The European Journal of Development Research
https://doi.org/10.1057/s41287-024-00656-7

ORIGINAL ARTICLE

Social Enterprise Under Moral Hazard: Who Gets State Subsidies and Active Financing?

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Accepted: 14 July 2024

Abstract

We develop a double-sided moral hazard model of social entrepreneurship and derive the optimal state subsidy. Then, we analyze the data of an EU-funded training and mentoring program aiming at preparing social entrepreneurs for private financing. Using content analysis techniques, we investigate the 203 applications for the program, the reviewers' evaluation, and the selection decision. Social enterprises produce private and public benefits, use market and non-market resources, and involve a wide range of stakeholders with different incentives. We examine why different projects can get active financing (financing plus advisory), or only passive financing (financing without advisory), or no financing at all. We identify five relevant selection criteria such as entrepreneurial net present value, entrepreneurial agency cost, advisory net present value, advisory agency cost, and the external effects of the project. Empirical findings are consistent with the theoretical model. Applicants with higher scores in business plan, social impact, and geographical scope were significantly more likely to be selected, especially if their activities required no domain-specific knowledge from the advisors. However, higher agency costs, reflected in too many business lines and early-stage operations, seem to reduce the chances significantly. We formulate a moral hazard model for social entrepreneurship with four simultaneously optimizing players: an entrepreneur, an investor, an advisor, and the state. With the help of our unique database, we get valuable insights into the financing decisions of a profit-seeking investor. Our findings can contribute to the improvement of the design of state-subsidized social entrepreneurship programs.

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Published online: 16 August 2024

Keywords Social enterprise · State subsidy · Moral hazard · Contract theory

Résumé
Nous développons un modèle d'aléa moral à double face de l'entrepreneuriat social et dérivons la subvention optimale de l'État. Ensuite, nous analysons les données d'un programme de formation et de mentorat financé par l'UE visant à préparer les entrepreneurs sociaux au financement privé. En utilisant des techniques d'analyse de contenu, nous examinons les 203 demandes pour le programme, l'évaluation des examinateurs et la décision de sélection. Les entreprises sociales produisent des avantages privés et publics, utilisent des ressources du marché et non marchandes, et impliquent un large éventail de parties prenantes avec des incitations différentes. Nous examinons pourquoi différents projets peuvent obtenir un financement actif (financement plus conseil), seulement un financement passif (financement sans conseil), ou aucun financement du tout. Nous identifions cinq critères de sélection pertinents tels que la valeur actuelle nette entrepreneuriale, le coût d'agence entrepreneurial, la valeur actuelle nette du conseil, le coût d'agence du conseil, et les effets externes du projet. Les résultats empiriques sont cohérents avec le modèle théorique. Les candidats ayant obtenu des scores plus élevés en matière de plan d'affaires, d'impact social et de portée géographique étaient nettement plus susceptibles d'être sélectionnés, surtout si leurs activités ne nécessitaient aucune connaissance spécifique du domaine de la part des conseillers. Cependant, des coûts d'agence plus élevés, reflétés par trop de lignes d'affaires et des opérations en phase initiale, semblent réduire significativement les chances. Nous formulons un modèle d'aléa moral pour l'entrepreneuriat social avec quatre joueurs optimisant simultanément : un entrepreneur, un investisseur, un conseiller et l'État. Avec l'aide de notre base de données unique, nous obtenons des informations précieuses sur les décisions de financement d'un investisseur à la recherche de profit. Nos résultats peuvent contribuer à l'amélioration de la conception des programmes d'entrepreneuriat social subventionnés par l'État.

Resumen
Desarrollamos un modelo de doble riesgo moral de emprendimiento social y derivamos la subvención estatal óptima. Luego analizamos los datos de un programa de formación y mentoría financiado por la UE que tiene como objetivo preparar a los emprendedores sociales para la financiación privada. Utilizando técnicas de análisis de contenido, investigamos las 203 solicitudes para el programa, la evaluación de los revisores y la decisión de selección. Las empresas sociales producen beneficios privados y públicos, utilizan recursos del mercado y otros, e involucran a una amplia gama de partes interesadas con diferentes incentivos. Examinamos por qué diferentes proyectos pueden obtener financiación activa (financiación más asesoramiento), solo financiación pasiva (financiación sin asesoramiento), o ninguna financiación en absoluto. Identificamos cinco criterios de selección relevantes, como el valor presente neto empresarial, el costo de agencia empresarial, el valor presente neto de asesoramiento, el costo de agencia de asesoramiento y los efectos externos del proyecto. Los hallazgos empíricos son consistentes con el modelo teórico. Los solicitantes con puntuaciones más altas en plan de negocios, impacto social y alcance geográfico tenían

muchas más probabilidades de ser seleccionados, especialmente si sus actividades no requerían conocimientos específicos del dominio por parte de los asesores. Sin embargo, los costos de agencia más altos, reflejados en demasiadas líneas de negocio y operaciones en etapa temprana, parecen reducir significativamente las posibilidades. Formulamos un modelo de riesgo moral para el emprendimiento social con cuatro jugadores que optimizan simultáneamente: un emprendedor, un inversor, un asesor y el estado. Con la ayuda de nuestra base de datos única, obtenemos valiosos conocimientos sobre las decisiones de financiación de un inversor que busca beneficios. Nuestros hallazgos pueden contribuir a la mejora del diseño de programas de emprendimiento social subvencionados por el estado.

JEL Classification D21 · G38 · H32 · H50 · O38

Introduction

Social enterprises are gaining increasing attention because they address important social, environmental, and economic issues while creating sustainable solutions. Social enterprises offer a new model for businesses that prioritizes creating social and environmental value alongside financial returns. In this article, we use a broad definition of social enterprises, considering all hybrid entities where a strong social mission is combined with profit-seeking (Goyal et al. 2015; Mair and Marti 2006). According to the literature, the distinctive characteristics of social enterprises are an explicit aim of benefiting society in a financially sustainable way, a high degree of entrepreneurial autonomy, a high level of economic risk and uncertainty, a combination of private/public resources and paid/non-paid work, and the participation of several stakeholders (Cornelissen et al. 2021; Cornelius et al. 2008; Defourny and Nyssens 2006; Ghatak 2021). In many cases, social enterprises focus on local and specific issues in an innovative way and their success depends heavily on the social entrepreneurs' commitment, expertise, and charisma; hence their activities are typically difficult to scale up.

Social enterprises produce private and public benefits, use market and non-market resources, and engage a wide range of stakeholders with different incentives. The high complexity of this business model makes the management and the financing of social enterprises more difficult (Ghatak 2021; Goyal et al. 2015; Mair and Marti 2006). The aim of this research is to understand the financing constraints of social enterprises under asymmetric information if state subsidy is available because of the positive external effects of the projects.

