

# Credit Availability During Financial Crisis: Which Role for External Agents?

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## Abstract

In this paper we develop a simple moral hazard model in which a bank has to decide whether to finance a risky project proposed by a start-up. We demonstrate that the access to credit is easier in presence of trusted external agents that mitigate the moral hazard problem. This is of fundamental importance especially in periods of recession, where trust between economic actors has to be re-established. We suggest therefore that independent and credible financial institutions may play the role of such agents. In particular, focusing on the European context, we believe that the European Investment Bank Group is moving into the right direction.

**Keywords:** moral hazard, start-up firm, monitoring, financial institutions

**JEL Classification:** D82

VERY PRELIMINARY VERSION

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# 1 Introduction

The recent crisis of the global financial system has been generated by a multiplicity of factors, among which the failure of national and international regulation systems. In a recent report, released in March 2009, the IMF argued that the main culprit was deficient regulation of the financial system, together with a failure of market discipline. During the recent G7 meeting held in Rome on February 2009, participants agreed on enhancing liquidity and funding through traditional and newly created instruments. Moreover, they suggested to strengthen the capital base according to the assessment of the competent authority evaluating individual financial institutions. In a joint declaration, the G7 called for urgent reforms of the international financial system.

There is a general consensus on a set of common rules to ensure more transparency on financial markets. A commonly shared view is that monitoring authorities and international financial institutions should work together to provide a revision of the rule of conduct of rating agencies. Until now, the most important credit rating agencies adopted a voluntary IOSCO (International Organization of Securities Commissions) code of conduct. According to Charlie McCreevy, the European Commissioner for Internal Market and Services, this volitional set of rules is a “toothless tiger”. In addition, this may lead to conflicts of interest as the issuers themselves pay the credit rating agencies to be evaluated and rated. With special reference to the European Union, the principle of the home country control prescribes that the banking monitoring system must be regulated and supervised at a country level, even in presence of a growing financial integration.

In an open letter addressed to the European leaders and appeared on VoxEU.org, a CEPR policy portal, several economists affirmed that European-level actions have to supplement and coordinate the national ones on recapitalisation of the banking sector.<sup>1</sup> They argue that such disposals are of fundamental importance to both help solve the present crisis and prevent the occurrence of future ones. These operations should be carried out by an institution which acts as a Lender of Last Resort.<sup>2</sup> In

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<sup>1</sup>‘Open Letter to European leaders on Europe’s banking crisis: A call to action’, by A. Alesina, R. Baldwin, T. Boeri, F. Giavazzi, D. Gros, S. Micossi, G. Tabellini, C. Wyplosz and K. F. Zimmermann, appeared on 1 October 2008.

<sup>2</sup>The theory of the Lender of Last Resort, elaborated by Bagehot (1873), asserts that an institution, usually a country’s central bank, has to offer loans to banks or other eligible institutions that are experiencing financial difficulty or are considered highly risky or near collapse, and whose failure would dramatically affect the economy. During a credit crunch, the Lender of Last Resort’s functions are both to protect private investors who have deposited funds, and to prevent panic

Europe the natural Lender of Last Resort should be the ECB, but the Protocol of ESCB/ECB, art. 25, chapter V, allows it only to offer non-binding advice regarding the prudential supervision of credit institutions and the stability of the financial system. That being so, a reform of the economic-institutional system in Europe have to take into account the strong connection which exists among the role of the Lender of Last Resort, the monetary policy and the vigilance activity.<sup>3</sup>

The aim of this paper is to demonstrate that trusted financial institutions can solve, or at least reduce, possible asymmetries of information between lenders and borrowers. This plays a fundamental role especially in periods of crisis, where trust between economic actors has to be re-established and where the access to credit for investors has to be facilitated. On a pure theoretical ground, we are interested in situations where external agents facilitate the access to bank financing for creditworthy borrowers. On a more policy-oriented ground, we identify the conditions that financial institutions should fulfill to qualify as external agents and suggest that the European Investment Bank Group is so far the best candidate.

