFI (namely, the IFC). As such, this metric is likely to be informative in explaining DFIs' decision-making. Another benefit of the concessionality measure is that it takes into account the various blending provisions, summarizing them into one metric that can be interpreted as a subsidy (or, similarly, as a "grant equivalent"). As can be seen from Table 5, the average project in our sample has a concessionality of 5.15%, and there is considerable variation across projects (the standard deviation is 7.45%).

The remaining variables in Table 5 are metrics that capture the sustainability impact of the projects. # SDGs is the number of SDGs to which the project contributes, along with a breakdown between the number of economics-related SDGs and the number of society- and environment-related SDGs, as defined in Section 3.2.3. As is shown, the average project contributes to 3.52 SDGs, out of which 0.99 are economics-related SDGs and 2.53 are society- and environment-related SDGs. We further report summary statistics for the number of SDGs scaled by the total project cost. The latter will be used in the analysis to facilitate comparisons across projects of different size.

Finally, the last variable in Table 5, environmental and social risk, is an index that takes on the values 1, 2, and 3 depending on whether the IFC assesses the project's environmental and social risk to be low, medium, and high, respectively.[14] As can be seen, most blended

[13]IFC (2024) describes the computation as follows: "Concessionality figures are based on the difference between (i) a 'reference price' (which can be a market price, if available; the price calculated using IFC's pricing model, which comprises three main elements of risk, cost and net profit; or a negotiated price with the client) and (ii) the 'concessional price' being charged by the blended concessional finance co-investment."

[14]More precisely, the IFC provides an assessment of the environmental and social risks of each project. Based on this assessment, each project is assigned to one of three risk categories. Category A (high risk) refers to "business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented", category B (medium risk) refers to "business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures", and category C refers to "business activities with minimal or no adverse environmental or social risks and/or impacts". A similar taxonomy is used for projects involving investments in financial institutions (FIs), which the corresponding Categories FI-1, FI-2, and FI-3. See IFC (2012) for details. Note that these risks refer to the probability

finance projects have relatively low risk, with an average index score of 1.09.

4 Methodology

In our baseline specification, we examine whether the degree of concessionality is higher for projects that have a higher sustainability impact, in keeping with the main prediction of our conceptual framework of Section 2. To conduct this analysis, we estimate the following regression in our sample of 173 blended finance deals from 2018-2023:

$$Concessionality_i = \alpha_t + \alpha_r + \alpha_j + \beta \times Sustainability\ impact_i + \epsilon_i, \tag{2}$$

where $concessionality_i$ is the degree of concessionality (that is, the "subsidy" from the blended financing, expressed as a share of the total project cost) of project i. On the right-hand side, α_t are year fixed effects (referring to the project's disclosure year), α_r are region fixed effects (referring to the six regions listed in Table 1), α_j are industry fixed effects (referring to the nine industry sectors listed in Table 2), $sustainability\ impact_i$ is the sustainability impact of project i (such as the number of SDGs the project contributes to), and ϵ_i is the error term. Standard errors are clustered at the deal level. The coefficient of interest is β that captures the association between the project's sustainability impact and the degree of concessionality.

Naturally, we caution that the inference that can be drawn from equation (2) is correlational and hence need not warrant a causal interpretation. Our objective is to capture the association between sustainability impact and concessionality. A positive estimate of β would imply that DFIs (such as the IFC) tend to provide a higher degree of concessionality

that the projects cause social and environmental harm, as opposed to financial risk. As such, these risks need not be part of the private investors' risk-return trade-off.

for projects that have higher sustainability impact.

5 Results

5.1 Sustainability impact and concessionality

Table 6 presents estimates of regression (2), in which we regress the degree of concessionality on the number of SDGs (per $M of project cost) that the project contributes to. In column (1), the regression is estimated without fixed effects. In columns (2)-(4), we sequentially include more layers of fixed effects. In column (2), the regression includes year fixed effects; in column (3), it includes year and industry fixed effects; in column (4), it includes year, industry, and region fixed effects. The latter is the tightest specification we consider, in which we enforce that comparisons be made between deals within the same year, same industry, and same region.

—— Insert Table 6 about here ——

As can be seen, we obtain similar estimates in all four specifications. The point estimates range from 0.088 to 0.109, and are highly significant with p-values from 0.001 to 0.007. They are economically significant as well. Specifically, they imply that a one-standard deviation increase in the number of SDGs per $M of project cost (0.212) corresponds to a higher concessionality rate by 0.019 to 0.023 (that is, a subsidy that is higher by 1.9 to 2.3 percentage points), which accounts for 25% to 31% of a one-standard deviation in the concessionality rate (0.075). Importantly, the fact that the point estimates are positive and significant indicates that DFIs provide a higher degree of concessionality for projects that have higher sustainability impact, consistent with the main prediction of our conceptual framework in Section 2.

In the last two columns, we decompose the number of SDGs into economics-related SDGs (column (5)) and society- and environment-related SDGs (column (6)). As can be seen, the point estimate is small and insignificant for economics-related SDGs (0.018, with a p-value of 0.733), while it is large and highly significant for society- and environment-related SDGs (0.164, with a p-value of 0.000). This indicates that the degree of concessionality depends on the environmental and social impact of the project, as opposed to economic considerations. Arguably, economics-related impact is likely to translate into higher private returns, and hence need not warrant a higher subsidy.

In Appendix Table B, we show that the results are robust if we re-estimate the regressions separately for deals in the industrial and financial sectors. We find that the point estimates for the number of SDGs and the number of society- and environment-related SDGs are somewhat larger in the industrial sector. The point estimates for economics-related SDGs remain small and insignificant in both sectors.

In Table 7, we repeat the analysis of Table 6 using an alternative metric of sustainability impact. Specifically, we use the IFC index of environmental and social risk discussed in Section 3.2.4, which captures the extent to which the project may not deliver environmental and social impact. As such, this index can be interpreted as an inverse metric of expected sustainability impact. As can be seen, we obtain similar results when using this metric in lieu of the number of SDGs. In all four columns, the point estimates are negative (ranging from -0.016 to -0.022) and highly significant (with p-values ranging from 0.000 to 0.003). They imply that a one-standard deviation increase in the IFC index (0.421) corresponds to a lower concessionality rate by 0.007 to 0.009 (that is, a subsidy that is lower by 0.7 to 0.9 percentage points), which accounts for 9% to 12% of a one-standard deviation in the concessionality rate (0.075). This confirms that DFIs provide a lower degree of concessionality for projects that are less likely to deliver environmental and social impact.

—— Insert Table 7 about here ——

5.2 Political risk and information asymmetries

Since blended finance projects are predominantly conducted in low-income countries (see Table 1 and Figure 1), one concern is that country-level risks—such as political risk or a lack of transparency—may deter private investors from contributing to the projects. This was explicitly mentioned in the example featured in the introduction (referring to sustainable cocoa sourcing in Côte d'Ivoire), whose project description stated that "[w]ithout the support of the blended finance co-investment, the Project will not go ahead due to heightened project risk, political risk, and low expected return." Arguably, the higher the political risk, the higher the concessionality that DFIs may need to offer to crowd in private capital. This prediction followed from our conceptual framework in Section 2.