First, we develop a theoretical model that reflects the most relevant characteristics of social enterprises. We include four players: a social entrepreneur (farmer, manufacturer, inventor, civil organization, etc.), an advisor (mentor, civil servant, volunteer, rural integrator, consulting firm, etc.), a passive investor (angel investor, bank, private equity investor, etc.), and the state (municipality, government, EU, or other international organization, etc.). Players are assumed to be rational, maximizing their utility under a budget constraint. The social entrepreneur has a specific, non-scalable project to be realized. The project has positive external effects on the society, but also a non-negative net present value in financial terms. The social

entrepreneur concentrates on the realization of both the social effects and the net present value. The advisor can help the social entrepreneur to improve the financial sustainability of the project. The complication is that the actions of the entrepreneur and the advisor are not fully observable; therefore, private investors face double moral hazard, which makes financing difficult. However, the project has positive externalities; therefore, the social entrepreneur can receive state subsidies, which can foster both private financing and advisory. With the help of the theoretical model, we identify five key factors, so-called deep parameters, whose relative magnitudes determine whether the outcome is active financing, passive financing, or no financing at all. These key factors are the entrepreneurial net present value, the entrepreneurial agency cost, the advisory net present value, the advisory agency cost, and the externalities of the project.

Second, we test model predictions by analyzing the data of a specific, EU-subsidized training and mentoring program (Erste Seeds) aimed at preparing social entrepreneurs for raising private financing. A total of 203 social entrepreneurs applied for the program, from which 68 applicants were selected to potentially receive active funding (advisory and financing) at the end of the process. Relying on content analysis techniques, we define several proxy variables corresponding to each investigated deep parameter and analyze the characteristics of the selected social entrepreneurs relative to the non-selected ones. The empirical results are consistent with the predictions of the theoretical model, which suggests that the model captures important aspects of reality.

Our research fills both a theoretical and an empirical literature gap. Up to our knowledge, we are the first to formalize the effects of state subsidy on social enterprises in a double moral hazard model, where state subsidy is endogenous. Furthermore, empirical evidence on social enterprises is mostly phenomenon-driven, relying on anecdotes and unique case-based experiences (Goyal et al. 2015). However, we have access to a comprehensive database comprising the applications of a relatively large number of social entrepreneurs, along with evaluations from anonymous reviewers and selection decisions. Our research findings contribute to a better understanding of the functioning of social enterprises, to the design of support schemes that are optimal for society, and to provide guidance for the development of optimal subsidy programs and selection criteria.

The article is structured as follows. In the next section, we summarize the literature related to moral hazard and state subsidy. In "The Model" section, we introduce the theoretical model. In "Empirical Analysis" section, we present and discuss the empirical results. Finally, in "Conclusions" section, we derive conclusions.

Literature Review

Social entrepreneurship, a complex and multifaceted practice, can be defined in various ways. Some authors highlight the non-profit nature of the operation as a key distinctive feature, whereas most researchers agree that legal form and other technical details are less relevant if we want to differentiate between social enterprises and traditional businesses. Defourny and Nyssens (2006) formulated criteria like

explicit aim to benefit the society, civil initiative, participatory structure, continuous business activity, high level of autonomy and risk, and low amount of paid work. Mair and Marti (2006) defined social entrepreneurship as a process involving the innovative use and combination of resources to pursue opportunities to catalyze social change and/or address social needs. Di Domenico et al. (2010) emphasized the lack of resources and the role of innovation and compared social entrepreneurship to bricolage. Both are characterized by making do, a refusal to be constrained by limitations, and improvisation. Frugal innovation is also an emerging paradigm closely related to social entrepreneurship and the lack of resources. Frugal innovators attempt to (re)design products and services, especially for low- to middle-income consumers, by minimizing material and financial costs, thus requiring lower levels of society's natural and financial resources (Knorringa et al. 2016; Rosca et al. 2018). Although authors may focus on different aspects, the most accepted definition posits that social entrepreneurs have both social and economic missions where the social mission is dominant (Cornelissen et al. 2021; Cornelius et al. 2008; Mair and Marti 2006; Goyal et al. 2015; Stevens et al. 2015; Williams et al. 2023). The economic mission is hence subordinated to the social mission; it is intended to ensure the financial viability. Teasdale et al. (2023) introduced a typology of social enterprises according to the extent the entrepreneur challenges the existing system, whether through decoupling, blending, or shifting the existing frames. When developing our theoretical model, we assume a double mission of the social entrepreneur operating within the given economic conditions combining the existing institutions and mechanisms (frame decoupling).

Social enterprises can serve as effective solutions to problems such as governments' failure to implement appropriate policies, NGOs' inability to create scalable market-based ecosystems, and commercial enterprises' struggles to realize impactful corporate social responsibility initiatives (Goyal et al. 2015). However, social entrepreneurs face their own challenges. In particular, it can be extremely difficult for them to mobilize scarce capital and skilled manpower resources (Di Domenico et al. 2010; Goyal et al. 2015).

Most of these challenges are due to governance problems rooted in the complex structure of social enterprises with dual missions and multiple stakeholders. Missions may be conflicting, and stakeholders' interests can easily clash (Brown et al. 2023; Hota et al. 2023; Leliveld and Knorringa 2018; Williams et al. 2023). Hota et al. (2023) listed ethical dilemmas social entrepreneurs must deal with, such as equality versus efficiency, utilitarianism versus fairness, and whether employees should be emotionally detached or engaged in their activities. However, the most challenging issue is how to marry profits with social aims. According to Rosca et al. (2018), a strong social mission can negatively affect the economic productivity of the enterprise, for example, in areas such as staff hiring, resource allocation, and other decisions within the firm. Advocates of social entrepreneurship have a business view of 'win–win', in which companies can earn profits while benefiting society, while critics argue that it will merely exacerbate capitalist exploitation and inequality (Knorringa et al. 2016). Furthermore, the measurement challenges of the social impact make proper performance evaluation almost impossible; hence

accountability is blurred, relieving decision-makers of responsibility (Stevens et al. 2015; Rowhauser et al., 2019).

Governance problems can manifest in conflicts of interest, perverse incentives, difficulties of performance measurement, and lack of accountability. These issues are usually discussed within the framework of contract theory, a field of microeconomics under asymmetric information. In corporate finance, the risk that managers misbehave and prioritize their own interests over those of shareholders is called moral hazard. In particular, managers may engage in activities that benefit themselves at the expense of the company's financial health, such as excessive risk-taking, low efforts, short-termism, empire building, and financial manipulations. Expenses and inefficiencies arising from conflicts of interest between different parties within an organization, the so-called agency costs, erode shareholder value, making financing difficult, and hence undermining the long-term sustainability of the organization (Tirole 2006). To mitigate agency costs, shareholders can implement various mechanisms, such as (i) strong governance structures, including independent board oversight, transparency, and accountability mechanisms; (ii) executive compensation packages that are tied to long-term performance metrics and shareholder value creation, incentivizing managers to act in the best interests of shareholders; and (iii) the regular monitoring and auditing of management actions and financial performance can help detect and deter opportunistic behavior (Csóka et al. 2015; Tirole 2006).

