Impact investing : contracting under asymmetric information

January 27, 2023

Abstract

We study the financing of for-profit social projects by (prosocial) investors uninformed about the project's quality. We define a high quality project as a project that does not have to sacrifice financial performance to generate a valuable social or environmental impact. On the contrary, a low quality project does. We propose two signaling strategies for entrepreneurs endowed with good quality projects. First, if contracting on social or environmental terms is feasible, we show that when entrepreneurs are *prosocial* enough (what is observed by investors), those endowed with high quality projects can signal the quality of their project to investors by committing to favor financial performance. On the contrary, when entrepreneurs have low concerns for social outcomes, those endowed with high quality projects can signal the quality of their project to investors by committing to favor social impact. However, those with intermediate social preferences are unable to separate this way. Second, if contracting on impact terms is not feasible, abandoning control rights to investors can signal the project's quality, conditional on investors and entrepreneurs' prosocial nature being *incongruent* enough.

Keywords: Impact investing, entrepreneurial finance, financial contracts, signaling, willingness to pay.

1 Introduction

Impact Investments are investments made in for-profit social ventures that pursue social or environmental *impact* (e.g., sustainable agriculture, renewable energy or affordable and accessible housing, healthcare, or education) alongside the profit motive. In 2020, at the core of the impact investing market (where intent, contribution and impact measurement were identified), $286 billion of investments were managed by privately owned asset managers and institutions and $350 billion by Development Finance Institutions (DFIs) for a total of $636 billion ($505 in 2019). In the broader market, where only intent for impact is identifiable, there were $308 billion of investments under private management and $1.338 trillion managed by publicly owned DFIs and national/regional development banks. Thus, in 2020, investments of $2.281 trillion could be considered impact investments under a broad definition[1].

In this work, we will rely on the definition given by the Global Impact Investing Network (GIIN): "Impact investments are investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return. Impact investments can be made in both emerging and developed markets, and target a range of returns from below market to market rate, depending on investors' strategic goals"[2]. Hence, impact investing does not exclude highly profitable ventures capable of positive impact, and also include corporate social responsibility (CSR) as generally understood ("sacrificing profits in the social interest", see Bénabou and Tirole 2010). For now, the financial literature on impact investing has mainly investigated how the possible misalignment of preferences (with regard to financial performance and social impact) between investors and entrepreneurs (or managers) might translate into opportunistic behavior and how financial contracts can adapt to serve the dual objective of for-profit social ventures (e.g., Chowdhry et al. 2019; Geczy et al. 2021).

[1]Source: The Global Impact Investing Market 2020 (International Finance Corporation, World Bank Group)

[2]https://thegiin.org/impact-investing/need-to-know/#what-is-impact-investing

In this paper, we aim to consider how privately informed entrepreneurs about the high "quality" of their project could signal their project's type to impact investors. Since in addition to financial prospects, investors have to assess whether or not the project can generate a *meaningful* social impact, information asymmetries might be particularly severe in the context of impact investing. To fix ideas, consider the case of *Dr. Consulta* which received early funding of Kascek Ventures, a commercial VC firm, and later from the Impact investor LGT Ventures. Founded in 2011, *Dr. Consulta* is a for-profit company that aims to offer quality and affordable healthcare to underprivileged communities in Brazil[3]. While there is clearly a possible meaningful social impact associated with the business model of *Dr. Consulta*, it might be very difficult to assess whether or not the social outcome can be sustained alongside the profit motive or if the profit motive will require concessions on the social outcome (by favoring some populations and/or medical acts, providing low salaries and poor working conditions to their medical staff, etc.).

To grasp this particular nature of impact investments, we define the quality of the project as its capacity to generate both outcomes and depart from previous work on impact investing by considering projects that can generate meaningful social outcomes alongside financial revenues in line with non impact projects. Thus, we model a high quality project as a project that does not face any trade-off between financial and extra-financial performance and a low quality project as a project that cannot generate both outcomes at a high level. More precisely, when the entrepreneur (she) endowed with a low quality project (the *bad* type in the following) faces a trade-off between financial revenues and impact, we assume that she has to take an *action* that favors one outcome over the other. The action $FinancialFirst$ favors financial revenues while the action $ImpactFirst$ favors impact. The entrepreneur endowed with a high quality project (the good type in the following) does not face any trade-off and so does not need to take any particular *action*. Importantly, we assume that investors and entrepreneurs care for the social impact of the project and that their prosocial nature (i.e.,

[3]Source https://thegiin.org/research/profile/dr.-consulta.

how much they care about the project's social impact) is common knowledge. In particular, investors exhibit a positive willingness to pay for the social outcome[4].

Because the resulting adverse selection situation might lead to cross-subsidization or market breakdown, the good type has an incentive to try to mitigate investors' informational disadvantage and to search a way to signal her "type" to investors. Building on the work of Geczy, Jeffers, Musto, and Tucker (2021), who conducted an empirical analysis of contractual terms adopted by impact funds to serve the social impact goal that they add to their financial goal, we identify two possible contractual terms on which the good type could rely to signal her project's quality to investors. First, we study the possibility for the good type to signal her project's quality to investors by contracting directly on the *action* (which either favors financial return or impact). The intuition is the following: since the good type will not face any trade-off in the future, she can contractually specify any of the two *actions* at no cost. On the contrary, by contracting on a specific action, the bad type will have to sacrifice financial performance or social performance (depending on the specified action). When the entrepreneur is very prosocial (what is observed by investors), committing to the $FinancialFirst$ action is very costly to the bad type because she abandons the project's social impact. As a result, the good type can signal her project's quality by committing to the $FinancialFirst$ action. Similarly, when the entrepreneur has very low prosocial concerns[5], the good type can signal the quality of her project to investors by committing to the $ImpactFirst$ action (because choosing the same action would be very costly to the bad type). Thus, when the action is contractible, we show that entrepreneurs endowed with high quality projects can signal their project's type if they are *prosocial* enough or on the contrary, if they have very few concerns for the social outcome. However, entrepreneurs with intermediate social preferences are not able to signal the high quality of their project to investors and so cannot separate from en-

[4]Previous research has shown that investors who care about social outcomes can accept below-market-rate of return (adjusted to risk) in exchange for the social or environmental positive impact of the startup (see e.g., Barber et al. 2021, Brodback et al. 2020).

[5]Previous research has shown that social entrepreneurs might not necessarily be prosocially motivated (see e.g., Williams and Nadin 2011, Renko 2013).

trepreneurs endowed with bad projects. This is because none of the action is costly enough to a bad type with intermediate social preferences to deter him from imitation. Simply put, the key driver of our results is the following. To signal herself to investors, the good type must choose an action which is costly enough to the bad type (that is dissimilar enough from her social preferences) to deter him from imitation, and investors must be aware of that, what they are if the prosocial nature of the entrepreneur is observable.[6]

Second, we consider the possibility for the good type to signal her projects' quality to investors by abandoning control rights. In such a case, the decision about which action to favor in the future is not contractually specified and will be taken by the entrepreneur if she keeps control rights and by investors otherwise. Abandoning control rights is not costly to the good type because investors won't have to choose between $FinancialFirst$ or $ImpactFirst$. However, abandoning control rights can be costly to the bad type if the action favored by investors is not in line with her preferences, what may deter her from imitation. We thus show that signaling by abandoning control rights is possible if investors and entrepreneurs have *incongruent* (conflicting) preferences. More precisely, when the entrepreneur is known to be prosocial, the good type can signal her project's quality by giving up control rights to investors with low social preferences because the bad type would incur a high cost of imitation by abandoning control rights. Similarly, when entrepreneurs are known to have very low social preferences, the good type can signal her project's quality by giving up control rights when investors are prosocial enough because imitation by the bad type would be very costly to her. Hence, signaling with control rights not only requires that the entrepreneur has very low or very high social preferences but additionally that investors have *incongruent* (conflicting) preferences with the entrepreneur.

As mentioned before, the above discussed signaling strategies are related to empirical contractual findings on impact investing. In particular, Geczy, Jeffers, Musto, and Tucker

[6]Note that while we assume that the prosocial nature of the entrepreneur is observable, one could alternatively consider the possibility to truthfully reveal her nature (at some cost or not) as part of the signaling strategy.

(2021) study how impact funds contracts adapt to serve the social-benefit goal in addition to the financial goal. They find that impact funds contract directly on impact and adjust aspects of the contract such as governance. Their paper belongs to a still nascent literature exploring the financial implications of impact investing. For example, Kovner and Lerner (2015) find substantial differences (with respect to the geography, development stage and successful exit) between traditional venture capital and community development venture capital[7] (CDVC).

On the theoretical side, our work builds on the literature (starting with Leland and Pyle 1977) that explores how entrepreneurs might signal the quality of their project to investors. We are not aware of any theoretical paper investigating adverse selection in the context of Impact Investing but the signaling mechanism of our model is closely related to the work of Dessein (2005), where a privately informed entrepreneur relinquishes control to an investor in order to signal the congruence of their preferences. We depart from his work in three respects. First, we consider that investors might not only care about financial revenues. Second, we consider projects that may or may not face a trade-off between financial revenues and extra-financial benefits. Third, in our work, asymmetric information relates to the type of the project and not to the the type of the entrepreneur. As a result, in his work, signaling is possible if preferences of investors and entrepreneurs are "congruent" enough while it is the opposite in our model. This is because in our paper, the "signal" is never costly to the good type so that she abandons control rights when the action chosen by investors is costly to the bad type, that is when preferences of investors and entrepreneurs are not "congruent".

Another closely related paper to us is the multi-task principal-agent model of Chowdhry et al. (2019) where the manager of the for-profit social venture must allocate scarce resources between the monetary payoff and the social benefit. Like us, they study a trade-off between the production of a monetary payoff and the production of a social benefit. However, their focus is on joint financing between a for-profit owner and socially motivated investors while

[7]CDVC funds make equity and equity-like investments in small businesses that hold the promise of rapid growth and a "double bottom line" of not only financial returns but also community and economic development benefits. see https://www.frbsf.org/community-development/initiatives/community-development-finance/investment-vehicles/community-development-venture-capital/

we consider a continuum of social preferences for both and concentrate on asymmetric information with regard to the project's quality. In a related work, Barigozzi and Tedeschi (2015) study the role of ethical banks in the financing of for-profit social ventures in presence of "standard" and socially motivated entrepreneurs. However, they restrict attention to ethical projects that cannot deliver expected revenues in line with non ethical projects and in their model, both types of projects are observable and subject to moral hazard. In connection with the signaling mechanism we rely on when commitment is feasible, Glaeser and Shleifer (2001) derive conditions under which completely self-interested entrepreneurs opt for not-for-profit status because this status limits entrepreneurs' ability to enjoy the profits of their enterprises (and thus signals to consumers that they care about quality and not only profits). We complement and depart from this literature by focusing on high quality impact ventures and the signaling strategies entrepreneurs might use to mitigate the adverse selection problem resulting from asymmetric information about their project's quality.