To examine this hypothesis, we use the country-level measure of "political stability and absence of violence/terrorism" from the World Bank.[15] This measure captures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. The World Bank reports this measure in units of a standard normal distribution (that is, it ranges from approximately -2.5 to 2.5). We take the reverse of this measure to obtain a country-level metric of political risk, and assign this metric to the blended finance deals in our sample based on the country and year of the projects. For projects that span multiple countries, we take the average across all countries within the corresponding region in the relevant year.

We then estimate a variant of regression (2) in which we use the measure of political risk as independent variable. The results are provided in columns (1)-(3) of Table 8. Column (1)

[15]The data are obtained from the World Bank's world development indicators, which can be accessed at `https://databank.worldbank.org/source/world-development-indicators`. The relevant item is coded as PV.EST in the database.

refers to the specification without fixed effects. In column (2), we include year fixed effects. In column (3), we further include industry fixed effects. Note that we do not include region fixed effects due to the regional nature of the measure of political risk. As can be seen, we find evidence for higher concessionality rates when political risk is higher. The point estimates range from 0.017 to 0.019, and are statistically significant with p-values from 0.028 to 0.055. Since political risk is recorded in units of a standard normal distribution, these estimates imply that a one-standard deviation increase in political risk is associated with a higher concessionality rate by 0.017 to 0.019 (that is, a subsidy that is higher by 1.7 to 1.9 percentage points), which accounts for 23% to 25% of a one-standard deviation in the concessionality rate (0.075).

—— Insert Table 8 about here ——

In columns (4)-(6) of Table 8, we further examine whether DFIs are more likely to add risk management provisions to the deal when they face a higher degree of political risk. To do so, we use as dependent variable a 1/0 indicator that is equal to one if the project includes a risk management provision. As is shown, we find that blended finance deals are indeed significantly more likely to entail risk management provisions for projects in countries with higher political risk, which is again consistent with the prediction from our conceptual framework in Section 2.

In Table 9, we repeat the previous analysis using a different measure of country-level risk. Specifically, we use a metric of opacity at the country level that captures the degree of information asymmetries in the project's country. We construct this measure using the composite openness score compiled by the Open Data Inventory (ODIN) for each country and year.[16] This score ranges from 0 to 100. Since this is a measure of transparency, we compute opacity as 100 minus the openness score, and scale it by 100 to obtain a metric that

[16]The data can be accessed at `http://www.opendatawatch.com`.

is normalized between 0 and 1. We then assign this metric to the blended finance deals in our sample based on the country and year of the projects. For projects that span multiple countries, we again take the average across all countries within the corresponding region in the relevant year.

—— Insert Table 9 about here ——

As can be seen, the results using opacity are similar to those we obtained for political risk. The higher the degree of opacity, the higher the concessionality rate. Moreover, the IFC is significantly more likely to include risk management provisions for projects in more opaque countries.[17,18]

6 Blended vs. non-blended deals

The analysis presented so far focused on the determinants of the concessionality rate. As such, the analysis focused on the *intensive* margin of blended finance (that is, whether DFIs use a higher or lower degree of blending). Another important dimension is the *extensive* margin (that is, DFIs' decision to blend or not). Since the IFC also invests in projects at market rates without partnering with others, we can contrast the IFC's blended finance deals versus their non-blended deals.

We conduct this analysis in Table 10. To do so, we download the set of non-blended deals from the IFC website. There is a total 595 non-blended deals that have non-missing information for the characteristics that are considered in the table. For each characteristic, we report the mean and standard deviation across the 173 blended finance deals and the 595

[17]The correlation between opacity and political risk is 0.21. To ensure that the results in Tables 8 and 9 are not merely capturing the same source of risk, Appendix Table C presents estimates from multivariate regressions in which both metrics are included as right-hand side variables. As can be seen, both political risk and opacity remain significant at conventional levels.

[18]The results in Tables 8 and 9 continue to hold if we control for the sustainability impact of the project using the number of SDGs per $M of project cost, as in Table 6.

non-blended deals. The last column reports the p-value of the difference in means between the two groups.

—— Insert Table 10 about here ——

As can be seen, the evidence is in line with what we observed at the intensive margin. First, blended finance deals tend to have significantly higher sustainability impact. On average, blended finance deals contribute to 3.5 SDGs compared to 2.2 SDGs for non-blended deals. This difference comes from the number of society- and environment-related SDGs (2.5 for the blended deals compared to 0.8 for the non-blended deals), which underscores the importance of the project's sustainability impact for the blending decision. The higher sustainability impact of blended finance deals is also reflected in the IFC index of environmental and social risk, which is significantly lower for blended finance deals.

Second, blended finance deals are more prevalent in Africa relative to the other regions (50.9% of the blended deal are in African countries compared to only 18.8% of the non-blended deals). Looking at country characteristics, the blended finance deals are significantly more common in countries with higher political risk and higher opacity, which is again consistent with our findings at the intensive margin.

Overall, the findings from Table 10 indicate that blended finance solutions are more likely to be used by DFIs for projects that have a higher sustainability impact and in countries where political risk and opacity might deter private capital investments. This is in line with what we observed at the intensive margins when studying the determinants of the concessionality level. Collectively, these findings are consistent with the predictions from our conceptual framework in Section 2.

7 Conclusion

Blended finance is a potentially helpful tool to finance a more sustainable world. Several practitioners highlight the potential of blended finance. For example, the Chairman and CEO of Bank of America recently stated that "[a] single project can benefit from the combining of different investor risk tolerances and expected rates of return. That's what blended finance is about. There's the potential to mobilize vast amounts of capital without sacrificing private capital returns" (Bank of America 2023). In this paper, we take an initial step to shed light on blended finance practices.

Our contribution is twofold. First, we propose a conceptual framework that formalizes the decision-making of DFIs that provide blended finance solutions. Second, we provide empirical evidence on blended finance using deal-level data from the IFC that include information on the degree of concessionality of each deal. Our main findings indicate that DFIs provide higher concessionality for projects that have a higher sustainability impact. Moreover, the concessionality is higher for projects in countries with higher political risk and a higher degree of information asymmetries. In such cases, the blending tends to also include risk management provisions. These findings are consistent with the predictions from our conceptual framework, in which DFIs have a limited budget that they allocate across projects to create societal value.

These insights notwithstanding, more research is needed to better understand the opportunities and challenges of blended finance. First, our analysis relies on a relatively small sample of 173 blended finance deals initiated by one specific DFI. While this sample is informative, especially since the IFC compiles information on the concessionality of each deal, it may not be representative of the universe of blended finance deals. As more data become available, future work could examine the extent to which our findings generalize to

other blended finance providers. Second, while blended finance holds great promise to be catalytic in crowding in more private capital, especially in the Global South, in order to finance innovative solutions in climate tech, renewable energy, nature-based solutions, and social inclusion, among others, more work is needed to understand the potential bottlenecks. Those might include the perceived lack of investable projects, the lack of qualified personnel to assess these projects, and the lack of familiarity with the relevant countries, among others. Understanding the bottlenecks that may prevent DFIs from channeling more funding toward the achievement of the SDGs is important to effectively scale up the global marketplace for blended finance. Third, more work is needed to understand the effectiveness and system-level implications of blended finance. In this regard, several commentators have raised concerns that blended finance may backfire if, for example, it disproportionately benefits certain industries or regions at the expense of others (e.g., Capital Monitor 2022, OECD 2018). A more aggregated analysis of blended finance could help shed light on this potential "dark side" of blended finance. These are important avenues to explore for future research on blended finance.