In the case of social enterprises, moral hazard issues are compounded by their dual missions, involvement of multiple stakeholders, and difficulties in measuring social performance. Consequently, agency costs are elevated, contributing to the scarcity of capital and other resources. Drawing on the concepts and methods of contract theory, in this paper, we expand upon the traditional findings of economic theory concerning moral hazard in corporate finance to encompass social enterprises, an area that is relatively unexplored from this perspective.

To ensure the success of the project, social entrepreneurs might need to engage advisors. In this case, moral hazard becomes double-sided, making fundraising even more difficult. Several authors examined the optimal contract under double moral hazard in the context of venture capital financing (Berglof 1994; Tennert et al. 2018). Casamatta (2003) and Renucci (2014) demonstrated that active financing (financing plus advisory) can be better than passive financing (without advisory). Repullo and Suarez (2004) and Shin and Yun (2014) concluded that stage financing (a method involving funding an early-stage company in multiple rounds or stages) is better than providing the entire investment upfront. In the empirical part of our research, we investigate a support program for social entrepreneurs characterized by active and stage financing.

In line with the strong social mission of social enterprises, a new player enters the picture, the state (or other sponsor) who is also interested in the realization of positive external effects of the firm's activity, and on this ground, can provide non-refundable subsidy. Relatively few theoretical articles dealt with the effects of state subsidy under moral hazard. Keuschnigg (2010) analyzed the macro-level effects of different state subsidy schemes on the number of profitable firms. Arping et al. (2010) and Berlinger et al. (2017) showed that optimal state subsidy can reduce moral hazard, hence may help to remove financing constraints. Despite the large

differences in model settings, most theoretical papers concluded that state subsidy ruins incentives, but helps to realize positive externalities, and the resulting welfare effect depends on which effect is stronger. Empirical results on the effects of different state subsidy forms are mixed; the overall effect of subsidies was found positive (Bonfim et al. 2023; Brander et al. 2015; Cull et al. 2017; Mouqué, 2012), neutral (Grilli and Murtinu 2014), or even negative (Andor and Voss 2016; Borisova et al. 2015; Saito and Tsuruta 2018; Zhang et al. 2022; Zhu and Liao 2019). Also, Kotowitz (2008, p. 6) is undecisive in this regard: 'The existence of such inefficiencies signals a possible role for government. However, government intervention may well cause more problems than it solves… It is therefore unclear whether government supply of these services enhances welfare.'

In this paper, we apply the tools of contract theory to analyze the complex governance structure of social enterprises to understand the effects of double moral hazard and state subsidy on the firms' success to involve outside financing and advisory. Our model is inspired by Tirole (2006, p. 364); however, there are important differences. First, we make a clear distinction between the investor and advisor: the investor does not give advice and the advisor does not invest money in line with the international practice of social entrepreneurship where these roles are typically separated. Second, in our model, the advisor does not get a fixed fee upfront (as in Tirole 2006, p. 364). Instead, they operate on a success fee basis, which offers stronger monetary incentives for the advisor to exert effort toward the project's success. Note that this success fee can even be zero if the advisor volunteers their services solely for the betterment of social welfare. Third, most importantly, we introduce positive externalities of the project and the state who subsidizes the project to realize the externalities.

The Model

Assumptions

We have therefore four distinct players in the model: an *entrepreneur*, an *advisor*, a *passive investor*, and the *state*. For the sake of simplicity, the time value of money, the risk-free interest rate is assumed to be zero, and all players are utility maximizers and risk neutral. The entrepreneur has a project that requires an initial investment I. We assume that the investment has a fixed size, and it is not scalable.

The *entrepreneur* has an initial capital (investment asset) A that is less than the capital needed for the investment I. She must acquire the missing capital $(I - A)$ from external sources such as private financing F and/or state subsidy S, otherwise the project cannot be realized.

The project consists of two periods ($t=0$ and 1) and has two possible outcomes in terms of private returns: it either succeeds with probability p, or fails with probability $1 - p$. In case of success, the total private return of the project $R>0$ that can be shared between the entrepreneur R_e, the advisor R_a, and the passive investor R_i. The

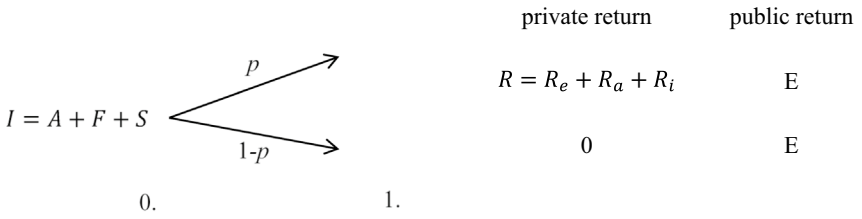


Fig. 1 Cash flows of the project

private return is zero in the case of a failure. Figure 1 summarizes the cash flows of the projects.

In addition to the private returns, the project is assumed to generate positive externalities called social returns (spillover effects) ($E > 0$) if the project is successful. Social returns can be due, for example, to knowledge transfer, increased employment, or increased economic activity and taxes (Berlinger et al. 2017). We suppose that these externalities are directly realized in the state budget in the form of explicit monetary income in $t=1$. This specification of externalities reflects the mutual interdependence of social and economic missions. The social mission cannot be fulfilled without financial sustainability, and vice versa.

Thus, the entrepreneur has a project and an initial capital A to invest. In case of success, she receives a share R_e while in case of failure, she receives nothing. The entrepreneur has limited liability, hence R_e is non-negative. If the entrepreneur behaves (works hard), the probability of success (p_H) is high, otherwise, it is low (p_L), but in the latter case of misbehaving, the entrepreneur realizes a private benefit $B \geq 0$ (shirking, rent-seeking, entrenchment, other opportunistic behaviors). Note that if the entrepreneur behaves, it also increases the expected value of the positive externalities. If the entrepreneur cares about the positive externalities E, this might be reflected in a lower private benefit of misbehaving B.

The *advisor* does not invest money into the project, she just works for its success, and in case of success, she receives a share R_a, while in case of failure, she receives nothing. The advisor has limited liability, too, hence R_a is non-negative. If she behaves, she adds $q > 0$ to the probability of success; otherwise, she adds nothing but realizes a private benefit $C \geq 0$ (shirking, rent-seeking, entrenchment, and other opportunistic behaviors). The more the advisor takes the social benefits of the project into account, the more her private benefit C resulting from misbehaving is reduced. In a specific case, it is possible that C is so low that no success fee is needed to motivate the advisor, that is, $R_a = 0$. Thus, this general model is able to incorporate voluntary work as well.