In the mainstream literature, the beneficial role of generic mediators has been initially studied by Myerson (1986) and Forges (1986) in communication games. However, relative scanty attention has been paid to the specific issue of external agents that may reduce asymmetries of information. Mitusch and Strausz (1999) consider a principal-agent problem within the firm and explicitly refer to the presence of consulting companies which mitigate the informational problems. However, the role of consultants as external agents is questionable as they are specifically hired by one of the players. Fedele and Mantovani (2008) analyse the investment problem of a start-up manager who applies for a bank loan to implement a project based on complementary activities which can be coordinated either by the manager himself or by delegating the task to a third agent. When the manager proceeds alone, a moral hazard problem arises. They show that delegation to the third agent mitigates the informational asymmetry and improves the efficiency of the contracting game.

In this paper we consider a simple moral hazard model and provide the conditions under which credit is granted by a bank only in presence of external agents. In particular, we focus on how start-up firms would benefit from the presence of external agents which reduce the moral hazard problem usually observed in a bank-firm relationship. It is well known in the corporate finance literature that bank finance

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withdrawing from solvent banks who have temporary limited liquidity.

<sup>3</sup>The ECB President Mr. Trichet has urged in favour of a modification of the actual banking monetary system. Article 105.6 of the Maastricht Treaty allows this reform, provided European Council achieves a unanimity vote.

is one of the main source of funding for start-up firms which benefit from building close ties with a bank because this increases the availability and reduces the costs of financing (Petersen and Rajan, 1994).

In our model, a wealthless firm applies for a bank loan to start up a business based on two alternative risky projects: one more efficient than the other, but also more costly to be implemented. The bank designs a standard debt contract, taking into account that the firm's effort is hidden. Firm's commitment to choose the more efficient project is verifiable only when the bank monitors directly the firm. Since monitoring is costly, the bank may not carry out it, in which case a moral hazard problem arises (Stiglitz and Weiss, 1981). We introduce an alternative for the bank, which consists in hiring an external agent which both evaluates and directly monitors the project presented by the firm. This provides an additional guarantee that the firm will behave. The moral hazard problem, even if not completely eliminated, is at least reduced.

We solve the contracting game between the bank and the firm under both scenarios, depending on whether the bank proceeds alone or it resorts to the external agent, and we then backwardly evaluate the bank's decision. By comparing the two different outcomes, we show that there exists a parameter region where the bank is willing to grant the loan only in presence of an external agent whose reputation is well recognized. We thus demonstrate that a trusted external agent has a welfare-improving function as it mitigates the informational problem and facilitates the access to credit market for the creditworthy firm. Our results are similar to those obtained in the relationship banking literature, where banks provide management advice and this enhances credit availability for new firms (Boot, 2000; Boot and Thakor, 2000). The main difference in our model lies in the fact that such advice is provided *indirectly* by the trusted third agent.

From a policy-oriented perspective, we argue that properly reformed financial institutions could improve the credit between start-ups and external financiers. As the results of our model crucially depend on the external agent's reputation, we look for the characteristics that financial institutions should have to play the role as trusted external agents. Focusing on the European context, we suggest that the European Investment Bank (EIB) Group is the best candidate as it ensures a sufficiently high degree of credibility and independence, and both are perceived as essential components of reputation.<sup>4</sup>

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<sup>4</sup>The European Investment Bank Group was established in 2000 to bring the European Investment Bank (EIB) and the European Investment Fund (EIF) under the same umbrella. The EIB

The EIB Group offers four main services to clients within and outside the EU: loans, technical assistance, guarantees and venture capital. This paper focuses especially on a specific aspect of the technical assistance. In particular, in our model an external agent is hired to carry out appraisal and monitoring operations on a project on which a bank has to make the loan decision. We think of the EIB Group as an appropriate external agent for three reasons. First, the EIB Group is financially independent and operates as a non-profit-motivated institution. Second, it is divided in departments, with several levels of control, set up to ensure the correctness of all its activities.<sup>5</sup> Third, the lending process is widely considered as very efficient and transparent. It follows that the EIB Group qualifies as a credible and independent external agent.

Regarding the lending process, an additional feature deserves attention, at least for the purpose of our paper. The EIB Group provides two different kinds of loan, individual and intermediate, depending on whether the total investment cost exceeds EUR 25 million or not, respectively. With regard to intermediated loans, the credit lines are granted to intermediary banks and financing institutions in the country where the project is based and the promoters are requested to apply directly to them. This paper pertains particularly to this situation, where the loan decision remains with a partner bank of the EIB and the loan is addressed to small firms which are more vulnerable during a credit crunch.