Since our results are driven by the assumption that entrepreneurs and investors care about non financial outcomes in addition to financial revenues, namely the social or environmental impact of the venture, our work builds on some recent related studies exploring investors' WTP for social outcomes. Directly related to impact investing, Barber et al. (2021) implement a random utilty/willingness-to-pay model to show evidence that investors derive non pecuniary utility from investing in dual-objective venture capital funds, accepting 2.5-3.7 ppts lower internal rates of returns ex ante for impact funds. They further study disparities among investors, where investors with mission objectives and/or facing political pressure exhibit high willingness-to-pay (WTP) while those subject to legal restrictions (e.g., Employee Retirement Income Security Act) exhibit low WTP[8]. In an experimental setting, Brodback, Guenster, and Pouget (2020) study investors' willingness-to-pay for socially responsible assets. They find that individuals attribute a positive value to social responsibility

[8]Outside impact investing, Hartzmark and Sussman (2019) find that mutual funds investors in the US put a positive value on sustainability, Riedl (2017) show evidence of lower expected return on SRI funds than on conventional funds and Bolton (2021) find that stocks of firms with higher total carbon dioxide emissions earn higher returns, suggesting a negative WTP for exposure to carbon emission risk.

at an increasing rate, and that assets generating an extra-financial benefit when financial performance is bad suffer from a price discount. On the entrepreneurial side, motivations toward social impact is not, to the best of our knowledge, as empirically grounded as it is for investors. Indeed, we are not aware of any work explicitly quantifying entrepreneurs' willingness to pay for social outcomes. However, a large literature has investigated motives that drive individuals to start new ventures (e.g., Baum and Locke 2004, Hessels, Van Gelderen, and Thurik 2008) in general, and social ventures in particular (see e.g., Renko 2013, Dacin, Dacin, and Matear 2010, Austin, Stevenson, and Wei-Skillern 2006). Directly related to our work, the dualism between social and commercial entrepreneurship has been challenged by Williams and Nadin (2011) whose empirical data suggests that entrepreneurial endeavour best suits a continuum from purely commercial to purely social entrepreneurship.

The rest of the paper proceeds as follows. Section 2 describes the model setup and equilibrium strategies when commitment is feasible. Section 3 presents alternative signaling strategies when commitment is not feasible. Section 4 derives implication for the impact investing market and section 5 concludes.

2 Contractible action

In this section we present a simple model where the action $a \in \{ImpactFirst, FinancialFirst\}$ is contractible. In other words, the decision to be taken post contracting by the entrepreneur can be specified in the contract.

2.1 The model

The project. The entrepreneur is cash poor and has limited liability. The project requires an initial investment f. The project generates a financial payoff x with probability p and a social outcome s (we denote C_s the cost to produce the same social outcome outside of the project) with probability q. The social outcome is not directly contractible (i.e., cannot be specified

ex-ante or cannot be made verifiable). However one can contract on a specific action a with regard to the production of the social outcome, with $a \in \{ImpactFirst, FinancialFirst\}$. A project might be *good* (type G) or *bad* (type B). A *good* project can produce a meaningful social outcome alongside a high financial return. On the contrary, a *bad* project cannot produce both outcomes so that the entrepreneur will face a trade off between the two outcomes. When a trade off arrises between extra-financial (or social) and financial performance (which is the case only if the project is *bad*), the ex-ante contractual choice of the $ImpactFirst$ (IF) action implies that social performance will be favored at the expense of financial performance. On the contrary, the ex-ante choice of the $FinancialFirst$ (FF) action implies that financial performance will be favored at the expense of social performance. All agents are risk neutral and have additively separable utility for cash and social output and we normalize the risk-free rate to zero. Investors and entrepreneurs have heterogenous preferences with regard to extra-financial performance and we denote ψ_i and ψ_e their preferences for the social outcome (referred as their *prosocial* nature).

Thus, depending on the contractual action $a \in \{IF, FF\}$ chosen, the Social Net Present Value [9] (SNPV) of *good* (G) and *bad* (B) projects are given by :

$SNPV^G(IF) = SNPV^G(FF) = px + qs(\psi_e + \psi_i) - f$ whatever the action chosen.

$SNPV^B(IF) = (p - \tau)x + qs(\psi_e + \psi_i) - f$ if the IF action is chosen.

$SNPV^B(FF) = px - f$ if the FF action is chosen.

Where τx is the *bad* project's expected decrease in financial revenue if the IF action is implemented. As a result, a *bad* project has a greater $SNPV$ when the IF action is chosen iif $qs(\psi_e + \psi_i) \geq \tau x$. In addition, the *good* project is valuable from the social planner's perspective as long as $f - px \leq C_s$ while the *bad* project is iif $f - (p - \tau)x \leq C_s$.

Contract. The contract specifies the payoff z secured by the entrepreneur in case of success and the action $a \in \{IF, FF\}$ to be implemented if a trade-off arises. If the contract

[9] We define Social Net Present Value as the sum of financial cashflows and social benefit cashflows, see https://redf.org/wp-content/uploads/REDF-Box-Set-Vol.-2-SROI-Paper-2000.pdf

is accepted, the project is undertaken and investors and entrepreneurs' respective utilities are given by: $u_i = p(x - z) + q\psi_i s - f$ and $u_e = pz + q\psi_e s$, where $0 \leq z \leq x$ is the financial revenue secured by the entrepreneur if the project succeeds.

Otherwise, entrepreneurs and investors obtain their reservation utility normalized to 0.

Information. The entrepreneur is privately informed about the type of her project while investors only know the share of *good* projects in the economy, denoted γ. Social preferences of entrepreneurs and investors are assumed to be common knowledge.

Timing. At date 0, the entrepreneur (E) has no cash and needs to raise funds (f). At $T = 0$, E proposes the contract to investors who may either accept or reject the contract. If investors accept the contract, f is invested. Between, $T = 0$ and $T = 1$, a trade-off may arise. At $T = 1$, if required, the contractual action $a \in \{IF, FF\}$ is implemented. At date $T = 2$, uncertainty about revenues is resolved, E and investors observe financial and extra-financial benefits of the project. If the contract is rejected, both E and investors obtain their reservation utility normalized to 0.

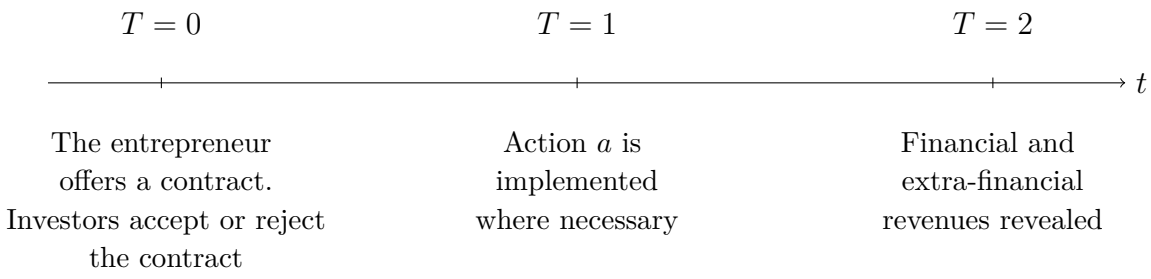

Figure 1: Timing of the project.

Competition. We assume that the market for funds is competitive so that investors break even.

2.2 Symmetric information

While in the rest of the paper we will consider that the type (*good* or *bad*) of the project is the entrepreneur's private information, we assume in this section that it is common knowledge.

Since, a *good* project generates both high financial and extra-financial performance whatever the chosen action $a \in A = \{IF, FF\}$, neither the financial revenue (denoted z^G) secured by an entrepreneur endowed with a good project (referred as E^G) if the project succeeds nor the extra-financial performance of the project are impacted by the specified contractual action. Thus, the participation constraint of investors to a good project does not depend on a and gives:

$$(PC_I):\ p(x - z^G) + q\psi_i s \geq f \ \Leftrightarrow\ z^G \leq x - \left(\frac{f - q\psi_i s}{p}\right)$$

The project obtains financing only if both E^G and investors break even. However, since entrepreneurs are penniless and have limited liability, the revenue secured by E in case of success cannot be negative. As a consequence, even if the expected extra-financial utility of the project is greater than E's reservation utility, so that she would agree to obtain a negative financial revenue, she cannot do so. In other words, the extra-financial utility of the entrepreneur represents a private benefit that the entrepreneur cannot transfer to investors. Formally we have:

$$(LLC^G):\ px + q\psi_i s \geq f \quad \text{and} \quad (PC_E):\ z^G \geq 0$$

To simplify the exposition, we additionally assume that investors' WTP is limited to their investment f in the project[10], i.e., $q\psi_i s \leq f$.

We now turn to the financing of *bad* projects. For these projects, in addition to payoffs, the contractual specified action to be taken matters. If the contract specifies $ImpactFirst$, the *bad* project generates a lower financial outcome than the *good* project, but the social outcome is secured. Then, we have:

$$(LLC^B_{IF}):\ (p - \tau)x + q\psi_i s \geq f$$

$$(PC_I):\ (p - \tau)(x - z^B_{IF}) + q\psi_i s \geq f$$

from which we obtain (since investors break even) : $z^B_{IF} = x - \left(\frac{f - q\psi_i s}{p - \tau}\right)$

[10] Alternatively, one might consider a more general framework in which concessionary returns are limited to δ, such that the expected financial repayment to the investor cannot be less that $(1 - \delta)f$ (that is zero if $\delta = 100\%$ as in our framework). Our simplification does not affect our results since it offers the largest possible range of values for ψ_i.

where z_{IF}^B denotes the highest financial revenue that can be secured by an entrepreneur endowed with a *bad* project when the contract specifies $ImpactFirst$. The resulting utility for E^B is given by :

$$v_e(IF) = (p-\tau)z_{IF}^B + q\psi_e s \quad \text{or equivalently,} \quad v_e(IF) = (p-\tau)x - f + q(\psi_i + \psi_e)s$$

Otherwise, if the contract specifies $FinancialFirst$, we respectively have :

$(LLC_{FF}^B) : px \geq f$

(PC_I): $p(x - z_{FF}^B) \geq f$

from which we obtain: $z_{FF}^B = x - \dfrac{f}{p}$, where z_{FF}^B denotes the highest financial revenue that can be secured by an entrepreneur endowed with a *bad* project when the contract specifies $FinancialFirst$. The resulting utility for E^B is given by:

$$v_e(FF) = pz_{FF}^B \quad \text{or equivalently,} \quad v_e(FF) = px - f$$

Hence, when both contracts are feasible, the entrepreneur endowed with a bad project prefers to specify $ImpactFirst$ rather than $FinancialFirst$ if $v_e(IF) \geq v_e(FF)$, that is if:

$$q(\psi_i + \psi_e)s \geq \tau x \quad \Leftrightarrow \quad \psi_e \geq \frac{\tau x}{qs} - \psi_i$$

Otherwise, E^B prefers to implement the FF strategy. Note that the decision of E^B does not only depend on her own preferences but also on those of the investor. In particular, the higher the willingness to pay of the investor, the less E^B has to be prosocial to prefer the IF strategy over the FF strategy. Thus, despite the lower probability of financial success, even a pure profit maximizer E^B (i.e. such that $\psi_e = 0$) prefers the IF action if the investor has a sufficiently important willingness to pay for the extra-financial performance of her project, that is if: $\psi_i \geq \dfrac{\tau x}{qs}$.

In addition, if E has no initial wealth, some projects with positive SNPV cannot be financed, and this is due E^B's inability to transfer her private benefit to investors. More generally, under complete information, some type-B projects will not specify the *ImpactFirst* action while it is the one that has the greatest Social Net Present Value. These projects are such that investors have intermediate prosocial preferences and the entrepreneur has high

enough prosocial references. Formally one must have:

- $\tau x - q\psi_e s \leq q\psi_i s \leq \tau x - (px - f)$, and
- $q\psi_e s \geq px - f$

Intuitively, the cumulated social utility of the entrepreneur and investors must be high enough (that both $q\psi_e s$ and $q\psi_i s$) must be large enough but the WTP of investors must not be too large (otherwise financing would be possible). The type of projects matching the conditions is likely to be very *social*, that is with rather low financial prospects but high potential social benefits.