In case of passive financing, the probability of success p depends only on the behavior of the entrepreneur, and we take the usual assumption that the net present value of the project is positive if and only if the entrepreneur behaves

$$\mathrm{NPV}^{\mathrm{behave}} = \mathrm{p_H}R - I > 0,$$

Table 1 Assumptions on the present value of the project under active financing

Behaviors	Probability of success	Assumptions on the NPV of the project
Both the entrepreneur and the advisor behave	$p = p_H + q$	$(p_H + q)R - I > 0$
Only the entrepreneur behaves	$p = p_H$	$p_H R - I + C > 0$
Only the advisor behaves	$p = p_L + q$	$(p_L + q)R - I + B < 0$
Nobody behaves	$p = p_L$	$p_L R - I + B + C < 0$

Remark $p_H, p_L, q > 0$, $p_H > p_L$, and $p_H + q < 1$

$$\mathrm{NPV}^{\mathrm{misbehave}} = p_L R - I < 0.$$

In case of active financing, the probability of success depends on the behavior of both the entrepreneur and the advisor, see Table 1.

Both active and passive financing can be optimal, but in any case, it is key to ensure the behavior of the entrepreneur.

We assume that the involvement of an advisor always increases the net present value:

$$qR > C. \tag{1}$$

The *passive investor* provides financing F for the project, and in exchange, in the case of a success, she receives a share R_i while in the case of a failure, she receives nothing. The passive investor has unlimited liability in relation to the given project, hence R_i can be of any sign. The passive investor does not care about the positive externalities; therefore, under private financing, social entrepreneurs get less funding than it is socially optimal.

The *state* cares about externalities which impact the state budget in form of cash revenue in $t=1$ but only if the project is successful. Therefore, the state is willing to contribute to the investment with an initial, non-refundable subsidy S in $t=0$. We assume that the state is also risk neutral, hence according to the budget constraint of the state, subsidies cannot exceed the expected value of externalities $\exp(E)$.

$$S \leq \exp(E). \tag{2}$$

Note that there is no moral hazard related to the state because it gives financial support without participating in the realization of the project. We assume that the state intervenes in an optimal way, maximizing the aggregate social utility U of the project which is defined as a weighted average of the net present value and the net social benefits, this latter is calculated as the difference between the expected value of externalities E and the state subsidy S:

$$U = \alpha \cdot \text{private profits} + (1-\alpha) \cdot \text{net social benefits} = \alpha \cdot \mathrm{NPV} + (1-\alpha) \cdot (\exp(E) - S), \tag{3}$$

where $0 \leq \alpha \leq 1$ is the relative weight of private profits to social benefits in the state's decision function. Economic recovery, economic growth, hence private profits can constitute an important element of the state's objectives, as well as the creation of budget surplus that can be used for other public policies (welfare systems,

green transition, etc.) to increase social welfare. It depends on the government policy represented by α what relative weights are assigned to these aspects.

Optimization of Private Players

First, the mechanism must ensure the behavior of the entrepreneur, otherwise, the project is not worth to realize (see Table 1). The incentive constraint $\mathrm{IC_e}$ of the entrepreneur is

$$\left(p_{\mathrm{H}}+q\right)R_{\mathrm{e}} \geq \left(p_{\mathrm{L}}+q\right)R_{\mathrm{e}}+B \tag{4}$$

which can be rearranged to

$$\mathrm{IC_e}: R_{\mathrm{e}} \geq \frac{B}{\Delta p}, \tag{5}$$

where $\Delta p = p_{\mathrm{H}} - p_{\mathrm{L}} > 0$.

Similarly, the advisor has interest to behave if the expected value of the success fee $\left(p_{\mathrm{H}}+q\right)R_{\mathrm{a}}$ is higher in this case than under misbehaving $p_{\mathrm{H}}R_{\mathrm{a}}+C$. Therefore, the incentive constraint $\mathrm{IC_a}$ of the advisor is

$$\left(p_{\mathrm{H}}+q\right)R_{\mathrm{a}} \geq p_{\mathrm{H}}R_{\mathrm{a}}+C \tag{6}$$

which is equivalent to

$$\mathrm{IC_a}: R_{\mathrm{a}} \geq \frac{C}{q}. \tag{7}$$

In principle, the expected rate of return of the passive investor is the sum of the risk-free rate, the risk premium, and an extra profit if the financial market is not competitive. In the model, all these components are zero because, for the sake of simplicity, we assume that the risk-free rate is zero, the investor is risk neutral, and financial markets are perfectly competitive. Therefore, the participation constraint $\mathrm{PC_i}$ of the passive investor is

$$\mathrm{PC_i}: R_{\mathrm{i}} \geq \frac{F}{p_{\mathrm{H}}+q}. \tag{8}$$

Assuming perfect competition among both the advisors and passive investors, (7) and (8) hold with equality. Given that $R = R_{\mathrm{e}} + R_{\mathrm{a}} + R_{\mathrm{i}}$, (5), (7), and (8) imply the necessary and sufficient condition of active financing (passive financing plus advisory):

$$A \geq \widehat{A} = I - \left(p_{\mathrm{H}}+q\right)\left(R - \left(\frac{B}{\Delta p}+\frac{C}{q}\right)\right) - \mathrm{S}, \tag{9}$$

where $\hat{A}$ is the minimum initial capital of the entrepreneur needed for active financing. Rearranging (9), we get that active financing is possible if and only if the initial

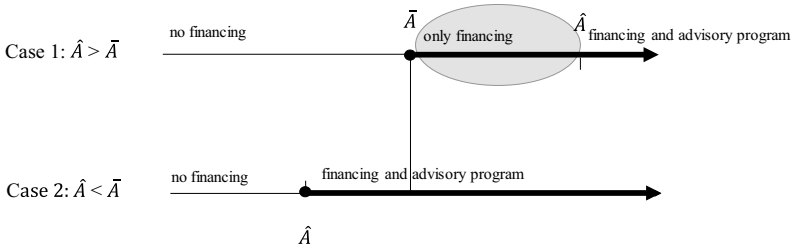


Fig. 2 Initial capital needed for active $\left(\hat{A}\right)$ and passive $\left(\bar{A}\right)$ financing under double moral hazard

capital of the entrepreneur (A) is large enough to finance the total agency cost (AC) minus the total net present value (NPV) and the state subsidy (S):

$$\begin{aligned} A \geq \hat{A} &= \left(\left(p_{\mathrm{H}} + q\right) \frac{B}{\Delta p} + p_{\mathrm{H}} \frac{C}{q} \right) - \left(\left(p_{\mathrm{H}} R - I\right) + \left(qR - C\right) \right) - S \\ &= (\mathrm{EAC} + \mathrm{AAC}) - (\mathrm{ENPV} + \mathrm{ANPV}) - S = \mathrm{AC} - \mathrm{NPV} - S. \end{aligned} \tag{10}$$

Note that the total agency cost (AC) is composed of two elements: the entrepreneurial agency cost (EAC) and the advisory agency cost (AAC). Similarly, the total net present value (NPV) is composed of two elements: the entrepreneurial net present value (ENPV) and the advisory net present value (ANPV).