The remainder of the paper is as follows. The formal model is laid out in Section 2. Section 3 considers the two possibilities available for the bank, either resorting to the external agent or not. In Section 4 we characterise the decision of the bank at equilibrium and derive welfare implications; moreover, we evaluate whether the EIB Group qualifies as a properly trusted external agent. Section 5 concludes the paper.

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was established under the Treaty of Rome as the EU's long-term lending institution. It is one of the largest non-sovereign borrowers on the EU bond market. The EIF, instead, was created in 1994 to promote, in particular, the development of SMEs.

<sup>5</sup>In addition, the EIB Group, to better support its transparency and credibility, relies also on other controls stem which are appointed to the evaluation and control procedures: the External Auditors, the Internal Audit, the Financial Control, the Credit Risk Control and the Operations (ex-post) Evaluations. These bodies constitute a vigilance control made strong by the fact it is set up from different positions and on different aspects of the EIB's activities.

## 2 The basic model

Consider a wealthless risk-neutral firm which needs one unit of funding to start up a business based on two alternative risky projects. Implementing project  $i$ ,  $i = H, L$ , requires a nontransferable effort  $e_i$ , whose disutility has monetary equivalent equal to  $c(e_i)$ . Project  $i$  yields  $A$  with probability  $p(e_i) \in (0, 1)$  and 0 otherwise. Throughout the paper we refer to project  $H$  (resp.  $L$ ) as the good (resp. bad) project. We assume a linear specification for both the effort disutility and the success probability, i.e.:  $c(e_H) = c_H$ ,  $c(e_L) = c_L$ ,  $p(e_H) = p_H$  and  $p(e_L) = p_L$ . Obviously,  $c_H > c_L$  and  $p_H > p_L$ .

The unit of capital is provided by a risk-neutral bank. The bank designs a standard debt contract  $\{R\}$ , where  $R \in [0, A]$  is the repayment and a limited liability constraint is specified for the firm. If the latter does not accept, or the loan is not proposed, the project cannot be implemented: the firm's outside option is zero.

When project  $i$  is implemented, gross expected surplus is:

$$S_i = p_i A - c_i. \quad (1)$$

**Assumption 1**  $A \cdot \Delta p > \Delta c$ , where  $\Delta p = p_H - p_L$  and  $\Delta c = c_H - c_L$ .

Assumption 1 ensures that  $S_H > S_L$ , i.e. gross expected surplus is higher when the firm selects the good project.

Gross expected surplus is shared in the following way:

$$U_i = p_i (A - R) - c_i \quad (2)$$

is the expected profit for the firm and

$$V_i = p_i R \quad (3)$$

is the one for the bank.

The bank's outside option is to invest the unit of capital in alternative assets which give a gross remuneration equal to  $\rho > 1$ .

The timing of the model is as follows:

- at  $t = 0$ , the firm applies for the bank loan;
- at  $t = 1$ , the bank decides first whether to (i) consult an external agent and then whether to (ii) grant a take-it-or-leave-it loan to the firm or not;
- at  $t = 2$ , if the loan is granted, returns accrue and the firm repays the bank.

All the parameters are common knowledge for both players, but between  $t = 1$  and  $t = 2$  the choice of the project is hidden, thus giving rise to a moral hazard problem between the firm and the bank. The bank can monitor the behaviour of the firm by paying a fixed cost equal to  $m$ .<sup>6</sup> Monitoring makes the agent's behavior perfectly observable: if choice of the bad project is detected, the bank imposes to the firm a non-monetary punishment whose value is  $\infty$ . The moral hazard problem therefore disappears.

However, in this paper we are specifically interested in situations where firms implement the good project and monitoring is too expensive for the bank. We assume therefore that:

**Assumption 2**  $\rho > \max \{S_H - m, S_L\}$ .

Under Assumption 2, neither the implementation of project  $L$  nor monitoring is profitable for the bank, which would obtain a higher profit from the outside option  $\rho$ .

Moreover, and this will be a crucial in our paper, the bank has an additional possibility, which consists of resorting to an external agent that evaluates the firm's project. If the external agent is hired, the bank pays an extra cost but it receives an additional guarantee about the proper implementation of the project proposed by the firm.

### 3 Two options for the bank

In this section we study the characteristics of the loan proposed by the bank in two different cases, depending on whether it decides to proceed alone or to consults the external agent. In the next section we will evaluate which option will guarantee a higher profit for the bank.