Consequently, by according a subsidy to the project, a social planner (or a charity) can circumvent inefficient financing of projects satisfying *Proposition 1* if $qC_s + z^B \geq 0$ where $z^B = x - \left(\frac{f - q\psi_i s}{p - \tau}\right) < 0$ is the largest possible revenue of E^B compatible with investors' participation constraint .

This has direct implications for charities and public policies in their optimal allocation of funds since the level of subsidy required to switch from $FinancialFirst$ to $ImpactFirst$ might be very low (i.e., z^B might be very close to 0) in comparison to the expected social outcome of the project, hence maximizing the leverage of the subsidy (or donation).

2.3 Asymmetric information

We now consider uniformed investors about the type of the project (*good* or *bad*) while the entrepreneur knows the type of her project. This assumption might be particularly relevant in the context of impact investing since in addition to financial prospects, investors have to assess whether the project can generate the *meaningful* social impact promised by the entrepreneur. Thus, in the following, we assume that investors share the same prior γ about the share of good projects (i.e. that generate high financial and high social impact together whatever the specified action in the contract).

2.3.1 Separating equilibria

Intuitively, commitment to an *action* may help E^G to separate from E^B since if E^G opts for the IF status and E^B mimics her, the bad project's expected financial revenue decreases (by τx), what might be especially harmful to the bad type if the entrepreneur and investors are not prosocial (i.e., are endowed with low levels of ψ_e and ψ_i). On the contrary, if E^G opts for the FF status and E^B mimics her, the bad type abandons the project's extra-financial performance, what might be especially harmful to her if the entrepreneur and investors are prosocial (i.e., are endowed with high levels of ψ_e).

More formally, consider first the candidate separating equilibrium where E^G proposes the contract $\mathcal{C}(z^G_{IF}, IF)$ while E^B proposes the contract $\mathcal{C}(z^B_{FF}, FF)$. Equilibrium constraints are the followings. The participation constraint of the entrepreneur impose that her financial revenue in case of success cannot be negative:

$(PC_E) : z^B_{FF} \geq 0$ and $z^G_{IF} \geq 0$

The participation constraint of investors imposes that the financial revenue of entrepreneurs in case of success cannot be too large, so that investors at least break even:

$$(PC_I) : z^B_{FF} \leq x - \frac{f}{p} \text{ and } z^G_{IF} \leq x - \left(\frac{f - q\psi_i s}{p}\right)$$

The incentive compatible condition of the good type imposes that the financial revenue secured by the good type if the project succeeds is greater than the financial revenue secured by the bad type (indeed, otherwise the good type would be better off to propose the same contract as the bad type):

$(IC_G) : z^G_{IF} \geq z^B_{FF}$

The incentive compatible condition of the bad type imposes that she does not prefer the contract proposed by the good type:

$(IC_B) : (p - \tau) z^G_{IF} + q\psi_e s \leq p z^B_{FF}$

The left hand side is what E^B would get by mimicking E^G while the right hand side is what she could obtain by following the candidate equilibrium strategy where she opts for the

FF strategy.

Finally, a necessary condition is that the bad type does not prefer to deviate and to propose a contract specifying the IF action and a level of z compatible with investors' participation constraint whatever their belief. That is one must have :

$$(IC'_B) : (p-\tau)\left(x - \frac{f - q\psi_i s}{p-\tau}\right) + q\psi_e s \leq p\left(x - \frac{f}{p}\right)$$

Now consider the opposite candidate separating equilibrium where E^G proposes the contract $\mathcal{C}(z^G_{FF}, FF)$ while E^B proposes the contract $\mathcal{C}(z^B_{IF}, IF)$. Equilibrium constraints give:

$$(PC_E) : z^B_{IF} \geq 0 \text{ and } z^G_{FF} \geq 0$$
$$(PC_I) : z^B_{IF} \leq x - \frac{f - q\psi_i s}{p-\tau} \text{ and } z^G_{FF} \leq x - \frac{f - q\psi_i s}{p}$$
$$(IC_G) : z^G_{FF} \geq z^B_{IF}$$
$$(IC_B) : pz^G_{FF} \leq (p-\tau)z^B_{IF} + q\psi_e s$$

The left hand side is what E^B would get by mimicking E^G while the right hand side is what she could obtain by following the candidate equilibrium strategy where she opts for the IF strategy. In addition, a necessary condition is that the bad type does not prefer to deviate and propose a contact specifying the FF action and a level of z compatible with investors' participation constraint whatever their belief. That is one must have :

$$(IC'_B) : (p-\tau)\left(x - \frac{f - q\psi_i s}{p-\tau}\right) + q\psi_e s \geq p\left(x - \frac{f}{p}\right)$$

From the conditions of both separating equilibria presented above we can state the following proposition (proof in the appendix):

Proposition 1. *Entrepreneurs endowed with good projects can separate by contractually specifying the IF action if they are not too* prosocial, *that is if $\psi_e \leq \frac{\tau}{qs}\left(x - \frac{f}{p}\right) \equiv \psi_e^{IF}$, conditional en investors' WTP being small enough, that is if $\psi_i < \frac{\tau x}{qs} - \psi_e \equiv \psi_i^{IF}(\psi_e)$. On the contrary, entrepreneurs endowed with good projects can separate by contractually specifying the FF action if they are* prosocial *enough, that is if $\psi_e \geq \frac{\tau}{qs}\left(x - \frac{f - q\psi_i s}{p-\tau}\right) \equiv \psi_e^{FF}(\psi_i)$, conditional en investors' WTP being large enough ($\psi_i > \psi_i^{FF}(\psi_e) \equiv \psi_i^{IF}(\psi_e)$).*

Corollary 1. *If conditions of the IF-separating equilibrium are satisfied, first best can be*

achieved if $\psi_e \leq \frac{\tau}{qs}\left(x - \frac{f}{p}\right) - \psi_i\left(1 - \frac{\tau}{p}\right) \equiv \hat{\psi}_e^{IF}(\psi_i)$. *Then,* $z_{IF}^G = x - \frac{f - q\psi_i s}{p}$ *and investors break even. If conditions of the* FF*-separating equilibrium are satisfied, first best can be achieved if* $\psi_e \geq \frac{\tau x}{qs} \equiv \hat{\psi}_e^{FF}$. *Then,* $z_{FF}^G = x - \frac{f - q\psi_i s}{p}$ *and investors break even. Otherwise, in both cases,* E^G *has to lower* z *to separate and investors obtain more than their reservation utility.*

The proposition is illustrated in figure 2 below. One can see that the IF-separating equilibrium (separating equilibrium achieved by the good type by specifying the IF action, area in red) is feasible if both entrepreneurs and investors are not very prosocial. In particular, there exists an absolute level of ψ_e so that the equilibrium cannot be sustained whatever the level of ψ_i. This is because if $\psi_e > \psi_e^{IF}$, the bad type is so prosocial that she is better off to deviate even if the good type abandons all the WTP of investors in her contract. Furthermore, no separating equilibrium can be sustained if either:

(i) ψ_e is too high to sustain the IF-separating equilibrium (because the bad type would prefer to change for the IF action) but ψ_e is to low with respect to ψ_i to sustain the FF-separating equilibrium (because the level of financial compensation of the good type must be set too low to prevent imitation from the bad type - i.e., to be compatible with the choice of the IF action by the bad type);

(ii) ψ_e is too high with respect to ψ_i to sustain the IF-separating equilibrium (because the bad type would prefer to mimic the good type's contract) but ψ_e is too low with respect to ψ_i to sustain the FF-separating equilibrium (because the WTP of investors is large enough in comparison to her social benefit to incentivize the bad type to mimic the FF contract of the good type and to internalize investors' WTP rather than to choose the IF action. This point is not straightforward because one could think that the bad type would prefer to choose the IF action if investors exhibit a very high WTP whatever her own prosocial preferences (and it is indeed the case under perfect information). As a result, one could expect the $FF - separating$ equilibrium to be feasible whenever ψ_i is large enough. However, since the entrepreneur internalize investors' WTP, the higher their WTP, the more it is costly for the

bad type to choose the IF action since her financial profit decreases from a larger amount (by $\tau q \psi_i s$). For this reason, the larger the WTP of investors, the greater the prosocial nature of the entrepreneur must be to satisfy the conditions of the $FF - separating$ equilibrium.

Finally, separation is not costly to the good type in the $IF - separating$ equilibrium (first best is achieved) if ψ_e is not too large in comparison to ψ and ψ_i is not too large because the WTP of investors is not too large (so that the financial revenue secured by the good type is not too large) and the entrepreneur's social utility is not too large neither (so that the bad type prefers the FF action). On the contrary, if the entrepreneur has very high prosocial preferences, first best can be achieved by the good type by committing to the FF action. Note however that the more investors are prosocial, the more the entrepreneur has to be prosocial to sustain the equilibrium. Intuitively, this because if investors are very prosocial, their WTP is very high so that the financial compensation of the entrepreneur good entrepreneur is very high. Since by choosing the IF action, the bad type abandons some of them, the IF action is less appealing to her if investors are very prosocial, so that she has to be very prosocial to compensate for the financial loss induced by the choice of the IF action when investors are very prosocial.

2.3.2 Pooling equilibria

We now consider candidate pooling equilibria when entrepreneurs can commit to a particular action, IF or FF. We might consider two possible pooling equilibria, one where the FF action is specified and the other where the IF action is specified. We first consider the candidate pooling equilibrium $\mathcal{C}(z_{IF}^{pool}, IF)$. Equilibrium conditions of such an equilibrium are given below.

The participation constraint of investors to the $IF - pooling$ candidate equilibrium requires that investors (at least) break even on average. Since the bad type commits to choose the IF action, the project's expected social outcome is the same whatever the type of the entrepreneur. However, the expected financial performance will be lower if the type is bad

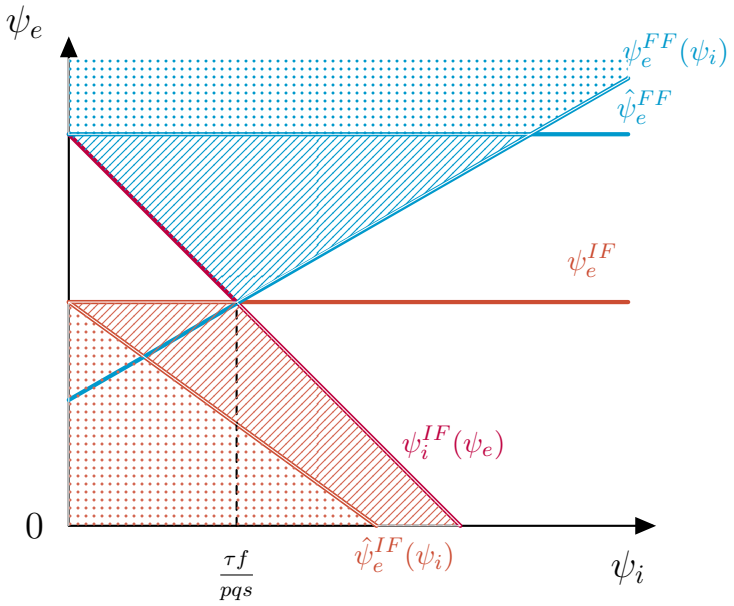

Figure 2: Separating equilibria. In blue the good separates with the FF action contractually specified, in red with the IF action specified. In dots, areas where first best can be achieved.