Let $\bar{A}$ denote the minimum initial capital needed for passive financing. Excluding the advisor from (10), we get

$$A \geq \bar{A} = p_{\mathrm{H}} \frac{B}{\Delta p} - \left(p_{\mathrm{H}} R - I\right) - \mathrm{S}. \tag{11}$$

Depending on the parameters, the difference between $\hat{A}$ and $\bar{A}$ can be of any sign:

$$\hat{A} - \bar{A} = \left(q \frac{B}{\Delta p} + \mathrm{AAC} \right) - \mathrm{ANPV}. \tag{12}$$

Under the model assumptions, if we move from passive financing to active financing, that is we also involve an advisor, the net present value always increases ($\mathrm{ANPV} > 0$), but at the same time, the agency cost also increases $\left(\left(q \frac{B}{\Delta p} + \mathrm{AAC} \right) > 0 \right)$. Therefore, the net effect on the minimal initial asset of the entrepreneur ($\hat{A} - \bar{A}$) can be both positive and negative. Because of moral hazard, the participation of an advisor does not necessarily help financing, even if it would create value at the project level. The outcome depends on the relation between $\hat{A}$ and $\bar{A}$. The two possible situations are illustrated in Fig. 2.

It may happen (Case 1, gray zone) that the entrepreneur can get passive financing, but due to her low amount of initial capital, she cannot afford to hire an

advisor even if it increased the net present value. This can be viewed as a deadweight loss due to moral hazard.

Optimization of the State

When determining the optimal size of the subsidy, the state considers the following thresholds.

- 0 is a *lower bound* to exclude a negative subsidy (taxation).
- $S^{\max}$ is an *upper bound* following from the state budget constraint.
- $\overline{S}$ is the *passive threshold* where the entrepreneur can just get private financing from the passive investor, which is also the boundary between the good and bad behavior of the entrepreneur.
- $\widehat{S}$ is the *active threshold* where the entrepreneur can just afford an advisor.

The optimal size of the state subsidy depends on the relative position of these four thresholds:

$$S^{\text{opt}} = f\left(0, S^{\max}, \widehat{S}, \bar{S}\right). \tag{13}$$

In particular, S^{opt} equals one of these four thresholds, the one which maximizes the aggregate social utility U defined in (3).

According to (2), the upper bound of the state subsidy is

$$S^{\max} = \exp(E). \tag{14}$$

We can derive the minimum state subsidy needed for active financing $\widehat{S}$ from (10) below which active financing is not possible.

$$\widehat{S} = (\text{EAC} + \text{AAC}) - (\text{ENPV} + \text{ANPV}) - A = \text{AC} - \text{NPV} - A. \tag{15}$$

The amount of state subsidy just needed to get passive financing $\overline{S}$ is expressed from (11). Below this threshold, the project is not feasible as there is no passive financing available due to the lack of motivation for the entrepreneur to behave.

$$\overline{S} = p_{\text{H}} \frac{B}{\Delta p} - \left(p_{\text{H}} R - I\right) - A. \tag{16}$$

It follows from (10), (11), (15), and (16) that

$$\widehat{S} - \overline{S} = \widehat{A} - \bar{A}. \tag{17}$$

Subsidy thresholds for active $\left(\widehat{S}\right)$ and passive $\left(\overline{S}\right)$ financing can be in different positions relative to each other, which determines the optimal size of the state subsidy, see Fig. 3.

In Case 1, the state can afford to subsidize both passive and active financing. When increasing state subsidy from $\overline{S}$ to $\widehat{S}$ (involving an advisor), the net present

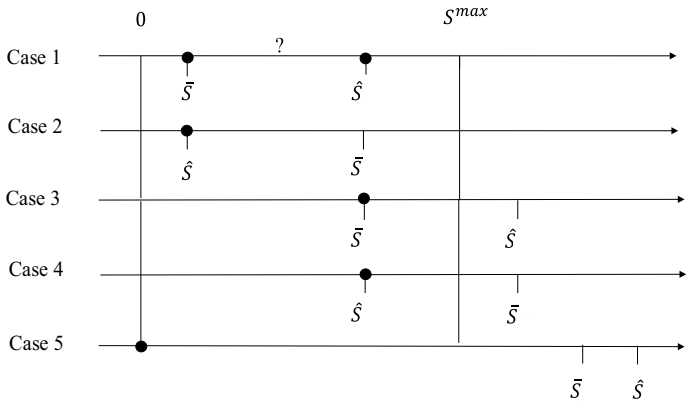


Fig. 3 The optimal size of the state subsidy

value of the project increases but the cost of the state also increases $\left(\widehat{S}-\overline{S}\right)$. The change in aggregate social utility (3) is

$$\Delta U = \alpha qR - (1-\alpha)\left(\widehat{S}-\overline{S}\right). \tag{18}$$

The optimal state subsidy depends on the sign of ΔU which is the function of α representing the state's policy.

$$S^{\text{opt}}(\alpha) = \left\{ \begin{array}{ll} \widehat{S} & if\,\Delta U \geq 0 \\ \overline{S} & if\,\Delta U < 0 \end{array} \right\}. \tag{19}$$

If $\alpha = 1$, that is the state prioritizes private profits excessively over other objectives, it will choose a state subsidy level $\widehat{S}$ which allows for involving an advisor. If contrary to this, $\alpha = 0$, the state will choose $\overline{S}$ which allows only for passive financing.

In Case 2, when $\widehat{S}$ (state subsidy needed for active financing) is lower than $\overline{S}$ (state subsidy needed for passive financing), the state will choose $\widehat{S}$. In Cases 3 and 4, the optimal state subsidy is always the lower one as the higher subsidy would excess the budget constraint. In Case 5, both $\overline{S}$ and $\widehat{S}$ are larger than the upper bound $S^{\max}$; therefore, neither of these is affordable. As projects are not scalable, there is no point in giving less than the critical amount needed for (active or passive) financing, so the optimal state subsidy is zero.

Table 2 summarizes the deep parameters that determine the optimal level of state subsidy if the outside financing need of the project $I - A$ is given.