Appendix

Appendix A. Risk management

To fix ideas, we start with a simple numerical example. Assume that a project with high societal return has an uncertain private return that is uniformly distributed between 0 and 10%. The mean return is 5% and the variance of the return is 8.33%. Let us further assume that this risk-return profile is unattractive to private investors. To increase the appeal of this project, the DFI can provide concessional capital at a below-market rate. For example, the DFI can provide funding at a zero rate of return and contribute 50% of the required

financing. In this case, the range of returns to the private capital is now from 0 to 20%, the mean is 10%, and the variance 33.33%. That is, the blending doubles the mean, but quadruples the variance. If the DFI wants to reduce the variance, they could provide a guarantee that the return will never fall below 5% and never exceed 15%. This way the private investor faces the following probability distribution over returns: a 0.25 probability of 5%, a 0.25 probability of 15%, and a 0.5 probability that the return is uniformly distributed over $\left[5\%, 15\%\right]$. The expected return is then 10%, and the variance 16.67%. Note that the expected return remains the same, but the spread of the distribution has been reduced.

This example illustrates two levers that DFIs can pull to alter the risk-return profile of private investments. One is to reduce the capital required to earn a given return (in the example by 50%) through the provision of concessional capital at a below-market rate (in the example at a zero rate). The second is to use concessional capital to finance risk management provisions that reduce the spread of the return distribution (in the example, from $[0, 20]$ to $[5, 15]$).

In order to draw general conclusions from this example, we resort to the concept of first- and second-order stochastic dominance.

Definition 1. The cumulative distribution F first-order stochastically dominates (FOSD) the cumulative distribution G if, for every non-decreasing function $u : R \to R$,

$$\int u(x)\, dF(x) \geq \int u(x)\, dG(x).$$

From this definition, a standard result in the literature tells us that the cumulative distribution F first-order stochastically dominates G if and only if $F(x) \leq G(x)\ \forall x$.

Definition 2. For any two cumulative distributions F and G with the same mean, F second-order stochastically dominates (SOSD) G if, for every non-decreasing concave function u :

$R \to R$,

$$\int u(x)\, dF(x) \geq \int u(x)\, dG(x).$$

There are other ways of characterizing SOSD. In particular, a useful characterization is in terms of mean-preserving spread. Formally, the cumulative distribution G is a mean-preserving spread of the cumulative distribution F if G is the reduction of a compound lottery made up of the distribution F with an additional lottery such that when F returns x the final outcome is $x + z$, where z is a random variable whose mean is zero. Using this terminology, we can formulate the following, well-known equivalence proposition:

Proposition 1. *Consider two cumulative distributions F and G with the same mean. Then the following statements are equivalent:*

1. *$F(.)$ second-order stochastically dominates $G(.)$*
2. *$G(.)$ is a mean-preserving spread of $F(.)$*
3. *$\int_0^x G(t)\, dt \geq \int_0^x F(t)\, dt \; \forall x$.*

If we think about the numerical example in terms of these concepts, we see that the uniform distribution over $[0, 20]$ FOSD the uniform distribution over $[0, 10]$, so that any utility maximizer will prefer the former over the latter. In addition, the truncated distribution $\left\{p(5) = 0.25, p(15) = 0.25, p\left(x \sim U[5, 15]\right) = 0.5\right\}$ is a mean-preserving contraction of the uniform distribution over $[0, 20]$ and therefore SOSD this distribution.[19] Hence any risk-averse investor will prefer the truncated distribution over the untruncated one.

We can generalize these examples: (1) decreasing the capital required of an investor while not changing the pattern of returns will always lead to an outcome preferred by any utility maximizer, and (2) reducing the spread of the distribution while not changing the mean will

[19] A mean-preserving contraction is the opposite of a mean-preserving spread. It reduces the dispersion of a random variable while keeping the mean constant. Formally, F is a mean-preserving contraction of G if G is a mean-preserving spread of F.

always be attractive to risk-averse investors. These capture two levers that blended finance can use when blending different sources of financing in order to attract private capital to otherwise unattractive projects. In what follows, we formalize and provide proofs for both statements.

Theorem 1. *Consider an investment project whose return \$x is distributed with a probability density function $f(x)$. The project requires an investment of \$K. A proportion $\alpha, 0 \leq \alpha \leq 1$, of the investment is provided by concessional capital at a zero rate of return. The return to the investor is $r = \frac{x}{(1-\alpha)K}$. If $\alpha_1 > \alpha_2$ then the return distribution associated with α_1 FOSD that associated with α_2 and hence is preferred by any utility-maximizing investor.*

Proof. Let $F_1(r)$ and $F_2(r)$ be the cumulative return distributions associated with α_1 and α_2, respectively. We can write:

$$P\left(\frac{x}{(1-\alpha)K} \leq Z\right) = P\left(x \leq Z(1-\alpha)K\right),$$

and hence $F_i(r) = F\left(r(1-\alpha_i)K\right)$, $i = 1, 2$. Since $F(.)$ is an increasing function,

$$F_1(r) = F\left(r(1-\alpha_1)K\right) \leq F_2(r) = F\left(r(1-\alpha_2)K\right)$$

and therefore $F_1(r)$ FOSD $F_2(r)$. □

This confirms that we can always make an investment more attractive to the private investors by requiring less capital. Note the generality of this result: it does not depend on the investor's risk preferences but applies to any expected utility-maximizing investor. Naturally, this is not costless, as the DFI needs to find more concessional capital that can be used to finance the project at a below-market rate of return.

We can also establish that a mean-preserving contraction of the distribution of returns will always make the investment more attractive to any risk-averse investor.

Theorem 2. *Consider an investment project whose return \$x is distributed with a probability density function $f(x)$. The project requires an investment of \$K. A proportion $\alpha, 0 \leq \alpha \leq 1$, of the investment is provided by concessional capital at a zero rate of return. The return to the investor is $r = \frac{x}{(1-\alpha)K}$. Let the density function $f(x)$ be altered to $g(x)$ by a mean-preserving contraction, that is, $f(.)$ is a mean-preserving spread of $g(.)$. Then any risk-averse investor prefers the distribution $g(.)$ to the distribution $f(.)$.*

Proof. Follows from Proposition 1 above. □

This confirms that we can always make an investment more attractive to risk-averse investors by inducing a mean-preserving contraction of the return distribution. This is again not costless, as the DFI needs to find more concessional capital that can be used to finance risk management provisions.

We can apply these results to the numerical example above. We began with a uniform distribution over $[0, 10]$ and altered it to a uniform distribution over $[0, 20]$, which doubled the expected return but roughly quadrupled the variance. For an investor who values return but dislikes risk, it is not immediately obvious that this change is an improvement. Theorem 1 tells us that it is. And Theorem 2 tells us how to improve the risk-return profile even further. Note that the fact that these changes improve the risk-return profile does not imply that the new profile is sufficiently attractive to bring in private investment. Private investors have an outside option given by the market, and the change in the risk-return profile has to be sufficient to match it.

Appendix Figure A illustrates this point, along with the results of Theorems 1 and 2. The blue curves represent the private investor's preferences for higher expected return (vertical

axis) and lower risk (horizontal axis) as a set of indifference curves, such that the investor's utility is higher as we move toward the upper left (higher return and lower risk). The purple indifference curve represents the utility of the investor's outside option.