(i.e., with probability γ). Thus we have:

$$(PC_I) : \gamma(p(x - z_{IF}^{pool}) + q\psi_i s) + (1-\gamma)((p-\tau)(x - z_{IF}^{pool}) + q\psi_i s) \geq f$$

The participation constraint of entrepreneurs is the same whatever their type and requires that their financial compensation cannot be lower than 0:

$$(PC_E) : z_{IF}^{pool} \geq 0$$

The good type does not have any profitable deviation toward a contract $\mathcal{C}(z_{FF}^{dev}, FF)$ that investors could accept, i.e., :

$$(IC_G) : pz_{IF}^{pool} + q\psi_e s \geq pz_{FF}^{dev} + q\psi_e s$$

The bad type does not have any profitable deviation toward a contract $\mathcal{C}(z_{FF}^{dev}, FF)$ that investors could accept, i.e., :

$$(IC_B) : (p-\tau)z_{IF}^{pool} + q\psi_e s \geq pz_{FF}^{dev}$$

First note that the above conditions imply :

$$z_{IF}^{pool} \in I_{IF}^{pool} = \left[x - \frac{f}{p}, x - \frac{f - q\psi_i s}{p - \tau(1-\gamma)}\right] = \emptyset \text{ if } f/p < \frac{f - q\psi_i s}{p - \tau(1-\gamma)}$$

This is because if z_{IF}^{pool} were below the lower bound both entrepreneurs would profitably

deviate whatever investors' beliefs while if z_{IF}^{pool} is above the larger bound, investors do not break even. Thus, necessary conditions to the existence of the $IF-pooling$ equilibrium are:

$\psi_i > \dfrac{\tau f}{pqs}(1-\gamma) \equiv \psi_i^{IF-pool}$

That is, the WTP for the social outcome (ψ_i) of investors (or alternatively the share of good projects γ) has to be large enough so that pooling is more attractive than the worst contract that can be secured by deviating toward $FinancialFirst$.

We now turn to candidate $FF-pooling$ equilibria $\mathcal{C}(FF, z_{FF}^{Pool})$. Participation constraints to any $FF-pooling$ candidate equilibrium give:

$(PC_I) : \gamma(p(x - z_{FF}^{pool}) + q\psi_i s) + (1-\gamma)p(x - z_{FF}^{pool}) \geq f$

$(PC_E) : z_{FF}^{pool} \geq 0$

$(IC_G) : pz_{FF}^{pool} + q\psi_e s \geq pz_{IF}^{dev} + q\psi_e s$

$(IC_B) : pz_{FF}^{pool} \geq (p-\tau)z_{IF}^{dev} + q\psi_e s$

Necessary conditions to the existence of such equilibria is that the *good* type does not have a profitable deviation under the most pessimistic belief of investors and (PC_I) is satisfied, so that :

$z_{FF}^{Pool} \in I_{FF}^{Pool} = \left[x - \dfrac{f - q\psi_i s}{p-\tau}, x - \dfrac{f - \gamma q\psi_i s}{p}\right]$

From the above mentioned conditions we obtain (proof in the appendix):

Proposition 2. *The pooling contract that specifies the IF action can be sustained in equilibrium when the entrepreneur has intermediate prosocial preferences. In addition, the investor has to be prosocial enough. Formally we must have:*

- $\frac{\tau}{qs}\left(x - \frac{\gamma f + (p-\tau)\frac{q\psi_i s}{\tau}}{p-\tau(1-\gamma)}\right) \equiv \underline{\psi}_e^{IF-pool}(\psi_i) < \psi_e < \overline{\psi}_e^{IF-pool}(\psi_i) \equiv \frac{\tau}{qs}\left(x - \frac{f - q\psi_i s}{p-\tau(1-\gamma)}\right)$ *and,*
- $\psi_i > \psi_i^{IF-pool} \equiv \frac{\tau f(1-\gamma)}{pqs}$.

Likewise, the pooling contract that specifies the FF action can be sustained in equilibrium when the entrepreneur has intermediate prosocial preferences. However, contrary to the $IF-$ pooling equilibrium, it requires a sufficiently low level of prosocial preferences from of the investor. More precisely we must have:

- $\frac{\tau}{qs}\left(x - \frac{f-q\psi_i s}{p-\tau}\right) \equiv \psi_e^{FF}(\psi_i) < \psi_e < \overline{\psi}_e^{FF-pool}(\psi_i) \equiv \frac{\tau x}{qs} - \psi_i(1-\gamma)$ *and,*
- $\psi_i < \psi_i^{FF-pool} \equiv \frac{\tau f}{qs(p-\gamma(p-\tau))}$.

Intuitively, ψ_e cannot be too large (in particular if ψ_i is small) for the IF pooling to be sustained because it ensures that a deviation toward FF from the good type might also be profitable to the bad type (and investors would not participate) so that the good type cannot deviate. In addition, ψ_e cannot be too low neither because otherwise the bad type would prefer a contract specifying the FF action and ψ_i must be large enough so that the best possible IF-pooling contract for entrepreneurs outperforms what they could obtain at worst by specifying the FF action.

The same line of reasoning applies to the FF-pooling equilibrium but now ψ_e cannot be too low to ensure that a deviation from the good type would also be profitable to the bad type so that investors would not agree to participate. In addition, both ψ_e and ψ_i cannot be too large to ensure that the contract specifying the FF action is appealing enough to both types in comparison to the contract specifying the IF action.

Corollary 2. *If the conditions of* Proposition 2 *are satisfied, the IF-pooling contract for the entrepreneur specifies $z_{IF}^{pool} = x - \frac{f-q\psi_i s}{p-\tau(1-\gamma)}$ and investors break even. If the conditions of* Proposition 2 *are satisfied, the FF-pooling contract for the entrepreneur specifies $z_{FF}^{pool} = x - \frac{f-\gamma q\psi_i s}{p}$ and investors break even.*

3 Non contractible action : the control rights view

Until now, we assumed that commitment to a contractually specified action was feasible. However, if this is not the case (e.g., if the action a is not verifiable by a court), the allocation of control rights between the entrepreneurs and investors over the decision to be made at $T = 1$ can be of critical importance and should be specified in the contractual terms. We denote d in $\{0, 1\}$ the allocation of decision rights where $d = 0$ if the entrepreneur chooses

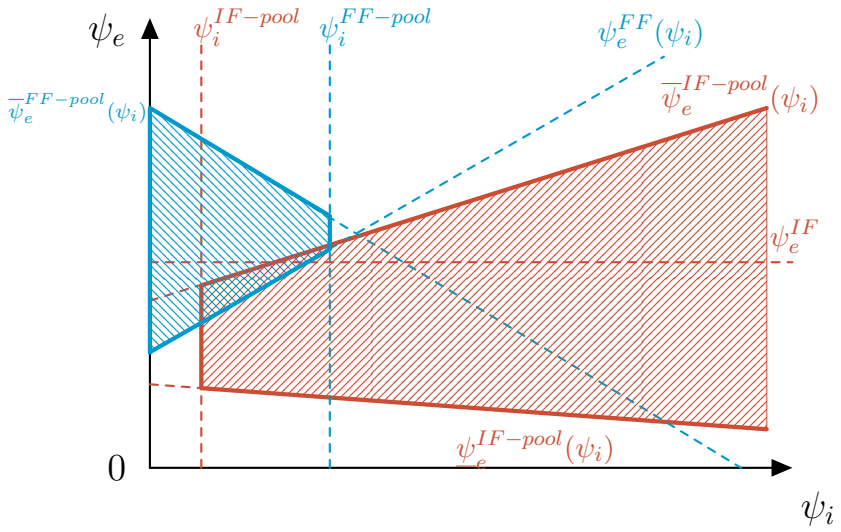

Figure 3: Pooling equilibria. In blue, entrepreneurs pool with a contract that specifies the FF action. In red, entrepreneurs pool with a contract that specifies the IF action.

which action to implement at $T = 1$ (i.e., E has control rights) and $d = 1$ if investors do (i.e., I has control rights).

3.1 Symmetric information

The case of the *good* project is straightforward and brings no particular insights in comparison to when a is contractible. However, if the type of the project is *bad*, decision rights matters.

The Entrepreneur has control rights. Consider first the contract $\mathcal{C}(0, z^B)$ allocating decision rights to the E^B. Then, the entrepreneur endowed with a bad project is free to decide which outcome to favor at $T = 1$. Importantly, note that the best post-contracting decision for E^B is relative to the level of z^B. Indeed, there exists a level $\hat{z}^B(\psi_e)$, that depends on how prosocial the entrepreneur is, such that E^B is indifferent between IF and FF at $T = 1$ and it is given by:

$$\hat{z}^B(\psi_e) = \frac{q\psi_e s}{\tau}$$

Hence, investors anticipate which action will be taken at $T = 1$ based on the level of z^B and E^B's preferences. Indeed, if E^B proposes $z^B > \hat{z}^B(\psi_e)$, investors anticipate that the entrepreneur will choose $a = FF$ at $T = 1$. On the contrary, if E^B proposes $z^B < \hat{z}^B(\psi_e)$,

investors anticipate that the entrepreneur will choose $a = IF$ at $T = 1$.

Thus, to determine the optimal level of z^B, E^B must consider, for each possible action to be taken, investors' utilities at the level $\hat{z}^B(\psi_e)$. These utilities are the following :

$u_i(FF, \hat{z}^B(\psi_e)) = p(x - \hat{z}^B(\psi_e)) - f$

$u_i(IF, \hat{z}^B(\psi_e)) = (p - \tau)(x - \hat{z}^B(\psi_e)) + q\psi_i s - f$

If $u_i(FF, \hat{z}^B(\psi_e)) > 0$, then E^B can raise z and should do so. Indeed, since she is indifferent between both actions at the level $\hat{z}^B(\psi_e)$, she is better off at a higher level of z, even if the investor anticipates she will take the FF action at $T = 1$. Since the investor does not break even at the level $\hat{z}^B(\psi_e)$, E^B can raise z to the optimal level z^*_{FF} such that $u_i(FF, z^*_{FF}) = 0$, that is:

$z^*_{FF} = x - \dfrac{f}{p} > \hat{z}^B(\psi_e)$ and the optimal contract that allocates control rights to the bad type specifies $\mathcal{C}(0, z^*_{FF})$.

If $u_i(FF, \hat{z}^B(\psi_e)) < 0$ and $u_i(IF, \hat{z}^B(\psi_e)) < 0$, investors would not agree to participate at the level $\hat{z}^B(\psi_e)$ since their utility would be below their reservation utility whatever the action chosen ex-post by E^B. Hence, E must pick $z < \hat{z}^B(\psi_e)$, which means she is better off by implementing the IF action post-contracting. In addition, $z = z^*_{IF}$ given by $u_i(IF, z^*_{IF}) = 0$.