Clearly, passive financing is a necessary condition for active financing: if there is no passive financing, there is no project, thus there is no need for advisory. As (10) suggests, the entrepreneurial net present value (ENPV) boosts both passive and active financing. At the same time, a high level of entrepreneurial agency cost (EAC) obstructs both passive and active financing, see (10) and (11). The advisory net

Table 2 Summary of the effects of deep parameters

Deep parameter	Formula	Effect on passive financing	Effect on active financing
Entrepreneurial NPV	$p_{\mathrm{H}}R - I$	+	+
Entrepreneurial agency cost	$\left(p_{\mathrm{H}} + q\right)\frac{B}{\Delta p}$	−	−
Advisory NPV	$qR - C$	Not applicable	+
Advisory agency cost	$p_{\mathrm{H}}\frac{C}{q}$	Not applicable	−
Externalities	E	+	+

present value (ANPV) and the advisory agency costs (AAC) have positive and negative effects on active financing, respectively. In line with (12), the ANPV improves active financing, while the AAC worsens it. Positive externalities (E) have a positive effect on both passive and active financing through mobilizing the state subsidy (14).

Empirical Analysis

In 2017, social entrepreneurs could apply for a training and mentoring program operated by the Erste Banks supported by EU funds (Erste Seeds), for more details, see Tóth (2021). The program aimed at developing the entrepreneurial skills of the participants with a strong focus on fundraising, project management, and financial efficiency. From 203 applicants, 68 social entrepreneurs were selected, see the selection process in "Appendix 1". Overall, 91 volunteers helped the implementation of the program. The application files, the (sub)scores given by the two anonymous referees, and the selection decisions served as an information basis for our empirical analysis.

Data and Methodology

The bank selected 68 social entrepreneurs suitable for active financing in the given sample, while the remaining 135 applicants could only hope for passive financing at best, see "Appendix 1". Our theoretical model suggests that five deep parameters are fundamental in getting active financing: the entrepreneurial NPV, the entrepreneurial agency cost, the advisory NPV, the advisory agency cost, and the externalities of the project. Therefore, we can hypothesize that these deep parameters, as latent variables, played a key role in the selection process as well. Relying on content analysis techniques, we define the following proxy variables to represent the key latent variables, see Table 3.

To calculate the proxy variables for the entrepreneurial NPV, we developed a specific coding method. If the term 'business plan' was not mentioned in the assessment of the application or it was mentioned in a negative context (e.g., 'poor'), then the

Table 3 Latent variables, proxy variables, and the corresponding hypotheses

Latent variable	Proxy variable	Type of the variable	Hypothesized effect
Entrepreneurial NPV	Business plan	Category	+
Entrepreneurial NPV	Viability	Category	+
Entrepreneurial agency cost	Number of business lines	Discrete	−
Entrepreneurial agency cost	Life cycle	Category	+
Advisory NPV	General profile	Discrete	+
Advisory agency cost	Not applicable	Not applicable	Not applicable
Externality	Social impact	Discrete	+
Externality	Geographical scope	Binary	+

project received 'low.' If it was mentioned in a neutral context, it received 'medium'; and if it was mentioned explicitly in a positive context (e.g., 'highly detailed'), it received 'high.' A similar coding was applied to viability. Depending on the availability of human capital, equipment, funding resources necessary for the running of the business and the market demand for the product or service, the assessment of the viability could be 'low,' 'medium,' or 'high.'

The entrepreneurial agency cost can be higher if the social enterprise has several business lines as it makes the operation more complex and less transparent, monitoring systems are less effective, different activities can be in conflict with each other leading to unwanted cross-financing, hence there is more room for misbehaviors (Tirole 2006). We defined nine potential business lines: employment; disability and social inclusion; services; education; environment and health; local products and tourism; community building; digitalization; and fundraising for charity. Then, we counted the number of activities the given social entrepreneur plans to be active in. In the sample, the maximal number of business lines of a social enterprise was 6 out of 9. The other proxy for the entrepreneurial agency cost is the life cycle of the enterprise. More mature projects are assumed to be more transparent due to the more developed monitoring systems. Accordingly, we distinguished projects that only existed as 'ideas' from those which already had a 'prototype' or a marketed 'product.'

In the framework of the Erste Seeds Program, the 'advisor' was a team of 91 volunteers organized by the Erste Bank. These volunteers were bankers or freshly graduated university students specialized in economics, management, or finance having no specific domain knowledge in disability, education, healthcare, local products, community building, and charity. We can assume that during the evaluation process those projects were preferred where the general training and mentoring program provided by the volunteers were expected to create more value (ANPV), that is, where less specific domain knowledge was required. Therefore, we counted how many of the most general business lines (employment, service, and digitalization) were involved in the project; this variable is called 'general profile.'

Note that in the investigated program, the advisory team was the same in each case; therefore, we can assume that the advisory agency cost was the same for all

Table 4 Comparison of the selected and non-selected social entrepreneurs

Latent variable	Proxy variable	Mean of the selected	Mean of the non-selected	Significance[a]
Entrepreneurial NPV	Business plan 'medium'	0.34	0.28	0.384
Entrepreneurial NPV	Business plan 'high'	0.39	0.14	0.000***
Entrepreneurial NPV	Viability 'medium'	0.75	0.65	0.188
Entrepreneurial NPV	Viability 'high'	0.18	0.07	0.025**
Entrepreneurial agency cost	Number of business lines	0.40	0.39	0.826
Entrepreneurial agency cost	Prototype	0.22	0.15	0.225
Entrepreneurial agency cost	Product	0.36	0.15	0.001***
Advisory NPV	General profile	0.35	0.27	0.010**
Externality	Social impact	0.47	0.34	0.000***
Externality	Geographical scope	0.87	0.72	0.021**
Business line	Employment	0.61	0.42	0.011**
Business line	Disability and social inclusion	0.28	0.15	0.032**
Business line	Services	0.33	0.26	0.305
Business line	Education	0.67	0.69	0.846
Business line	Environment and health	0.16	0.28	0.070*
Business line	Local products and tourism	0.54	0.52	0.864
Business line	Community building	0.30	0.40	0.186
Business line	Digitalization	0.10	0.13	0.621
Business line	Fundraising for charity	0.06	0.08	0.599

[a]Mann–Whitney test, p value, *$p<0.1$; **$p<0.05$; ***$p<0.01$

applicants. Consequently, the advisory agency cost (AAC) cannot be examined in the empirical model.

One of the most important latent variables is the externality of the project. Positive externalities justify the EU funding supporting the whole program. Therefore, we can hypothesize that positive externalities play a fundamental role in the selection process as well. We measure positive externalities by the social impact and the geographical scope of the planned activities. To calculate the social impact variable, we relied on content analysis techniques again. We defined seven categories of potential benefits such as economic growth, equality, community, institutions, social security, culture, and environment, and 26 subcategories, then we counted the total number of subcategories where the project was expected to have a positive effect. We note that this measurement technique for assessing social impact falls within the category of outcome-oriented and multi-sectoral approaches, as classified by Rawhouse et al. (2019). Widely regarded as a best-practice method, it is recognized for its consistency and generalizability. The geographical scope is a dummy variable taking '1' if the social entrepreneur's activities extend beyond a smaller town (to a large town, or a county, or even abroad).