The project's initial (that is, pre-blending) risk-return profile is given by point A. Since it provides less utility than the outside option, private investors will not finance it. Applying a mean-preserving contraction to the project's return distribution moves the risk-return combination along the line AC, and can take it above the indifference curve corresponding to the outside option. However, if the initial point A involves a significantly lower return, the horizontal line from A might not cross the purple indifference curve, in which case it would be impossible to make the deal commercially attractive through a mean-preserving contraction alone. It would be necessary to combine a mean-preserving contraction with a reduction in capital required, as indicated by the move along the line AB and then BD.

In general, there will be many combinations of mean-preserving contractions and decreased capital requirements that will take the project's risk-return profile above the outside option. Both options are costly in that they require concessional capital from the DFI's budget. In the former, concessional capital is used to finance risk management provisions. In the latter, it is used to provide financing at a below-market rate. The DFI's job is to find the most cost-efficient way of using concessional capital along both margins in order to cross the indifference curve of the outside option.

Ultimately, the optimal mix between the two depends on the DFI's cost-effectiveness in implementing both approaches. Since mean-preserving contractions (through the use of risk management provisions) are designed to reduce the project's risk, while decreased capital requirements are designed to increase the project's returns, we expect risk management provisions to be more prevalent among riskier projects.

Appendix B. Ambiguity

It is possible that the uncertainty associated with blended finance projects is sufficiently profound that it cannot be captured by a single probability density function, that is, there is "deep uncertainty" or ambiguity over the possible outcomes.

In this case, it is natural to model the decision-maker as facing multiple possible prior probability distributions over possible outcomes. We consider this case next, and show that the results we have established for conventional uncertainty carry over to the more complex case of ambiguity. We model ambiguity using the smooth ambiguity approach of Klibanoff, Marinacci, and Mukerji (2005). Specifically, we assume that investors have a non-decreasing utility function $U(x)$ and face N possible probability density functions of returns, given by $f_n(x)$, $n \in \{1, ..., N\}$. To each of these distributions they assign a weight $Pr_n \in [0, 1]$, $\sum_i Pr_i = 1$. Each probability density function gives rise to an expected utility $\int U(x) f_n(x) dx = E_n U$. Investors seek to maximize

$$V = \sum_n Pr_n \Phi(E_n U), \tag{3}$$

where $\Phi(.)$ is an increasing function of expected utilities. We consider the same modifications of the probability density functions $f_n(x)$ as in Appendix A, that is, the DFI can 1) reduce the share of capital that private investors need to contribute, and 2) use risk management provisions to induce a mean-preserving contraction of the return distribution. In what follows, let V^0 be the maximized value of the objective (3) and let the values of the expected utilities in the initial configuration be $E_n^0 U$, so that $V^0 = \sum_n Pr_n \Phi\left(E_n^0 U\right)$.

We first consider the case in which the DFI reduces the share of capital that private investors need to contribute, as in Theorem 1. Then, by our earlier arguments, each expected utility increases or at least does not decrease. If we denote these new expected utilities by

$E_n^1 U$, then $E_n^1 U \geq E_n^0 U \; \forall n$. Consequently the distribution of expected utilities given by $\left\{Pr_n, E_n^1 U\right\}$ first-order stochastically dominates the initial distribution $\left\{Pr_n, E_n^0 U\right\}$. We therefore have a result that is analogous to Theorem 1:

Corollary 1. *Consider an investment project whose return \$x investors believe may be distributed according to one of the PDFs $f_n(x)$, $n = 1, .., N$, with $Pr_n \geq 0$ being their estimate of the probability that f_n is the correct PDF. The project requires an investment of \$K. A proportion α, $0 \leq \alpha \leq 1$ of the investment is provided by concessional capital at a zero rate of return. The return to the investor is $r = \frac{x}{(1-\alpha)K}$. If $\alpha_1 > \alpha_2$ then the return distribution associated with α_1 FOSD that associated with α_2, regardless of the PDF, so that $E_n^{\alpha_1} U \geq E_N^{\alpha_2} U \; \forall n$. Furthermore, $V^{\alpha_1} \geq V^{\alpha_2}$ so that the investor will rank the projects associated with α_1 as at least as good as those associated with α_2.*

Proof. Follows from Theorem 1 above. □

We can also extend the results in Theorem 2, concerning second-order stochastic dominance and mean-preserving contractions. Suppose that investors are risk-averse so that U is concave, and each distribution $f_n(x)$ is subject to a mean-preserving contraction, so that, by our earlier arguments, $E_n^1 U \geq E_n^0 U \; \forall n$ where the superscript 0 refers to values before the mean-preserving contraction and 1 refers to values after. In this case the new distribution of expected utilities again FOSD the initial distribution, so that any investor whose second-order utility function $\Phi(.)$ is non-decreasing will prefer the new distribution to the old one.[20]

Corollary 2. *Consider an investment project whose return \$x investors believe may be distributed according to one of the PDFs $f_n(x)$, $n = 1, .., N$, with $Pr_n \geq 0$ being their estimate of the probability that f_n is the correct PDF. The project requires an investment of \$K. A*

[20]Note that concavity is not required of the function $\Phi(.)$.

proportion α, $0 \leq \alpha \leq 1$ *of the investment is provided by concessional capital at a zero rate of return. The return to the investor is* $r = \frac{x}{(1-\alpha)K}$. *Let the density function* $f_n(x)$ *be altered to* $g_n(x)$ *by a mean-preserving contraction, that is,* f_n *is a mean-preserving spread of* g_n. *Then any risk-averse investor prefers the distribution* g_n *to the distribution* f_n *and any investor maximizing (3) will prefer the investment with the modified distributions to the original.*

Proof. Follows from Theorem 2 above. □

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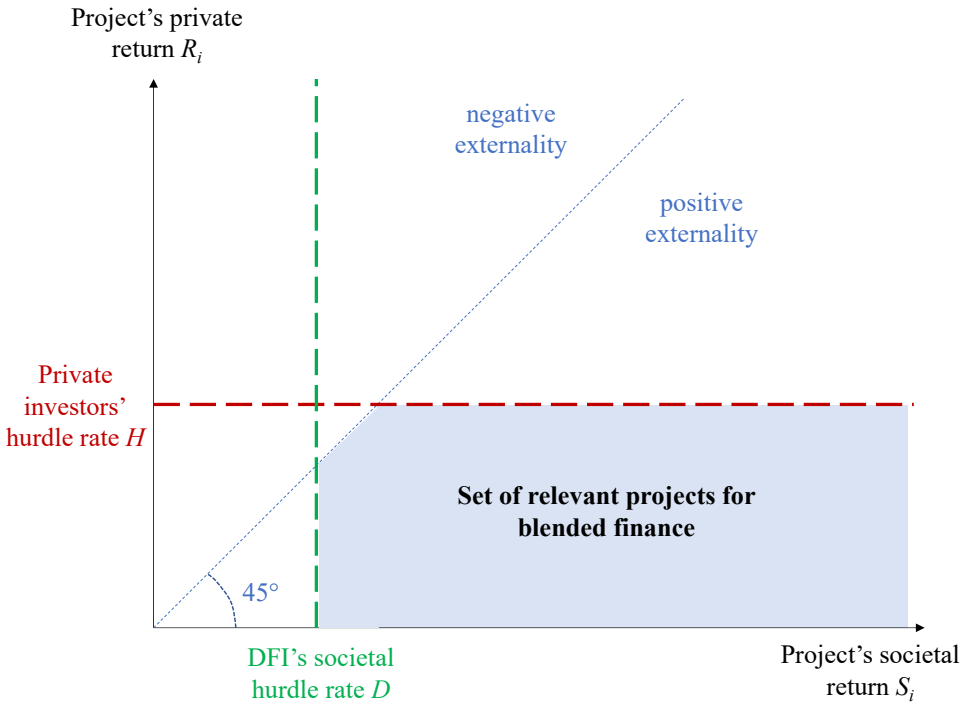
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Figure 1. Conceptual framework