Finally, if $u_i(FF, \hat{z}^B(\psi_e)) < 0$ and $u_i(IF, \hat{z}^B(\psi_e)) \geq 0$, E cannot raise z above $\hat{z}^B$ because the investor would not agree to participate. The best she can do is to propose $z^B = \hat{z}^B(\psi_e)$.[11] It is interesting to observe that if E were able to ensure investors she would choose IF, she would be better off. Indeed, if E^B could commit to the IF action, she would raise z to the level z^B_{IF} so that $u_i(IF, z^B_{IF}) = 0$. This case occurs only if $u_i(FF, \hat{z}^B(\psi_e)) < u_i(IF, \hat{z}^B(\psi_e))$ that is when the SNPV of the bad project is greater if the IF action is chosen (i.e. if $qs(\psi_i + \psi_e) > \tau x$). Alternatively, this means that at the level z^B_{IF} at which investors break even when IF is contractible, E prefers to implement the FF action, i.e. :

$$\psi_e < \frac{\tau}{qs} z^B_{IF} \quad \text{where} \quad z^B_{IF} = x - \left(\frac{f - \psi_i qs}{p - \tau} \right)$$

Hence, this scenario occurs iif :

[11] Assuming E takes the IF action in $T = 1$ when she is indifferent between both.

$$\frac{\tau}{qs}\left(x-\frac{f}{p}\right)<\psi_e<\frac{\tau}{qs}\left(x-\frac{f-\psi_i qs}{p-\tau}\right)$$

What is possible only if : $\psi_i > \dfrac{\tau f(p-\tau)}{pqs}$

This suggests that the financing of *bad* projects with important social return (i.e. $(qs(\psi_i+\psi_e))/(\tau x)>1$) but managed by entrepreneurs with low social concerns might not be optimally financed when E^B has control rights. Intuitively, if investors are very *prosocial*, they accept low financial revenues which implies, in turn, that E could capture high financial revenues. However the higher the financial revenue of E, the more he has to be prosocial for the IF action to be credibly anticipated by the investor. Hence, if E is not sufficiently prosocial in comparison to the investor, the IF action is not anticipated by investors and E cannot capture as much profits as if the IF action were contractible. To sum up, if $d=0$ is chosen, the optimal contract specifies:

Proposition 3. *When the bad entrepreneur retains control rights and the project's type is common knowledge, optimal contracts specify :*

(1) $\mathcal{C}(0,z^*_{FF})$ *if* $\psi_e<\dfrac{\tau}{qs}\left(x-\dfrac{f}{p}\right)$ *where* $z^*_{FF}=x-\dfrac{f}{p}$

(2) $\mathcal{C}(0,z^*_{IF})$ *if* $\psi_e>max\left[\dfrac{\tau}{qs}\left(x-\dfrac{f-q\psi_i s}{p-\tau}\right),\dfrac{\tau}{qs}\left(x-\dfrac{f}{p}\right)\right]$ *where* $z^*_{IF}=x-\left(\dfrac{f-\psi_i qs}{p-\tau}\right)$

(3) $\mathcal{C}(0,\hat{z}^B(\psi_e))$ *if* $\dfrac{\tau}{qs}\left(x-\dfrac{f}{p}\right)<\psi_e<\dfrac{\tau}{qs}\left(x-\dfrac{f-\psi_i qs}{p-\tau}\right)$ *where* $\hat{z}^B(\psi_e)=\dfrac{q\psi_e s}{\tau}$

Solutions (1) and (2) are identical to what has been obtained under the assumption of contractible action at $T=1$ and the entrepreneur respectively chooses the FF and IF actions. However, solution (3) is worst for E^B since investors obtain more than their reservation utility and E^B is indifferent between both actions.

The Investor has control rights. Now consider the contracts of the form $\mathcal{C}(1,z^B_F)$ allocating decision rights to the investor. Then, the entrepreneur endowed with a bad project let the investor decide which outcome to favor at $T=1$.

As for the entrepreneur endowed with decision rights, the action chosen by the investor at $T=1$ depends on the level of z. In particular, the level $\hat{z}^I(\psi_i)$ at which she is indifferent between FF and IF is defined by $\hat{z}^I(\psi_i)=x-\frac{q\psi_i s}{\tau}$.

If investors' utility at $\hat{z}^I(\psi_i)$ is greater than 0 (i.e., $\hat{z}^I \leq z^B_{IF}$), then E^B can raise z up to z^B_{IF}, level at which the investor favors the IF action (since raising z lowers the expected financial revenue of the investor and thus reinforces his choice toward the IF action) and breaks even. Then E^B compares her expected utility at the level z^B_{IF} when the IF action is chosen and at the level $\hat{z}^I(\psi_i)$ when the FF action is chosen. Hence, E^B prefers the $\mathcal{C}(1, z^B_{IF}) = \mathcal{C}(IF, z^B_{IF})$ contract to the $\mathcal{C}(1, \hat{z}^I(\psi_i))$ contract iif,

$v_e(FF, \hat{z}^I(\psi_i)) \leq v_e(IF, z^B_{IF})$ conditional on $\hat{z}^I(\psi_i) \leq z^B_{IF}$ or iif $\psi_e > \frac{\tau x + f}{qs} - \psi_i \left(1 + \frac{p}{\tau}\right)$ and $\psi_i > \frac{\tau f}{pqs}$.

Otherwise, if $\psi_e < \frac{\tau x + f}{qs} - \psi_i \left(1 + \frac{p}{\tau}\right)$ and $\psi_i > \frac{\tau f}{pqs}$, E^B prefers the $\mathcal{C}(1, \hat{z}^I(\psi_i))$ to the $\mathcal{C}(1, z^B_{IF}) = \mathcal{C}(IF, z^B_{IF})$ contract and the investor obtains a strictly positive utility.

Hence, first-best is feasible if the entrepreneur is *prosocial* enough (and the more investors are *prosocial*, the less E has to be *prosocial*). It is quite intuitive since the more investors are *prosocial*, the higher their WTP and the less E^B has to derive utility from the social outcome to favor $ImpactFirst$ over $FinancialFirst$.

Now, if $u_i(FF, \hat{z}^I(\psi_i)) = u_i(IF, \hat{z}^I(\psi_i)) < 0$ (i.e. $\psi_i < \frac{\tau f}{pqs}$), E^B must propose a level of z below $\hat{z}^I(\psi_i)$ so that, in turn, investors will choose the FF action at $T = 1$ and E^B proposes $\mathcal{C}(1, z^B_F) = \mathcal{C}(FF, z^B_{FF})$.

Proposition 4. *When the bad entrepreneur abandons control rights and the project's type is common knowledge, optimal contracts specify :*

(1) $\mathcal{C}(1, z^B_{IF})$ *if* $\psi_e > \frac{\tau x + f}{qs} - \psi_i \left(1 + \frac{p}{\tau}\right)$ *and* $\psi_i > \frac{\tau f}{pqs}$

where $z^B_{IF} = x - \frac{f - q\psi_i s}{p - \tau}$

(2) $\mathcal{C}(1, \hat{z}^I(\psi_i))$ *if* $\psi_e \leq \frac{\tau x + f}{qs} - \psi_i \left(1 + \frac{p}{\tau}\right)$ *and* $\psi_i > \frac{\tau f}{pqs}$

where $\hat{z}^I(\psi_i) = x - \frac{q\psi_i s}{\tau}$

(3) $\mathcal{C}(1, z^B_{FF})$ *if* $\psi_i \leq \frac{\tau f}{pqs}$ *where* $z^B_{FF} = x - \frac{f}{p}$

Solutions (1) and (3) are identical to what has been obtained under the assumption of contractible action at $T = 1$ and the investor respectively chooses the IF and FF actions.

However, solution (2) is worst for E since investors obtain more than their reservation utility and are indifferent between both actions.

Control rights allocation. Then a natural question arises, when should E^B abandon control rights ? And more precisely, can the inefficient outcome pointed out in proposition 3 when E^B keeps control rights be overcome by abandoning control rights ? Remember, this case occurs if:

$$\frac{\tau}{qs}\left(x-\frac{f}{p}\right) < \psi_e < \frac{\tau}{qs}\left(x-\frac{f-\psi_i qs}{p-\tau}\right) \text{ and } \psi_i > \frac{\tau f}{pqs}$$

Then the optimal choice of the entrepreneur is to propose $\mathcal{C}(0, \hat{z}^B(\psi_e))$ where $\hat{z}^B(\psi_e) = \frac{q\psi_e s}{\tau}$ and E would be better off if she could convince the investor that she would take the IF action at $T=1$, what would not be sequentially rational though. Hence, E would be better off if she could implement a contract such that the investor chooses the IF action when he has control rights and $z = z^B_{IF}$ (i.e., we have $\mathcal{C}(1, z^B_{IF}) = \mathcal{C}(IF, z^B_{IF})$), what is possible if:

$$\psi_e > \frac{\tau x + f}{qs} - \psi_i\left(1+\frac{p}{\tau}\right) \text{ conditional on } \psi_i > \frac{\tau f}{pqs}$$

And since the condition is always verified in case (3) of *proposition* 3 we have:

Proposition 5. *Under symmetric information, for intermediate values of ψ_e and when ψ_i is large, entrepreneurs endowed with bad projects are worst-off if they decide to keep control rights and cannot contract on action a. Formally, the entrepreneur is better off by abandoning control rights if the following conditions are verified :*

- $\frac{\tau}{qs}\left(x-\frac{f}{p}\right) < \psi_e < \frac{\tau}{qs}\left(x-\frac{f-\psi_i qs}{p-\tau}\right)$
- $\psi_i > \frac{\tau f}{pqs}$

Then, the entrepreneur proposes the contract $\mathcal{C}(1, z^B_{IF})$ and the investor chooses the IF action at $T=1$.

We represent graphically the results of this section below (fig. 4).

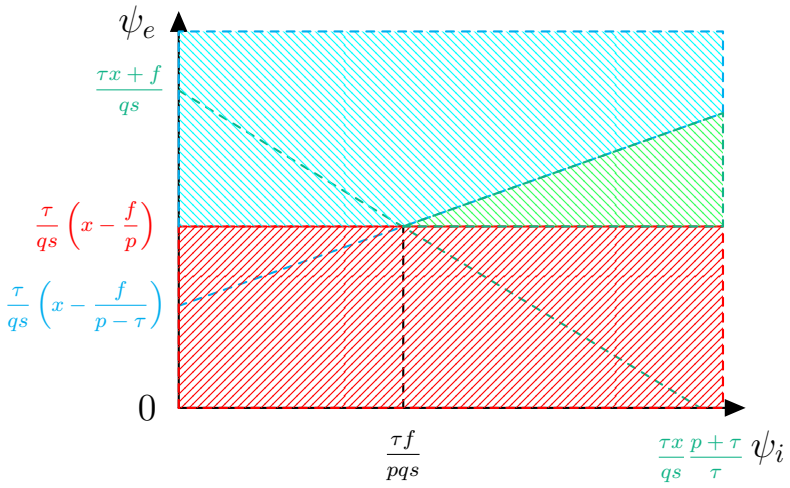

Figure 4: Entrepreneur's optimal control rights allocation depending on social preferences (symmetric information). In blue, E keeps control rights and chooses the IF action. In red E keeps control rights and chooses the IF action. In green, E abandons control rights and the Investor chooses the IF action.