Discrete variables (number of business lines, general profile, and social impact) were standardized taking values between 0 (sample minimum) and 1 (sample maximum). Out of the 203 applications, 12 were excluded completely due to some missing data. Table 4 compares the selected and the non-selected projects in each dimension.

The univariate comparison of the selected and non-selected social entrepreneurs (Table 4) shows that there are one or more proxy variables in each category where the differences are significant. Moreover, the signs of the differences are in line with the expectations (Table 3).

"Appendices 2 and 3" present the most important statistics of the proxy variables as well as the correlations between them. We performed a variance inflation factor (VIF) analysis to investigate multi-collinearity. As the highest VIF-value (1.76 belonging to the variable of viability 'high') is well below 2.5, multi-collinearity does not seem to be a serious issue in our sample. We can conclude that the above-defined variables seem to capture different aspects of social entrepreneurs' applications.

Multivariate Models

In the first specification, we estimate the following multivariate linear probability model:

$$P_i = \alpha + \sum_j \beta_j \,\mathrm{ENPV}_{i,j} + \sum_k \gamma_k \mathrm{EAC}_{i,k} + \delta \mathrm{ANPV}_i + \sum_m \theta_m E_{i,m}, \tag{20}$$

where the dependent variable P_i is the probability that the ith social entrepreneur gets selected conditional on the right-hand side variables. $\mathrm{ENPV}_{i,j}$ is the jth proxy variable for the entrepreneurial net present value. Similar to this, EAC_k, ANPV, and E_m stand for the proxy variables corresponding to the entrepreneurial agency cost, the advisory NPV, and the externality of the project, respectively. Table 5 presents regression results as we gradually add more and more explanatory variables to the model.

As Table 5 shows, for each latent variable, one or more proxy variables are significant both statistically and economically, the sign of the coefficients is consistent with the hypothesized effects (in Table 3), and most results are robust across different specifications. A high-quality business plan is associated with 23–33% higher likelihood of getting selected for the program. However, having six different business lines (sample maximum) instead of one single can decrease the chances even by 56%. The life cycle of the social enterprise also seems to matter; if the project is already in the production phase, it can increase the chances by 22%. A more general profile of the activities can also have a large positive effect (50%) on being selected. Externalities proved to be key variables, as well, a higher social impact and a broader geographical scope can make a difference of 61% and 16%, respectively.

Table 5 Probability of getting selected, results of multivariate linear probability models

Latent variable	Proxy variable	β	p-value	β	p-value	β	p-value	β	p-value
Entrepreneurial NPV	Business plan 'medium'	0.14	0.073*	0.09	0.283	0.11	0.194	0.06	0.455
Entrepreneurial NPV	Business plan 'high'	0.33	0.000***	0.30	0.002***	0.29	0.002***	0.23	0.009***
Entrepreneurial NPV	Viability 'medium'	0.15	0.102	0.11	0.202	0.12	0.181	0.09	0.264
Entrepreneurial NPV	Viability 'high'	0.25	0.069*	0.17	0.216	0.17	0.197	0.17	0.175
Entrepreneurial agency cost	Number of business lines			−0.01	0.936	−0.21	0.187	−0.56	0.002***
Entrepreneurial agency cost	Prototype			0.15	0.104	0.17	0.054*	0.15	0.090*
Entrepreneurial agency cost	Product			0.21	0.018**	0.22	0.012**	0.22	0.009***
Advisory NPV	General profile					0.52	0.002***	0.50	0.003**
Externality	Social impact							0.61	0.000***
Externality	Geographical scope							0.16	0.031**

The significance levels are the same across the whole paper: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 6 Probability of getting selected, results of multivariate linear probability models with aggregated indices and business lines

Explanatory variables	β	p-value	β	p-value	β	p-value
Entrepreneurial NPV index	0.25	0.0061***			0.29	0.0021***
Entrepreneurial agency cost index	−0.44	0.0007***			−0.35	0.0133**
Advisory NPV index	0.47	0.0025***				
Externality index	0.37	0.0005***			0.42	0.0004***
Employment			0.15	0.1361	0.11	0.1361
Disability and social inclusion			0.15	0.1576	0.12	0.1576
Services			0.08	0.2780	0.08	0.2780
Education			−0.01	0.0928*	−0.13	0.0928*
Environment and health			−0.13	0.1396	−0.11	0.1396
Local products and tourism			−0.02	0.4867	−0.05	0.4867
Community building			−0.12	0.0561*	−0.13	0.0561*
Digitalization			0.00	0.6354	0.05	0.6354
Fundraising for charity			−0.06	0.4572	−0.09	0.4572

To assess the potential effects of the latent variables, we constructed an aggregate index for each. For the aggregate index of the entrepreneurial net present value (ENPV), we created a dummy variable for both the business plan and viability (1 if the assessment is 'medium' or 'high', otherwise 0), then we took the equally weighted average of the two. For the aggregate index of the entrepreneurial agency cost (EAC), we created a life cycle dummy variable (1 if at least a prototype exists, otherwise 0), then it was divided by the number of the business lines, and this ratio was subtracted form 1. The index of the advisory net present value (ANPV) is simply the general profile. The aggregate externality index (E) was calculated as an equally weighted average of social impact and geographical scope. In this way, we got standardized aggregate measures for all the investigated latent variables.

In the second specification, we introduce the aggregate indices in the regression models instead of their separate components:

$$P_i = \alpha + \beta\,\mathrm{ENPV}_i + \gamma \mathrm{EAC}_i + \delta \mathrm{ANPV}_i + \theta E_i. \tag{21}$$

In the third specification, to check the robustness of our findings, we replace the variable of advisory net present value ANPV (general profile) with separate business lines $\mathrm{BL}_{i,n}$:

$$P_i = \alpha + \beta\,\mathrm{ENPV}_i + \gamma \mathrm{EAC}_i + \theta E_i + \sum_n \mu_n \mathrm{BL}_{i,n}. \tag{22}$$

Table 6 shows the results of the linear probability models of (21) and (22).

Table 6 strengthens that the aggregate indices contain relevant information, while the separate business lines not. We also run models with several types of interactions between the aggregate indices, but these interaction variables

were not significant in any setting. Similarly, regression tree analysis could not detect any significant non-linearities. Therefore, all the four investigated latent variables proved to be fundamental in the selection decision; however, these are not K.O. criteria. If social entrepreneurs were relatively weak in one dimension, they could still get active financing if they outperformed in other dimensions.

The most accepted definition of social entrepreneurship suggests that the social mission must dominate over the economic mission. In light of this, it may seem counter-intuitive for the first sight that in a social entrepreneurship program, financial sustainability (positive net present value) is at least as important as social impact (positive externality). However, to allow the social enterprise to lose capital would not only jeopardize private funding, but also the long-term viability of the project even if funded fully from a state subsidy. As such, the two missions are inherently complementary and cannot be separated.