Panel A. Relevant project set



Panel B. Example with three projects

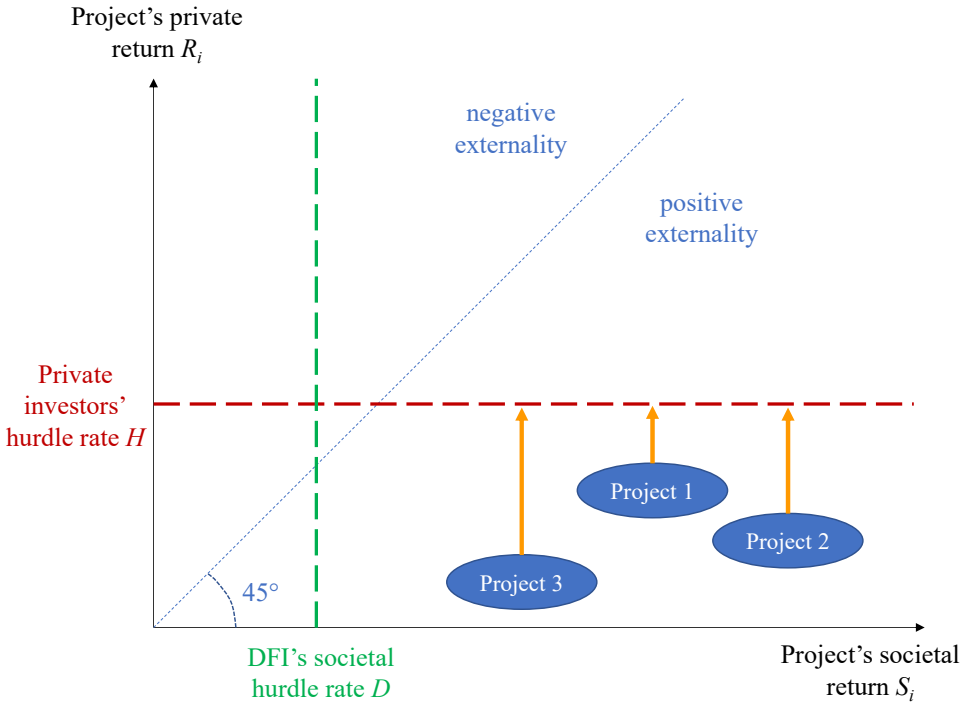


Figure 1
(continued)

Panel C. Shift in hurdle rate

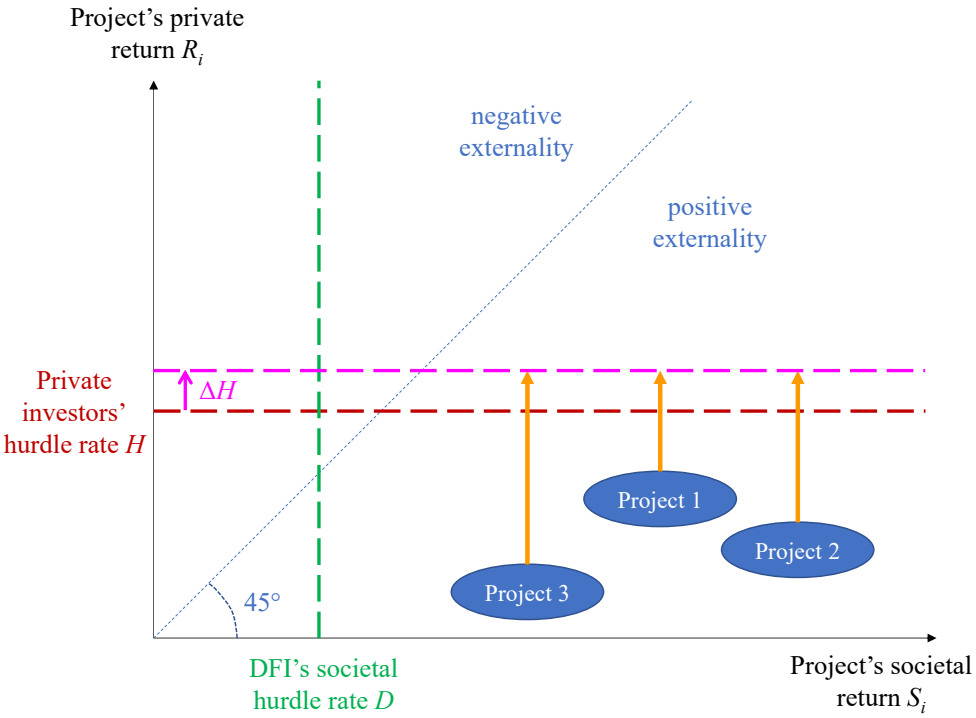


Figure 2. Blended finance deals by countries

This figure plots the number of blended finance deals by countries in our sample of 173 blended finance deals of the IFC from 2018-2023. Darker-shaded areas indicate countries with a higher number of deals.

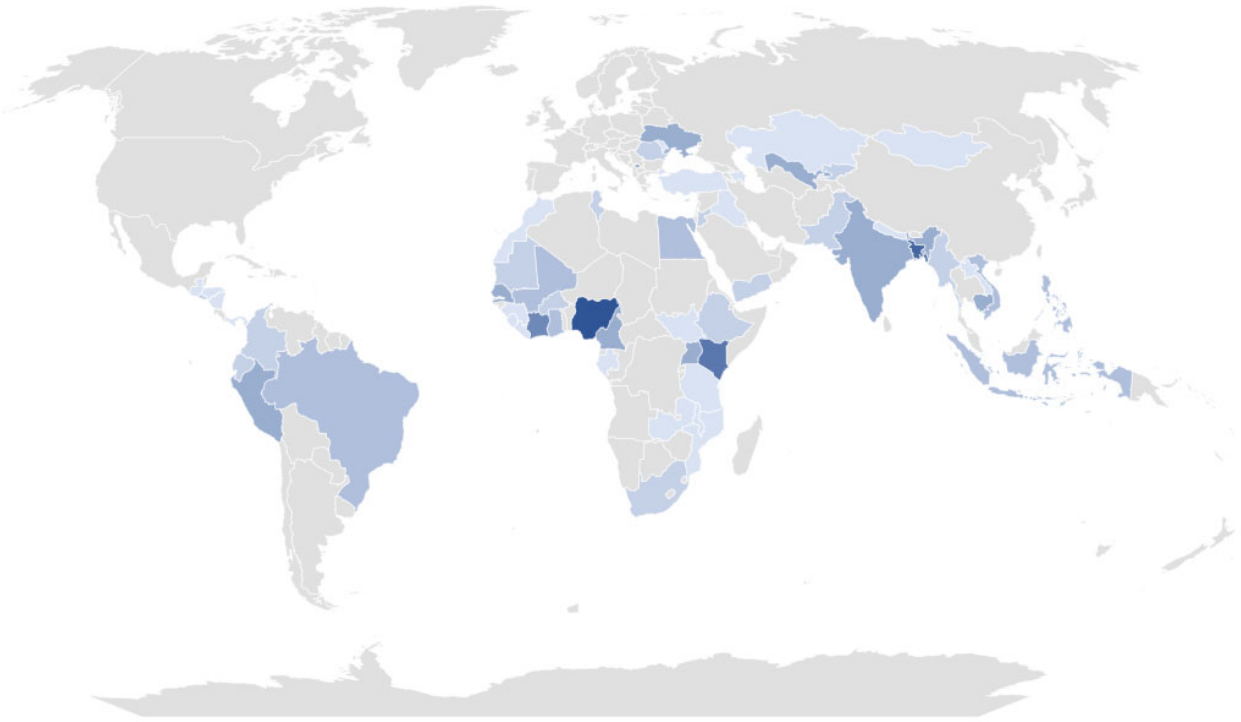


Table 1. Blended finance deals by countries

This table reports the number and percentage of blended finance deals by countries in our sample of 173 blended finance deals of the IFC from 2018-2023.