3.2 Asymmetric information, signaling and preferences *congruence*

We now consider privately informed entrepreneurs about the quality of their ventures when the action a to be taken at $T = 1$ is not contractible. In particular, we are interested in figuring out whether or not it might be possible for a good entrepreneur to separate from a bad entrepreneur by giving up control rights when they cannot commit on a. Intuitively, while the good entrepreneur can abandon control rights at no cost whatever her preferences and those of the investor, this strategy can be costly for the *bad* type because the investor might choose an action a at $T = 1$ that does not fit her preferences. This suggests that the separating equilibrium might be sustained when E and the investor have conflicting (*incongruent*) preferences over the action to be taken in $T = 1$ while it might not be the case otherwise.

More formally, we consider candidate separating equilibria such that E^G abandons control rights and proposes a contract $\mathcal{C}(1, z^G)$ while E^B retains control rights and proposes a contract $\mathcal{C}(0, z^B)$ to investors. Note that depending on the action that will be favored by the bad

type at $T = 1$, there might exist two sets of such separating equilibria. We first consider conditions of existence of the candidate separating equilibrium where E^B will choose IF at $T = 1$. Participation constraints of investors and the good type to the $\mathcal{C}(1, z^G)$ contract give:

$(PC_I^G) : p(x - z^G) + q\psi_i s \geq f$

$(PC_E) : pz^G + q\psi_e s \geq 0$

Participation constraints to the $\mathcal{C}(0, z_{IF}^B)$ contract give:

$(PC_I^B) : (p - \tau)(x - z_{IF}^B) + q\psi_i \geq f$

$(PC_E^B) : (p - \tau)z_{IF}^B + q\psi_e s \geq 0$

While the level of z^G does not affect the action taken at $T = 1$ whoever has control rights, this is not the case for z^B. Here, since E^B keeps control rights, the level of z^B will influence his choice at $T = 1$, choice that will affect investors' participation. Hence, the bad type's incentive compatible condition for the contract $\mathcal{C}(0, z_{IF}^B)$ gives (the *bad* entrepreneur prefers $a = IF$ to $a = FF$ in $T = 1$):

$(IC^B) : (p - \tau)z_{IF}^B + q\psi_e s \geq pz_{IF}^B$

The incongruent preferences condition[12] (I prefers the FF action if a trade off occurs between $T = 0$ and $T = 1$):

$(IP) : (p - \tau)(x - z^G) + q\psi_i s \leq p(x - z^G)$

The no mimicking condition for the contract $\mathcal{C}(0, z_{IF}^B)$ gives (the *bad* entrepreneur does not want to deviate):

$(NM) : (p - \tau)z_{IF}^B + q\psi_e s \geq pz^G$

We now turn to the conditions of existence for the candidate separating equilibrium where E^B opts for FF in $T = 1$:

Participation constraints to the $\mathcal{C}(1, z^G)$ contract are unchanged while those of the $\mathcal{C}(0, z_{FF}^B)$ contract give:

$(PC_I^B) : p(x - z_{FF}^B) \geq f$

$(PC_E^B) : pz_{FF}^B \geq 0$

[12]Necessary condition for the no mimicking condition to apply. Note that preferences must differ at the level z^G and not necessarily at the level z_{IF}^B

The incentive compatible condition for the contract $\mathcal{C}(0, z^B_{FF})$ gives (the *bad* entrepreneur prefers $a = FF$ to $a = IF$ in $T = 1$):

$(IC) : pz^B_{FF} \geq (p - \tau)z^B_{FF} + q\psi_e s$

The no mimicking condition for the contract $\mathcal{C}(0, z^B_{FF})$ gives:

$(NM) : pz^B_{FF} \geq (p - \tau)z^G + q\psi_e s$

The incongruent preferences condition (the investor prefers the IF action at the level z^G if a trade off occurs between $T = 0$ and $T = 1$):

$(IP) : (p - \tau)(x - z^G) + q\psi_i s \geq p(x - z^G)$

From these conditions we can state the following proposition:

Proposition 6. *By abandoning control rights, good entrepreneurs can separate from bad entrepreneurs who will prefer to keep control rights to choose the IF action at $T = 1$. Formally:*

- *if* $\frac{\tau}{qs}\left(x - \frac{f - q\psi_i s}{p - \tau}\right) \leq \psi_e \leq \frac{\tau x}{qs}$ *and* $\frac{\tau x}{qs} - \psi_e \leq \psi_i \leq \frac{\tau f}{(p+\tau)qs}$, *contracts specify* $z^G \leq x - \frac{q\psi_i s}{\tau}$ *and* $z^B = x - \frac{f - q\psi_i s}{p - \tau}$ *and investors obtain more than their reservation utility with the good type and break even with the bad type. In addition, if* $\psi_e \geq \frac{\tau x}{qs}$, *first best is achieved and* $z^G = x - \frac{f - q\psi_i s}{p}$.

- *if* $\psi_e \geq \frac{\tau}{qs}\left(x - \frac{f - q\psi_i s}{p - \tau}\right)$ *and* $\frac{\tau f}{(p+\tau)qs} \leq \psi_i \leq \frac{\tau f}{pqs}$, *contracts specify* $z^G \leq x - \frac{q\psi_i s}{\tau}$ *and* $z^B = x - \frac{f - q\psi_i s}{p - \tau}$ *and investors obtain more than their reservation utility with the good type and break even with the bad type.*

Alternatively, by abandoning control rights, good entrepreneurs can separate from bad entrepreneurs who will prefer to keep control rights to choose the FF action at $T = 1$. Formally:

- *if* $\frac{\tau f}{(p+\tau)qs} \leq \psi_i \leq \frac{\tau x}{qs} - \psi_e$ *and* $\psi_e \leq \dfrac{\tau}{qs}\left(x - \dfrac{f}{p}\right)$, *contracts specify* $z^G \leq x - \frac{q\psi_i s}{\tau}$ *and* $z^B = x - \frac{f - q\psi_i s}{p - \tau}$ *and investors obtain more than their reservation utility with the good type and break even with the bad type. In addition, if* $\psi_e \leq \dfrac{\tau}{qs}\left(x - \dfrac{f}{p}\right) - \psi_i\left(1 - \dfrac{\tau}{p}\right)$, *contracts specify* $z^G = x - \frac{f - q\psi_i s}{p}$ *and* $z^B = x - \frac{f}{p}$ *and investors break even in both cases.*

The interpretation of the conditions of equilibrium where E^B prefers to keep control rights to choose the IF action at $T = 1$ is the following. If E^B is prosocial enough, the *bad* type prefers to implement the IF action even for the largest values of z compatible with investors' participation (the NM condition is not very restrictive). In addition, if investors are not prosocial, they prefer the FF action over the IF action (in case E^B would deviate) even for the largest values of z (i.e. the smallest values of $x - z$). On the contrary, if investors are prosocial, they still prefer the IF action over the FF action for large values of z and the incongruent preferences condition becomes more restrictive and the equilibrium cannot be sustained.

The interpretation of the conditions of equilibrium where E^B prefers to keep control rights to choose the FF action at $T = 1$ is the following. If investors are not prosocial, z^G has too be very large to make sure the investor would take the IF action if he had control rights and the participation constraint of the investor to the $\mathcal{C}(1, z^G)$ contract cannot be verified. If the entrepreneur is very prosocial, z^B_{FF} has too be very large to make sure that the bad entrepreneur willl take the FF action if he has control rights and the participation constraint of the investor to the $\mathcal{C}(0, z^B_{FF})$ cannot be verified. In addition if the cumulated WTP of E and the investor is not too large, E^B does not want to deviate even at the highest level of z^G compatible with investors' participation constraint.

Fig. 5 illustrates proposition 6. It shows that separation with control rights allocation is less effective than separation when commitment is feasible $ex - ante$. This result is not surprising since separation with control rights requires more conditions (in particular the incongruent preferences condition — IP) than separation with commitment. More precisely, if we consider the equilibrium such that the bad type prefers to commit to the IF action (in blue), the IP condition requires that investors would choose the FF action if the bad type were to deviate. However, this is possible only if the investor is not prosocial and thus rules out the "right" part of the equilibrium. Hence, when the entrepreneur is very prosocial so that the entrepreneur endowed with a high quality project would commit to

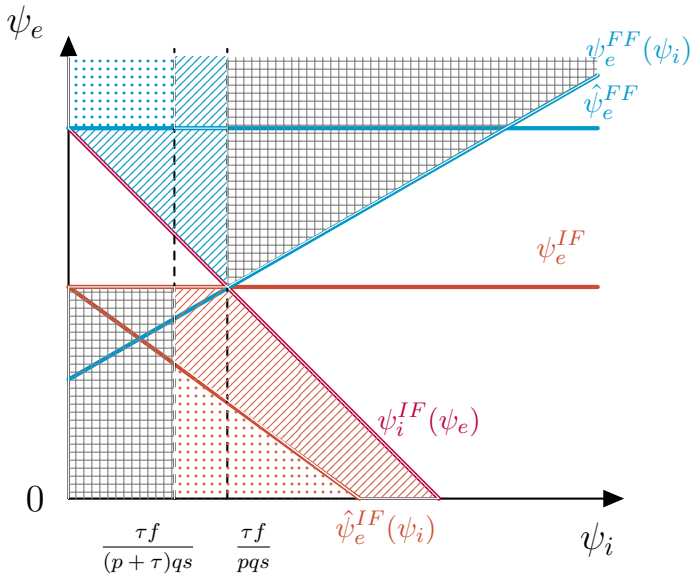

Figure 5: Separating equilibria achieved by the good type by abandoning control rights. In red, E^G abandons control rights and the bad type keeps control rights and chooses the FF action. In blue E^G abandons control rights and the bad type keeps control rights and chooses the IF action. In dots, first best can be achieved. In grey, areas where separation is possible only when commitment is feasible.

the FF to signal herself if commitment were feasible, she can only separate if investors are willing to take the FF action if the bad type imitates her contract, what occurs only if investors are not very prosocial (i.e., if ψ_i is small enough). The same line of reasoning applies to the $IF-$*separating* equilibrium discussed in proposition 1. When commitment is not feasible, in addition to be feasible only if the entrepreneur is not very prosocial, the separating equilibrium can be achieved only if investors are prosocial enough to deter the entrepreneur endowed with a low quality project from imitation.

4 Application to the impact investing market

This section builds on the work of Geczy et al. (2021) who study how contractual terms of financial contracts (in particular *direct contracting* on impact and *participatory governance*) adapt to serve impact funds' dual objective of social impact and financial performance. We follow their differentiation between market-rate-seeking (MRS) funds and non-market-rate-

seeking (NMRS) funds (even if profit-seeking in impact investing might be "*best represented along a spectrum*", as they point out)[13] and transpose our theoretical contribution to an empirical framework in the following way. First, *direct contracting* on impact in the "real world" might be a proxy for contractually specifying the IF action in our model while *participatory governance* terms might be used as a proxy to the allocation of control rights in our work. Second, in all the section, we interpret the level of $q\psi_i s$ as investors' WTP (as a proxy one might consider the type of the investor, see Barber et al. 2021). Hereafter we give some examples of possible empirical implications of our model.