Our research has several limitations. As it is usual in the literature of moral hazard, when developing a theoretical model, we assume that model parameters are measurable and known without any uncertainty, while net present values, and especially agency costs and external effects are difficult to estimate in the practice. The inclusion of explicit risk aversion of some of the players could also complicate the model and change both the private and public optimums. These simplifications enable us to concentrate on the main source of uncertainty: whether the project succeeds or not. In the empirical analysis, the estimated coefficients might be biased due to endogeneity related to measurement errors (if proxy variables are not representing well the latent variables) or unobserved confounders (for example, omitted variables of common cause). Our research relying on cross-sectional data cannot prove causality between project characteristics and selection. However, the consistency of theoretical model and the empirical analysis strengthens both.

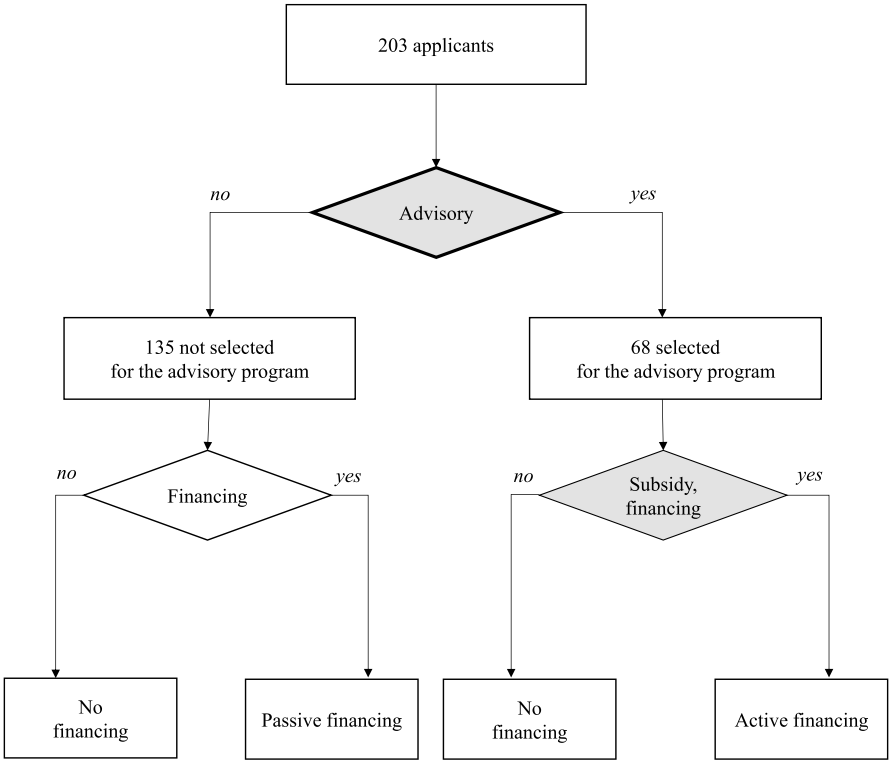
Conclusions

In the theoretical model, the optimal state subsidy improves the incentives and hence make private financing easier. The state acts as a catalyzer, helping to realize projects which could not have been financed by the market otherwise. Depending on deep parameters such as the initial capital of the entrepreneur, the profitability, the agency costs, and the external effects of the project, the state is ready or not to support the project with or without an advisor. Therefore, our model explains why passive and active financial structures coexist in the arena of state-subsidized social enterprises.

In practice, it is difficult to look into the selection processes of private and public financiers and to assess the success factors for social entrepreneurs to get a state subsidy and (active or passive) financing. Having access to a unique database of an EU-subsidized social entrepreneurship program, however, we could test the model predictions on real data. With content analysis techniques, we constructed separate proxy variables and aggregate indices for each important deep parameter.

Our research provides guidance on the design of the optimal state subsidy schemes to help social enterprises and also of the appropriate mechanism to select the best applicants.

Appendix 1: Selection Process



Remarks the figure illustrates that at the end of the process, there can be three outcomes: no financing, passive financing, or active financing. Active financing was exclusively available through the Erste program. To qualify for active financing, a social enterprise must first have been selected for the 'Advisory' stage. Subsequently, the most successful entrepreneurs out of the 68 selected candidates could receive not only state subsidies but also financing from the bank in the form of stage financing.

In our analysis, we focused solely on the first step of the selection process as the entry point for active financing and state subsidies. It is worth noting that entrepreneurs who had not been selected for the advisory program (totaling 135) could still have access to classic bank loans from other banks, thus passive financing could have been available to them as well.

Appendix 2: Descriptive Statistics

Latent variables	Proxy variables	Number of observations	Mean	Median	Mode	Standard deviation
Entrepreneurial NPV	Business plan 'medium'	191	0.30	0.00	0.00	0.46
Entrepreneurial NPV	Business plan 'high'	191	0.23	0.00	0.00	0.42
Entrepreneurial NPV	Viability 'medium'	191	0.69	1.00	1.00	0.47
Entrepreneurial NPV	Viability 'high'	191	0.11	0.00	0.00	0.31
Entrepreneurial agency cost	Number of business lines	191	0.39	0.40	0.40	0.23
Entrepreneurial agency cost	Prototype	191	0,18	0.00	0.00	0.38
Entrepreneurial agency cost	Product	191	0.23	0.00	0.00	0.42
Advisory NPV	General profile	191	0.45	0.50	0.50	0.31
Externalities	Social impact	191	0.39	0.38	0.15	0.24
Externalities	Geographical scope	191	0.77	1.00	1.00	0.42

Appendix 3: Correlations

		1	2	3	4	5	6	7	8	9	10
1	Business plan 'medium'	1.00									
2	Business plan 'high'	−0.36	1.00								
3	Viability 'medium'	0.08	0.09	1.00							
4	Viability 'high'	0.10	0.21	−0.52	1.00						
5	Number of business lines	0.08	0.13	0.11	0.00	1.00					
6	Prototype	0.14	−0.05	0.08	0.06	−0.12	1.00				
7	Product	0.19	0.16	0.01	0.21	0.01	−0.25	1.00			
8	General profile	−0.07	0.09	0.03	−0.02	0.41	−0.14	−0.03	1.00		
9	Social impact	0.10	0.16	0.14	−0.02	0.61	−0.04	−0.01	0.34	1.00	
10	Geographical scope	0.09	0.06	0.06	0.07	−0.05	0.12	0.12	−0.18	−0.06	1.00

Acknowledgements This research was funded by the National Office for Research, Development and Innovation—NKFIH, K-138826. Edina Berlinger acknowledges support from the Chair and Research Program in Sustainable Finance at the University of Luxembourg, sponsored by the Ministry of the Environment, Climate and Sustainable Development.

Funding Open access funding provided by Corvinus University of Budapest.

Data availability The participants of this study did not give written consent for their application materials to be shared publicly, so due to the sensitive nature of the research supporting data is not available.

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