Country	# Deals	% Deals
Africa	88	50.9%
Burkina Faso	2	1.2%
Cabo Verde	1	0.6%
Cameroon	4	2.3%
Cote d'Ivoire	6	3.5%
Egypt	3	1.7%
Ethiopia	2	1.2%
Gabon	1	0.6%
Ghana	3	1.7%
Guinea	1	0.6%
Kenya	7	4.0%
Liberia	1	0.6%
Malawi	1	0.6%
Mali	3	1.7%
Mauritania	2	1.2%
Morocco	1	0.6%
Mozambique	1	0.6%
Nigeria	9	5.2%
Senegal	4	2.3%
Sierra Leone	1	0.6%
South Africa	2	1.2%
South Sudan	1	0.6%
Tanzania	1	0.6%
Tunisia	2	1.2%
Uganda	4	2.3%
Zambia	1	0.6%
Multiple countries	24	13.9%
Asia and the Pacific	38	22.0%
Bangladesh	8	4.6%
Cambodia	4	2.3%
India	4	2.3%
Indonesia	3	1.7%
Kazakhstan	1	0.6%
Kyrgyz Republic	2	1.2%
Laos	1	0.6%
Mongolia	1	0.6%
Myanmar	2	1.2%
Nepal	1	0.6%
Philippines	3	1.7%
Turkey	1	0.6%
Uzbekistan	4	2.3%
Vietnam	3	1.7%

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Table 1
(continued)

Country	# Deals	% Deals
Eastern Europe	12	6.9%
Azerbaijan	1	0.6%
Kosovo	4	2.3%
Moldova	1	0.6%
Romania	2	1.2%
Ukraine	4	2.3%
Latin America and the Caribbean	20	11.6%
Brazil	3	1.7%
Colombia	2	1.2%
Ecuador	2	1.2%
El Salvador	2	1.2%
Guatemala	1	0.6%
Honduras	1	0.6%
Nicaragua	1	0.6%
Panama	1	0.6%
Peru	4	2.3%
Multiple countries	3	1.7%
Middle East	9	5.2%
Iraq	1	0.6%
Jordan	2	1.2%
Pakistan	2	1.2%
Palestine	2	1.2%
Yemen	2	1.2%
World (multiple regions)	6	3.5%
Total	173	100.0%

Table 2. Blended finance deals by industries

This table reports the number and percentage of blended finance deals by industries in our sample of 173 blended finance deals of the IFC from 2018-2023.

Industry	# Deals	% Deals
Panel A. Industrial sector		
Agribusiness and forestry	27	15.6%
Coffee, cocoa, tea	3	1.7%
Dairy products	1	0.6%
Diversified edible agricultural crops production	2	1.2%
Fruits and vegetables	2	1.2%
Furniture and related products	1	0.6%
Grain processing (milling, starch, flour, malt)	3	1.7%
Grains and beans	2	1.2%
Natural fibers (cotton, sisal, jute, etc.)	1	0.6%
Poultry farming	6	3.5%
Soft drink	3	1.7%
Other	3	1.7%
Health and education	4	2.3%
Medical and diagnostic services	3	1.7%
Other	1	0.6%
Infrastructure	15	8.7%
Distribution business	1	0.6%
Gas - thermal power generation	1	0.6%
Large hydro - renewable energy generation	1	0.6%
Port and harbor operations	1	0.6%
Rural electrification	1	0.6%
Solar - renewable energy generation	7	4.0%
Storage (including agricultural products)	1	0.6%
Waste to energy - waste	1	0.6%
Water and wastewater utilities	1	0.6%
Manufacturing	13	7.5%
Cement	2	1.2%
Finishing (dyeing, printing, finishing, etc.)	1	0.6%
Garment and apparel (with primary textile operations, excluding footwear)	1	0.6%
Garment and apparel (without fabric , excluding footwear)	1	0.6%
Petrochemical	1	0.6%
Plastics material and resin	1	0.6%
Other	6	3.5%

(continued on next page)

Table 2
(continued)

Industry	# Deals	% Deals
Telecommunications, media, and technology	2	1.2%
Mobile telephony	1	0.6%
Other	1	0.6%
Tourism, retail, and property	3	1.7%
City and business hotel	2	1.2%
Resort hotel (including lodges)	1	0.6%
Other	12	6.9%
Panel B. Financial sector		
Financial institutions	74	42.8%
Commercial banking - general	22	12.7%
Commercial banking - housing finance	6	3.5%
Commercial banking - microfinance	4	2.3%
Commercial banking - risk management facility	1	0.6%
Commercial banking - SME finance	10	5.8%
Commercial banking - trade	1	0.6%
Commercial Banking - trade and supply chain	11	6.4%
Finance companies	2	1.2%
Finance companies - consumer finance	1	0.6%
Leasing services	1	0.6%
Microfinance and small business - non commercial banking	7	4.0%
Primary mortgage institutions	2	1.2%
Secondary mortgage institutions	3	1.7%
Small business fund	1	0.6%
Other	2	1.2%
Funds	23	13.3%
Growth equity fund	4	2.3%
Small business fund	3	1.7%
Venture capital fund	9	5.2%
Other	7	4.0%
Total	173	100.0%

Table 3. Blended finance deals by blending type

This table reports the number and percentage of blended finance deals by type of concessionality in our sample of 173 blended finance deals of the IFC from 2018-2023. Note that the percentages add to more than 100% since blended finance deals can have multiple concessionality provisions.

Blending type	# Deals	% Deals
Financing	86	49.7%
Loan	58	33.5%
Equity	28	16.2%
Risk management	59	34.1%
Cross-currency swap	26	15.0%
First loss guarantee	23	13.3%
Risk-sharing facility	6	3.5%
Interest rate buy-down	4	2.3%
Performance-based incentives	42	24.3%

Table 4. Blended finance deals' contribution to SDGs

This table reports the number and percentage of blended finance deals that contribute to each of the 17 United Nations' Sustainable Development Goals (SDGs) in our sample of 173 blended finance deals of the IFC from 2018-2023. A description of the 17 SDGs is provided in Appendix Table A. Note that the percentages add up more than 100% since blended finance deals can contribute to multiple SDGs.