Implication 1. *In MRS funds, direct contracting on impact should be related to firm quality while it might not be the case in NMRS funds.*

The intuition builds on the results of proposition 1 and 2. The good type can separate by choosing the action IF only if the WTP of investors (and hers) is not too large, so that the interest rate offered to investors should then be close to the market rate of similar non impact investments (especially if first best cannot be achieved). In such an equilibrium, the bad type chooses the FF action (and so does not participate to the impact investing market). On the contrary, a necessary condition for the FF-separating equilibrium to be sustained is that investors' (and entrepreneurs') WTP is rather large. In such a case, both the good and the bad type can access to NMRS funds (i.e., can propose below market rates to investors). However, here, the good type contracts more tightly on financial terms (while she contracts more tightly on impact terms in MRS funds) and the bad type contracts more tightly on impact terms. In addition, following this line of reasoning, the IF-pooling equilibrium (where both types of entrepreneurs choose to contract directly on the IF action) requires that investors' WTP is rather large, so that entrepreneurs might be in position to propose below market rate to investors (because both types generate the social outcome and investors' WTP is rather large). Finally, the FF-pooling equilibrium requires that investors' WTP is rather small.

[13]MRS funds are impact funds targeting market levels of financial performance adjusted to risk while NMRS target lower financial performance (investors in such funds are willing to accept concessionary returns in exchange for the social impact objective of the fund).

Since then the bad type does not generate social impact, the entrepreneur must propose a return to investors close to the market rate of comparable non impact investments. In a nutshell, when investors' WTP is small, only the good type contracts on the action IF and she matches with MRS funds. On the contrary, when investors' WTP is rather large, both types contract on the IF action and they match with NMRS funds. From the discussion above, we thus also expect that:

Implication 2. *Investors' WTP should be smaller in MRS funds that in NMRS funds.*

Implication 3. *Direct contracting on impact should be observed in both MRS funds and NMRS funds but should be more prevalent in NMRS funds.*

We now turn to empirical implications related to the allocation of control rights allocation to investors as a way to signal project's quality (see proposition 6). Then, if the bad type prefers to keep control rights to choose the FF action while the good type relinquishes control, she does not participate to the impact investing market while the good type must propose to investors a return close to the market rate of return (because investors' WTP must be rather small; here again, especially if first best cannot be achieved). Alternatively, if separation is such that the bad type keeps control to choose the IF action, both good and bad projects generate impact while investors' WTP is rather large, so that entrepreneurs can propose below market rates to investors. As a result, we expect that:

Implication 4. *Investors in MRS funds should obtain more participatory governance rights related to impact than investors in NMRS funds.*

Note that this implication is in line with empirical findings of Geczy et al. (2021) who report that the incidence of fund veto right on deviations from the business plan of the PC is 49% for MRS funds while it is 27% for NMRS funds.

Finally, since good projects use control rights allocation to signal their projects' quality to investors, we expect that:

Implication 5. *More control rights allocation to investors should be related to greater project quality in both MRS funds and NMRS funds.*

The model might also suit particularly well an experimental study where investors and entrepreneurs' expected social utilities ($q\psi_i s$ and $q\psi_e s$) could be inferred during the first part of the experiment. Then, relying on social utilities of participants, our results could be tested in the second part of the experiment.

4.1 Future research

4.1.1 The case where entrepreneurs' prosocial nature is not observable

Since our results build on the somewhat strong assumption that the entrepreneur's prosocial nature is observable to investors, we consider here as a robustness check the case where it is not.

In the model we assume that the entrepreneur's prosocial nature (ψ_e) is known to investors. Alternatively, one could consider ψ_e as unknown so that strategies would depend on the distribution of ψ_e among entrepreneurs, on ψ_i and on the expected social outcome of the project qs. If investors only know the distribution of ψ_e, we anticipate that the good type might not be able to separate from the bad type by committing to an action but could nonetheless improve her contract by committing to an action (by lowering the expected share of bad projects in her equilibrium contract). To grasp the intuition, consider for example the case where qs is very small. Then, the WTP of investors is rather small (more or less, depending on ψ_i) so that choosing the IF action might not be very appealing to the bad type, except if she has high social concerns. In such a case, if the good type chooses the IF action, he might be imitated by a bad type with high social concerns but not by a bad type with low social concerns (who will prefer to choose the FF action). Thus, investors can anticipate that if the contract specifies the IF action while qs is small, the probability to invest in a good project is larger than the share of good projects (γ) in the economy[14].

[14]We anticipate that there might exist a threshold $\hat{\psi}_e(qs)$ so that if $\psi_e > \hat{\psi}_e(qs)$, the bad type pools with

Hence, even if investors cannot infer the type of entrepreneur based on the proposed contract, they can infer that bad types with low social concerns would be better off to propose another contract (namely a contract that specifies the $FF - action$) so that the equilibrium contract of the good type can be more favorable than if she does not commit to the IF action. As a consequence, while complete separation might not be possible if the entrepreneur's prosocial nature is not observable to investors, we anticipate that the intuitions of the models should hold under the broader assumption that it is not.

4.1.2 Investors' WTP and project's profitability

Consider a for-profit social venture that can deliver the market rate of return to investors but only proposes a concessionary return in line with investors' WTP for the social outcome. While investors would accept such an offering if the project cannot deliver the market rate, whether or not investors would accept the same offering if the project can deliver much more but the entrepreneur tries to capture all investors' WTP for the social outcome to her own benefit might not be straightforward.

In particular, relying on theory based on inequality aversion (Fehr and Schmidt 1999, Bolton and Ockenfels 2000), it would be interesting to test experimentally whether investors would accept to transfer all their willingness to pay for the social outcome to entrepreneurs. For example, one could build on previous studies investigating investors' WTP for socially responsible assets (see e.g., Brodback et al. 2020) and adapt it to an *ultimatum game* setting to figure out how prosocial investors would react to "unfair" splits of their WTP[15]. It might be interesting to further investigate this topic in future research.

the good type and specifies the IF action and if $\psi_e \leq \hat{\psi}_e(qs)$, the bad type specifies the FF action and reveals her type.

[15]The WTP of investors might be shared between the entrepreneur and investors but also allocated to third parties, in particular to improve the social outcome of the project.

5 Conclusion

Our paper presents a theory of contracting under asymmetric information between an entrepreneur who needs funds to undertake a for-profit social project and impact investors uninformed about the quality of the project. We study two possible signaling strategies for entrepreneurs. The first strategy consists to commit ex-ante to an *action* that will favor extra-financial performance or financial performance if the project faces a trade-off between both outcomes in the future (what occurs if the quality of the project is low). When commitment is feasible (i.e., the action to be taken in the future is contractible), we show that entrepreneurs endowed with high quality projects can signal their type to impact investors when the prosocial nature of the entrepreneur is sufficiently high or low and observable by investors. More precisely, when the entrepreneur is very prosocial, the good type can separate from the bad type by committing to favor financial revenues. On the contrary, when the entrepreneur has very low social concerns, the good type can separate from the bad type by committing to favor social impact. However when the entrepreneur has intermediate social concerns, the good type cannot separate from the bad type by committing ex-ante to favor either extra-financial or financial return.

If commitment to an action is not possible, we show that the good type can still signal her quality to investors by appropriately allocating control rights over the decision to be taken if a trade-off occurs. However, signaling by abandoning control rights is more restrictive. Indeed, in such a case, entrepreneurs that are not prosocial can separate by abandoning control rights only if investors are *prosocial* enough while *prosocial* entrepreneurs can separate by abandoning control rights only if investors are not very *prosocial*. Thus, signaling with control rights further requires that the entrepreneur and investors have *incongruent* (conflicting) prosocial preferences.

References

J. Austin, H. Stevenson, and J. Wei-Skillern. Social and commercial entrepreneurship: same, different, or both? *Entrepreneurship theory and practice*, 30(1):1–22, 2006.

B. M Barber, A. Morse, and A. Yasuda. Impact investing. *Journal of Financial Economics*, 139(1):162–185, 2021.

F. Barigozzi and P. Tedeschi. Credit markets with ethical banks and motivated borrowers. *Review of Finance*, 19(3):1281–1313, 2015.

J R. Baum and E. A Locke. The relationship of entrepreneurial traits, skill, and motivation to subsequent venture growth. *Journal of applied psychology*, 89(4):587, 2004.

R. Bénabou and J. Tirole. Individual and corporate social responsibility. *Economica*, 77 (305):1–19, 2010.

G. E Bolton and A. Ockenfels. Erc: A theory of equity, reciprocity, and competition. *American economic review*, 90(1):166–193, 2000.

M. Bolton, P.and Kacperczyk. Do investors care about carbon risk? *Journal of Financial Economics*, 2021.

D. Brodback, N. Guenster, and S. Pouget. The valuation of corporate social responsibility: A willingness-to-pay experiment. 2020.

B. Chowdhry, S. W. Davies, and B. Waters. Investing for impact. *The Review of Financial Studies*, 32(3):864–904, 2019.

P. A Dacin, M T. Dacin, and M. Matear. Social entrepreneurship: Why we don't need a new theory and how we move forward from here. *Academy of management perspectives*, 24(3): 37–57, 2010.

W. Dessein. Information and control in ventures and alliances. *The Journal of Finance*, 60 (5):2513–2549, 2005.

E. Fehr and K. M Schmidt. A theory of fairness, competition, and cooperation. *The quarterly journal of economics*, 114(3):817–868, 1999.

C. Geczy, J.S Jeffers, D. K Musto, and A. M Tucker. Contracts with (social) benefits: the implementation of impact investing. *Journal of Financial Economics*, 2021.

E. L Glaeser and A. Shleifer. Not-for-profit entrepreneurs. *Journal of public economics*, 81 (1):99–115, 2001.

S.M Hartzmark and A. B Sussman. Do investors value sustainability? a natural experiment examining ranking and fund flows. *The Journal of Finance*, 74(6):2789–2837, 2019.

J. Hessels, M. Van Gelderen, and R. Thurik. Entrepreneurial aspirations, motivations, and their drivers. *Small business economics*, 31(3):323–339, 2008.

A. Kovner and J. Lerner. Doing well by doing good? community development venture capital. *Journal of Economics & Management Strategy*, 24(3):643–663, 2015.

H. E Leland and D. H Pyle. Informational asymmetries, financial structure, and financial intermediation. *The journal of Finance*, 32(2):371–387, 1977.

M. Renko. Early challenges of nascent social entrepreneurs. *Entrepreneurship theory and practice*, 37(5):1045–1069, 2013.

P. Riedl, A.and Smeets. Why do investors hold socially responsible mutual funds? *The Journal of Finance*, 72(6):2505–2550, 2017.

C. C Williams and S. Nadin. Beyond the commercial versus social entrepreneurship divide: Some lessons from english localities. *Social Enterprise Journal*, 2011.

Appendix

Proof of Proposition 1. By substituting (PC_I) in (IC_B) we obtain:$pz_{FF}^G \leq (p-\tau)z_{IF}^B + q\psi_e s$ $\Leftrightarrow$ $z_{FF}^G \leq \frac{p-\tau}{p}x - \frac{f-qs(\psi_i+\psi_e)}{p}$. Hence, the separating equilibrium can be sustained if (from IC_G): $z_{IF}^B \leq z_{FF}^G \leq \frac{p-\tau}{p}x - \frac{f-qs(\psi_i+\psi_e)}{p}$ or, $\psi_e \geq \frac{\tau}{qs}\left(x - \frac{f-q\psi_i s}{p-\tau}\right) \equiv \psi_e^{FF}$. In addition, first best can be achieved if $\psi_e \geq \frac{\tau x}{qs} \equiv \hat{\psi}_e^{FF}$.