#### 3.1 Proceeding alone

Consider first the situation where, at  $t = 1$ , the bank decides to evaluate the project proposed by the bank without consulting the external agent. The bank sets  $R$  to maximize profit  $V_i$  as in (3), provided that the firm participates and selects project

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<sup>6</sup>One can think of the time spent by the bank to directly monitor the behavior of the firm, parameter  $m$  thereby representing the opportunity cost of not devoting that time to other productive activities.

*i.* The following constraints have to be satisfied:

$$U_i \geq 0, \quad (4)$$

$$U_i \geq U_{-i}, -i = L, H \quad (5)$$

where  $U_i \geq 0$  represents the participation constraint and  $U_i \geq U_{-i}$  the incentive compatibility constraint; they ensure that choosing project  $i$  gives to the firm a higher profit than, respectively, the outside option and the choice of project  $-i$ . For the sake of simplicity we assume that the indifferent firm applies for the bank loan when the participation constraint is binding and that it selects project  $H$  when the incentive constraint is binding.

First, we obtain that

$$U_H \geq U_L \text{ when } R \leq \hat{R} = A - (\Delta c / \Delta p); \quad (6)$$

moreover,

$$U_i \geq 0 \text{ when } R \leq \bar{R}_i = A - (c_i / p_i). \quad (7)$$

It is worth noting that:

**Condition 1**  $\bar{R}_i > \hat{R}$  when  $\frac{c_H}{c_L} > \frac{p_H}{p_L}$ .

The informational gap between the bank and the firm is irrelevant when Condition 1 is not met, as this implies that  $\hat{R} > \bar{R}_i$ .<sup>7</sup> In such a case  $U_H \geq 0 \Rightarrow U_H \geq U_L$ : the bank is able to induce the firm to choose project  $H$  at zero cost. By simply setting  $R$  such that  $U_H = 0$ , the bank simultaneously makes the firm's participation constraint binding and it induces the firm to choose project  $H$ , thereby ending up with the entire surplus  $S_H$ . On the contrary, when Condition 1 holds, the bank faces a trade-off: its profit is increasing in  $R$ , but when  $R > \hat{R}$  the firm is induced to choose the bad project, thus reducing total surplus. The bank is then forced to propose a lower repayment to induce the firm to choose  $H$ .

The parametric region in which  $\hat{R} > \bar{R}_i$  is not interesting for the purposes of this paper as there is no conflict between the parties. In order to focus on region where Condition 1 holds, we assume that

**Assumption 3**  $c_H = c$  and  $c_L = 0$ .

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<sup>7</sup>This always holds when  $\Delta c \rightarrow 0$ , i.e. when the good project is extremely good or, equivalently, the bad one is extremely bad.

Under Assumption 3 we obtain that  $\bar{R}_i > \hat{R}$  is always (strictly) satisfied. Moreover, this simplifies our notation as it implies that  $\hat{R} = A - (c/\Delta p)$  and  $\bar{R}_L = A$ . The bank's profit  $V_i$  is increasing in  $R$ , so that it compares the profit when setting  $\hat{R}$ , the maximum repayment that induces the firm to select project  $H$ , with the one when setting  $\bar{R}_L$ , the maximum repayment that induces the firm to participate when choosing the bad project.

On the one hand, when the contract is  $\{\hat{R}\}$ , the bank gets

$$V_H(\hat{R}) = S_H - c \left( \frac{p_L}{\Delta p} \right), \quad (8)$$

while the firm obtains

$$U_H(\hat{R}) = c \left( \frac{p_L}{\Delta p} \right). \quad (9)$$

Notice that  $U_H(\hat{R}) > 0$  and the firm receives an informational rent. Moreover, the informational rent is increasing in  $c$ , because it represents a compensation for the effort disutility.

On the other hand, when the contract is  $\{\bar{R}_L\}$ , the bank ends up with  $V_L(\bar{R}_L) = S_L$  and the firm with zero.

Alternatively, the bank has the possibility to monitor the proper implementation of the good project, in which case, as explained in the previous section, the moral hazard problem disappears. It follows that the bank chooses  $R$  to maximize  $V_H - m$  subject only to the firm's participation constraint  $U_H \geq 0$ . Solution to the bank's problem is  $R = A - c_H/p_H$ : the bank gets  $S_H - m$  and the firm zero.