SDG	# Deals	% Deals
1 - No Poverty	23	13.3%
2 - Zero Hunger	15	8.7%
3 - Good Health and Well-Being	11	6.4%
4 - Quality Education	16	9.2%
5 - Gender Equality	55	31.8%
6 - Clean Water and Sanitation	1	0.6%
7 - Affordable and Clean Energy	24	13.9%
8 - Decent Work and Economic Growth	68	39.3%
9 - Industry, Innovation, and Infrastructure	101	58.4%
10 - Reduced Inequalities	20	11.6%
11 - Sustainable Cities and Communities	19	11.0%
12 - Responsible Consumption and Production	23	13.3%
13 - Climate Action	54	31.2%
14 - Life Below Water	1	0.6%
15 - Life on Land	2	1.2%
16 - Peace, Justice, and Strong Institutions	0	0.0%
17 - Partnerships for the Goals	173	100.0%

Table 5. Characteristics of blended finance deals

This table reports means and standard deviations for various characteristics of the 173 blended finance deals of the IFC from 2018-2023. Total project cost is expressed in millions of U.S. dollars. Concessional loan, concessional equity, non-concessional loan, and non-concessional equity refer to financing provided by the IFC. Risk management provisions and performance-based provisions are 0/1 indicator variables that are equal to one if the IFC provides the corresponding provisions. Concessionality is the "subsidy" from the blended financing (expressed as a percent of the total project cost). This variable is computed by the IFC, taking into account the various concessionality provisions of the project. # SDGs is the count of SDGs to which the project contributes. Economics-related SDGs refer to SDG #8 (decent work and economic growth) and SDG #9 (industry, innovation, and infrastructure). Society- and environment-related SDGs refers to the other fifteen SDGs. A description of the SDGs is provided in Appendix Table A. Finally, environmental and social risk is an index ranging from 1 to 3 that captures the extent to which the project may not deliver environmental and social impact based on the IFC's assessment.

	N	Mean	Std. Dev.
Total project cost ($M)	173	107.85	213.76
% Concessional loan	173	8.63%	14.99%
% Concessional equity	173	2.52%	9.42%
% Non-concessional loan	173	44.26%	37.21%
% Non-concessional equity	173	3.51%	12.34%
% Non-IFC financing	173	41.08%	34.78%
Project has risk management provisions	173	0.335	0.473
Cross-currency swap	173	0.150	0.358
First loss guarantee	173	0.133	0.341
Interest rate buy-down	173	0.023	0.151
Risk-sharing facility	173	0.035	0.184
Project has performance-based provisions	173	0.243	0.430
Concessionality ("subsidy", % of total project cost)	173	5.15%	7.45%
# SDGs	173	3.520	1.134
# Economics-related SDGs	173	0.994	0.633
# Society- and environment-related SDGs	173	2.526	1.174
# SDGs (per $M of total project cost)	173	0.159	0.212
# Economics-related SDGs (per $M)	173	0.047	0.081
# Society- and environment-related SDGs (per $M)	173	0.112	0.163
Environmental and social risk (IFC index, 1 to 3)	173	1.092	0.421

Table 6. Sustainability impact and level of concessionality (blending "subsidy")

This table reports estimates of regression (2). The dependent variable, concessionality, is the "subsidy" from the blended financing (expressed as a share of the total project cost). This variable is computed by the IFC, taking into account the various concessionality provisions of the project. # SDGs (per $M) is the count of SDGs to which the project contributes, scaled by the total project cost (in $M). Economics-related SDGs refer to SDG #8 (decent work and economic growth) and SDG #9 (industry, innovation, and infrastructure). Society- and environment-related SDGs refers to the other fifteen SDGs. A description of the SDGs is provided in Appendix Table A. Years refer to the project's disclosure year, regions refer to the six regions listed in Table 1, and industries refer to the nine industry sectors listed in Table 2. The sample includes the 173 blended finance deals of the IFC from 2018-2023. Standard errors (reported in parentheses) are clustered at the deal level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Concessionality					
	(1)	(2)	(3)	(4)	(5)	(6)
# SDGs (per $M)	0.0930***	0.109***	0.0882***	0.0911***		
	(0.0342)	(0.0371)	(0.0293)	(0.0277)		
# Economics-related SDGs (per $M)					0.0182	
					(0.0534)	
# Society- and environment-related SDGs (per $M)						0.164***
						(0.0411)
Year FE	No	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes	Yes	Yes
Region FE	No	No	No	Yes	Yes	Yes
R-squared	0.070	0.107	0.274	0.326	0.273	0.365
Observations	173	173	173	173	173	173

Table 7. Sustainability risk and level of concessionality (blending "subsidy")

This table reports variants of the regressions in Table 6. The dependent variable, concessionality, is the "subsidy" from the blended financing (expressed as a share of the total project cost). This variable is computed by the IFC, taking into account the various concessionality provisions of the project. Environmental and social risk is an index ranging from 1 to 3 that captures the extent to which the project may not deliver environmental and social impact based on the IFC's assessment. The sample includes the 173 blended finance deals of the IFC from 2018-2023. Standard errors (reported in parentheses) are clustered at the deal level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Concessionality			
	(1)	(2)	(3)	(4)
Environmental and social risk	-0.0177***	-0.0164***	-0.0169***	-0.0220***
	(0.00404)	(0.00419)	(0.00568)	(0.00611)
Year FE	No	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Region FE	No	No	No	Yes
R-squared	0.010	0.029	0.229	0.286
Observations	173	173	173	173

Table 8. Political risk

This table reports variants of the regressions in Table 6. In columns (1)-(3), concessionality is the "subsidy" from the blended financing (expressed as a share of the total project cost). This variable is computed by the IFC, taking into account the various concessionality provisions of the project. In columns (4)-(6), risk management provision is an indicator variable that is equal to one if the project includes a risk management provision. Political risk is a country-level measure of political risk that is obtained from the World Bank's world development indicators. It is recorded in units of a standard normal distribution. The sample includes the 173 blended finance deals of the IFC from 2018-2023. Standard errors (reported in parentheses) are clustered at the deal level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Concessionality			Risk management provision		
	(1)	(2)	(3)	(4)	(5)	(6)
Political risk	0.0167*	0.0188**	0.0192**	0.127**	0.128**	0.176***
	(0.00863)	(0.00848)	(0.00961)	(0.0498)	(0.0519)	(0.0554)
Year FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
R-squared	0.024	0.050	0.245	0.034	0.047	0.154
Observations	173	173	173	173	173	173

Table 9. Information asymmetries

This table reports variants of the regressions in Table 6. In columns (1)-(3), concessionality is the "subsidy" from the blended financing (expressed as a share of the total project cost). This variable is computed by the IFC, taking into account the various concessionality provisions of the project. In columns (4)-(6), risk management provision is an indicator variable that is equal to one if the project includes a risk management provision. Opacity is a country-level measure of opacity that is obtained from the Open Data Inventory (ODIN). It is recorded as a score that is normalized from 0 to 1. The sample includes the 173 blended finance deals of the IFC from 2018-2023. Standard errors (reported in parentheses) are clustered at the deal level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