Proof of Proposition 2. First note that one must have : $z_{IF}^{pool} \in I_{IF}^{pool} = \left[x - \frac{f}{p}, x - \frac{f-q\psi_i s}{p-\tau(1-\gamma)}\right] = \emptyset$ if $f/p < \frac{f-q\psi_i s}{p-\tau(1-\gamma)}$. This is because if z_{IF}^{pool} were below the lower bound both entrepreneurs would profitably deviate whatever investors' beliefs while if z_{IF}^{pool} is above the larger bound, investors do not break even. Thus, necessary conditions to the existence of the $IF-pooling$ equilibrium are: $\gamma > 1 - \frac{pq\psi_i s}{\tau f} \Leftrightarrow \psi_i > \frac{\tau f}{pqs}(1-\gamma)$. That is, the WTP for the social outcome (ψ_i) of investors (or alternatively the share of good projects γ) has to be large enough so that pooling is more attractive than the worst contract that can be secured by deviating toward $FinancialFirst$. Now assume the above condition satisfied and consider any candidate pooling equilibrium $\mathcal{C}(IF, z_{IF}^{pool})$. Intuitively, if the entrepreneur is very prosocial, the bad type might not want to deviate toward a contract specifying the FF action so that the good type might profitably deviate by proposing such a contract. Indeed, a profitable deviation for the *good* type must be such that $z_{FF}^{dev} > z_{IF}^{pool}$ (and would also be preferred by the *bad* type if she were free to choose her preferred action at $T=1$). However, if E^G proposes the contract $\mathcal{C}(FF, z_{FF}^{dev})$, then the application of the intuitive criterion rules out any $IF-pooling$ equilibrium if: $pz_{IF}^{pool} < (p-\tau)z_{IF}^{pool} + q\psi_e s \Leftrightarrow q\psi_e s > \tau z_{IF}^{Pool}$. Indeed, in such a case, one can find $z_{FF}^{dev} > z_{IF}^{pool}$ so that $pz_{FF}^{dev} \leq (p-\tau)z_{IF}^{pool} + q\psi_e s$. Since E^B would be worst-off if to deviate under the belief that the deviation comes from the *good* type, investors' belief that the entrepreneur who deviates is of the *bad* type would not be reasonable (according to the intuitive criterion). In particular, no $IF-pooling$ passes the intuitive criterion if the relation is satisfied for the upper bound of I_{IF}^{pool}, that is if:$\psi_e > \frac{\tau}{qs}\left(x - \frac{f-q\psi_i s}{p-\tau(1-\gamma)}\right)$. On the contrary, the $IF-pooling$ passes the intuitive criterion if there exists a level $z_{IF}^{pool} \in I_{IF}^{pool}$ such that $z_{IF}^{pool} \geq \frac{q\psi_e s}{\tau}$ that is if: $\gamma \leq 1 - \frac{p}{\tau} + \left(\frac{f-q\psi_i s}{x - \frac{q\psi_e s}{\tau}}\right) \Leftrightarrow \psi_e \leq \frac{\tau}{qs}\left(x - \frac{f-q\psi_i s}{p-\tau(1-\gamma)}\right) \Leftrightarrow \psi_i \geq f - (p-\tau(1-\gamma))\left(x - \frac{q\psi_e s}{\tau}\right)$.

Hence, the $IF-pooling$ might be sustained in equilibrium if $\psi_e < \frac{\tau}{qs}\left(x - \frac{f-q\psi_i s}{p-\tau(1-\gamma)}\right)$, conditional on $\psi_i > \frac{\tau f(1-\gamma)}{pqs} \Leftrightarrow \gamma > 1 - \frac{pq\psi_i s}{\tau f}$. Otherwise, no $IF-pooling$ passes the intuitive criterion. Finally, from (IC_B) one must have : $(p-\tau)z_{IF}^{Pool} + q\psi_e s > px - f$, from which we obtain $q\psi_e s > \frac{\tau}{qs}\left(x - \frac{\gamma f + (p-\tau)\frac{q\psi_i s}{\tau}}{p-\tau(1-\gamma)}\right)$. We now turn to candidate $FF-pooling$ equilibria $\mathcal{C}(FF, z_{FF}^{Pool})$. Necessary conditions to the existence of such equilibria is that the *good* type does not have a profitable deviation under the most pessimistic belief of investors, and (PC_I) is satisfied, i.e. that $z_{FF}^{Pool} \in I_{FF}^{Pool} = \left[x - \frac{f-q\psi_i s}{p-\tau}, x - \frac{f-\gamma q\psi_i s}{p}\right]$ which is not an empty set iif $\frac{f-\gamma q\psi_i s}{p} < \frac{f-q\psi_i s}{p-\tau} \Leftrightarrow \psi_i < \frac{\tau f}{qs(p-\gamma(p-\tau))} \Leftrightarrow \gamma > \frac{1}{p-\tau}\left(p - \frac{\tau f}{q\psi_i s}\right)$. Otherwise $I_{FF}^{Pool} = \emptyset$. Consider first a deviation by the good type such that she proposes the contract $\mathcal{C}(IF, z_{IF}^{dev})$ where $z_{IF}^{dev} > z_{FF}^{Pool}$. If investors anticipate that the deviation comes from the good type, the bad type would be worst-off to propose such a contract if $(p-\tau)z_{IF}^{dev} + q\psi_e s < pz_{FF}^{Pool}$. Hence, if $\psi_e < \frac{\tau}{qs}\left(x - \frac{f-q\psi_i s}{p-\tau}\right)$ all $FF-pooling$ equilibria are ruled out by the intuitive criterion. Now consider the deviation $\mathcal{C}(IF, z^{dev})$ from the *bad* type where $z^{dev} = z_{IF}^{B} = x - \frac{f-q\psi_i s}{p-\tau}$. Then investors break even and agree to participate even under the belief that the deviation comes from the *bad* type. In addition, the *good* type would be worst-off to participate. Hence, all $FF-pooling$ equilibria are ruled out by the intuitive criterion if $(p-\tau)\left(x - \frac{f-q\psi_i s}{p-\tau} + q\psi_e s\right) > p\left(x - \frac{f-\gamma q\psi_i s}{p}\right)$. Which gives, $\psi_e > \frac{\tau x}{qs} - \psi_i(1-\gamma)$. Hence, here again, $FF-pooling$ might be sustained in equilibrium for intermediate values of ψ_e such that $\tau\left(x - \frac{f-q\psi_i s}{p-\tau}\right) < \psi_e < \frac{\tau x}{qs} - \psi_i(1-\gamma)$, conditional on $\psi_i < \frac{\tau f}{qs(p-\gamma(p-\tau))}$. Otherwise, no $IF-pooling$ passes the intuitive criterion.

Proof of Corollary 3. For the IF-pooling equilibrium: according to the equilibrium conditions, if $z_{IF}^{pool} < \frac{q\psi_e s}{\tau}$, the good type has a profitable deviation toward a contract that specifies the FF action because such a deviation would not be profitable to the bad type. Hence we must have $z_{IF}^{pool} \geq \frac{q\psi_e s}{\tau}$ so that the equilibrium can specify the maximal value of z compatible with investors participation, i.e., $z_{IF}^{pool} = x - \frac{f-q\psi_i s}{p-\tau(1-\gamma)}$, and investors break even. For FF-pooling equilibrium: according to the equilibrium conditions, if $z_{FF}^{pool} > \frac{q\psi_e s}{\tau}$, the good type

has a profitable deviation toward a contract that specifies the IF- action because such a deviation would not be profitable to the bad type. Hence we must have $z_{FF}^{pool} \leq \frac{q\psi_e s}{\tau}$ from which we obtain $z_{FF}^{pool} = min\left[\frac{q\psi_e s}{\tau}, x - \frac{f-\gamma q\psi_i s}{p}\right]$. Hence investors obtain more than their reservation utility if $\psi_e < \frac{\tau}{qs}\left(x - \frac{f-\gamma q\psi_i s}{p}\right)$. However, this last condition is never satisfied in equilibrium so that we have $z_{FF}^{pool} = x - \frac{f-\gamma q\psi_i s}{p}$.

Proof of proposition 6. We derive that one must have $0 \leq z_{IF}^B \leq z^G \leq min\left[x - \frac{q\psi_i s}{\tau}, x - \frac{f-q\psi_i s}{p}\right]$; $0 \leq \frac{pz^G - q\psi_e s}{p-\tau} \leq z_{IF}^B \leq min\left[\frac{q\psi_e s}{\tau}, x - \frac{f-q\psi_i s}{p-\tau}\right]$. So that z^G must also verify $\frac{pz^G - q\psi_e s}{p-\tau} \leq z^G \Leftrightarrow z^G \leq \frac{q\psi_e s}{\tau}$. Consider first the case where ψ_i is not too large. In particular, assume $\psi_i \leq \frac{\tau f}{(p+\tau)qs}$ (that is, PC_I^B is more restrictive than IP). Then, contracts $\mathcal{C}(1, z^G)$ and $\mathcal{C}(0, z_{IF}^B)$ specify $z^G = x - \frac{f-q\psi_i s}{p}$ and $z_{IF}^B = x - \frac{f-q\psi_i s}{p-\tau}$. Otherwise, if $\psi_e < \frac{\tau}{qs}\left(x - \frac{f-q\psi_i s}{p-\tau}\right)$, one must have $z^B \leq \frac{q\psi_e s}{\tau}$ and the bad type would systematically deviate since we would be better off by choosing the FF action. Now consider that investor's preferences are mostly social (i.e. $\psi_i > \frac{\tau f}{(p+\tau)qs}$). Then first-best cannot be achieved and we have the following conditions. The good type's best possible contract is greater than the bad type's contract, i.e.,$x - \frac{q\psi_i s}{\tau} > x - \frac{f-q\psi_i s}{p-\tau}$ from which we obtain $\psi_i < \frac{\tau f}{pqs}$. One still have the necessary condition on the bad type's IC constraint $\psi_e \geq \frac{\tau}{qs}\left(x - \frac{f-q\psi_i s}{p-\tau}\right)$. In addition, the NM condition implies $\frac{pz^G - q\psi_e s}{p-\tau} \leq z_{IF}^B$, from which we also obtain $\psi_e \geq \frac{\tau}{qs}\left(x - \frac{f-q\psi_i s}{p-\tau}\right)$. We now turn to the conditions of existence for the candidate separating equilibrium where E^B opts for FF at $T = 1$. A necessary condition is that the bad type does not prefer to deviate to propose a contract specifying the IF action and a level of z compatible with investors' participation constraint whatever their belief. That is one must have $(p-\tau)\left(x - \frac{f-q\psi_i s}{p-\tau}\right) + q\psi_e s \leq p\left(x - \frac{f}{p}\right)$, from which we obtain $\psi_i < \frac{\tau x}{qs} - \psi_e$. Note that these conditions are easier to satisfy if investors are *prosocial* (ψ_i is large) and entrepreneurs are not (ψ_e is small). In particular, the equilibrium cannot be sustained if $\psi_i < \frac{\tau f}{(p+\tau)qs}$ nor if, $\psi_e > \frac{\tau}{qs}\left(x - \frac{f}{p}\right)$, nor if, $\psi_e > \frac{\tau}{qs}\left(x - \frac{f}{\tau}\right) + \psi_i\left(\frac{p}{\tau} - 1\right)$, nor if, $\psi_e > \frac{\tau}{qs}\left(x - \frac{f}{p}\right) + \frac{\tau}{p}\psi_i$. In addition, when conditions above are not satisfied, first best can be achieved if $\psi_e + \psi_i\left(1 - \frac{\tau}{p}\right) < \frac{\tau}{qs}\left(x - \frac{f}{p}\right)$.