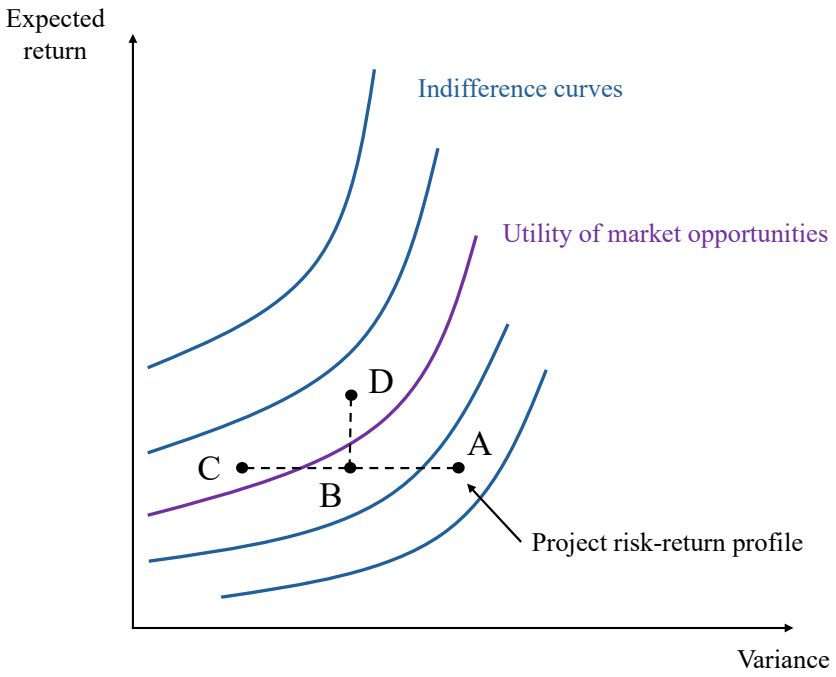
	Concessionality			Risk management provision		
	(1)	(2)	(3)	(4)	(5)	(6)
Opacity	0.132***	0.128***	0.105***	0.856***	0.870***	1.041***
	(0.0384)	(0.0385)	(0.0385)	(0.277)	(0.284)	(0.298)
Year FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
R-squared	0.044	0.062	0.244	0.046	0.060	0.160
Observations	173	173	173	173	173	173

Table 10. Characteristics of blended vs. non-blended deals

This table provides means and standard deviations for various characteristics of the IFC's blended and non-blended deals. The variables listed under "Deals by regions" are 0/1 indicator variables that are equal to one if the project is conducted in the respective region. The variables listed under "Deals by industry" are defined analogously with respect to the project's industry. Political risk is a country-level measure of political risk that is obtained from the World Bank's world development indicators. It is recorded in units of a standard normal distribution. Opacity is a country-level measure of opacity that is obtained from the Open Data Inventory (ODIN). It is recorded as a score that is normalized from 0 to 1. The other variables are described in Table 5. The last column provides the *p*-value of the difference in means between the two groups. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Blended deals			Non-blended deals			*p*-value of difference in means
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	
Deals by region							
Africa	173	0.509	0.501	595	0.188	0.391	0.000***
Asia and the Pacific	173	0.220	0.415	595	0.331	0.471	0.003***
Eastern Europe	173	0.069	0.255	595	0.126	0.332	0.017**
Latin America and the Caribbean	173	0.116	0.321	595	0.262	0.440	0.000***
Middle East	173	0.052	0.223	595	0.066	0.248	0.493
World (multiple regions)	173	0.035	0.184	595	0.027	0.162	0.614
Deals by industry							
Industrial sector							
Agribusiness and forestry	173	0.156	0.364	595	0.077	0.267	0.008***
Health and education	173	0.023	0.151	595	0.055	0.229	0.029**
Infrastructure	173	0.087	0.282	595	0.224	0.417	0.000***
Manufacturing	173	0.075	0.264	595	0.025	0.157	0.018**
Telecommunications, media, and technology	173	0.012	0.107	595	0.015	0.122	0.709
Tourism, retail, and property	173	0.017	0.131	595	0.018	0.135	0.920
Other	173	0.069	0.255	595	0.047	0.212	0.293
Financial sector							
Financial institutions	173	0.428	0.496	595	0.304	0.460	0.003***
Funds	173	0.133	0.341	595	0.234	0.423	0.001***
Total project cost ($M)	173	107.85	213.76	595	192.87	277.58	0.000***
# SDGs	173	3.520	1.134	595	2.227	0.886	0.000***
# Economics-related SDGs	173	0.994	0.633	595	1.447	0.585	0.000***
# Society- and environment-related SDGs	173	2.526	1.174	595	0.780	0.908	0.000***
# SDGs (per $M of total project cost)	173	0.159	0.212	595	0.053	0.104	0.000***
# Economics-related SDGs (per $M)	173	0.047	0.081	595	0.033	0.065	0.048**
# Society- and environment-related SDGs (per $M)	173	0.112	0.163	595	0.019	0.055	0.000***
Environmental and social risk (IFC index, 1 to 3)	173	1.092	0.421	595	1.252	0.672	0.000***
Political risk (in the project's country)	173	0.817	0.689	595	0.560	0.589	0.000***
Opacity (in the project's country)	173	0.516	0.119	595	0.449	0.119	0.000***

Appendix Figure A. Risk-return profiles



Appendix Table A. Description of SDGs

This table provides a description of the 17 United Nations' Sustainable Development Goals (SDGs). Their description is obtained from United Nations (2023).

SDG	Description
1 - No poverty	End poverty in all its forms everywhere
2 - Zero hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3 - Good health and well-being	Ensure healthy lives and promote well-being for all at all ages
4 - Quality education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5 - Gender equality	Achieve gender equality and empower all women and girls
6 - Clean water and sanitation	Ensure availability and sustainable management of water and sanitation for all
7 - Affordable and clean energy	Ensure access to affordable, reliable, sustainable and modern energy for all
8 - Decent work and economic growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9 - Industry, innovation, and infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10 - Reduced inequalities	Reduce inequality within and among countries
11 - Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient and sustainable
12 - Responsible consumption and production	Ensure sustainable consumption and production patterns
13 - Climate action	Take urgent action to combat climate change and its impacts
14 - Life below water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15 - Life on land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16 - Peace, justice, and strong institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17 - Partnerships for the goals	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Appendix Table B. Industrial and financial sectors

This table provides variants of the regressions presented in Table 6, distinguishing between projects conducted in the industrial sector (columns (1)-(3)) and the financial sector (columns (4)-(6)). The sample includes the 173 blended finance deals of the IFC from 2018-2023. Standard errors (reported in parentheses) are clustered at the deal level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Concessionality					
	Industrial sector			Financial sector		
	(1)	(2)	(3)	(4)	(5)	(6)
# SDGs (per $M)	0.117*			0.0860***		
	(0.0605)			(0.0298)		
# Economics-related SDGs (per $M)		-0.0902			0.0887	
		(0.0927)			(0.0732)	
# Society- and environment-related SDGs (per $M)			0.232***			0.139***
			(0.0717)			(0.0456)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.419	0.379	0.483	0.271	0.220	0.293
Observations	76	76	76	97	97	97

Appendix Table C. Multivariate analysis of political risk and information asymmetries

This table provides variants of the regressions presented in Tables 8 and 9, including both political risk and opacity as independent variables. The sample includes the 173 blended finance deals of the IFC from 2018-2023. Standard errors (reported in parentheses) are clustered at the deal level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

	Concessionality	Risk management provision
	(1)	(2)
Political risk	0.0175*	0.159***
	(0.00991)	(0.0571)
Opacity	0.0946**	0.949***
	(0.0371)	(0.285)
Year FE	Yes	Yes
Industry FE	Yes	Yes
R-squared	0.264	0.201
Observations	173	173