However, recalling Assumption 2, we can exclude both  $V_L(\bar{R}_L)$  and  $S_H - m$  from the decision set of the bank, which would get a higher profit from the outside option  $\rho$ . The bad project is not worthy for the bank, while the monitoring option is assumed to be too expensive.

It follows that the bank is left with comparing  $V_H(\hat{R})$  and  $\rho$ , *i.e.* it has to decide between financing the project and inducing the firm to behave, or not granting the loan at all.

**Lemma 1** *When the bank proceeds alone, it decides to grant the loan only when*

$$c \leq c_1 = \Delta p (A - \rho/p_H), \text{ otherwise the loan is denied.}$$

**Proof** By comparing  $V_H(\hat{R})$  and  $\rho$ , it is immediate to demonstrate that  $V_H(\hat{R}) \geq \rho$  when  $c \leq c_1 = \Delta p (A - \rho/p_H)$ . ■

The above result deserves attention. When the bank does not resort to the consultancy of an external agent, the decision about financing the project depends

on the size of the informational rent necessary to induce the firm to choose the good project. In particular, the bank is willing to grant the loan when the rent is relatively small, i.e. when  $c \leq c_1$ . On the contrary, when  $c > c_1$ , the outside option guarantees a higher profit for the bank and the project is not financed.

### 3.2 Resorting to the external agent

Focus now on the situation where, at  $t = 1$ , the bank decides to ‘hire’ an external agent to better evaluate and monitor the behaviour of the start-up firm. The contract prescribes that the external agent receives a payment of  $(c + \phi)$  in exchange for its service. Following previous notation, we assume that  $c(e_H) = c$  is the disutility from monitoring and  $c(e_L) = 0$  the disutility when the monitoring effort is not exerted. Parameter  $\phi > 0$  represents the external agent’s remuneration.

When the external agent is hired to monitor, the firm’s moral hazard problem disappears. In fact monitoring is modeled as in the previous section, with the exception that the cost is now  $c + \phi$  and not  $m$ . However, the monitoring activity performed by the external agent is hidden. This implies that the above contract is not incentive compatible: the external agent receives  $\phi$  when it accomplishes its duties, while it can increase its remuneration up to  $(c + \phi)$  by not monitoring and then announcing that  $H$  has been implemented. The moral hazard problem transfers to the external agent’s behaviour.

However, the present paper wants to explicitly consider whether international financial institutions may play the role of external agents, thereby facilitating the access to credit. A very important characteristic turns out to be fundamental when dealing with those institutions: reputation. Banks tend to trust financial institutions whose reputation is well recognized. In our model this would reduce the moral hazard problem as it provides an additional guarantee that the external agent behaves.

In formal terms, assume that an infinitely lived external agent is hired by other banks only when it fulfills its promises in every contract, otherwise no bank will demand its services.<sup>8</sup> Assume that the typology of the contract is always the same and let  $\delta$  be the discount factor.

**Lemma 2** *The monitoring activity will be properly implemented by the external agent if and only if  $\phi \geq \left(\frac{1-\delta}{\delta}\right) c = \tilde{\phi}$ .*

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<sup>8</sup>We consider a repeated interaction between external agent and bank, since reputation is fundamentally a dynamic concept.

**Proof** The external agent finds it convenient to behave when

$$\phi + \sum_{t=1}^{\infty} \delta^t \cdot \phi \geq (c + \phi) \quad (10)$$

where the LHS describes what the external agent gets when fulfilling the contract, thereby gaining access to contracts with other banks, while the RHS is what it obtains when not monitoring and then announcing that  $H$  has been implemented. Solving (10) for  $\phi$  we get  $\phi \geq \left(\frac{1-\delta}{\delta}\right) c = \tilde{\phi}$ . ■

We refer to  $\phi$  as the external agent's *reputational* rent and to  $\tilde{\phi}$  as the threshold value above which such a rent is sufficiently high to induce the external agent to monitor the correct implementation of the project. Notice that  $\partial\tilde{\phi}/\partial c > 0$ , as it represents a compensation for the effort. Moreover,  $\partial\tilde{\phi}/\partial\delta < 0$ : the threshold value  $\tilde{\phi}$  is decreasing in the discount factor  $\delta$ . For high values of  $\delta$  reputation matters and the external agent tends to give more importance to future contracts; a relatively low value of  $\phi$  is therefore sufficient to make the agent comply with the conditions specified in the contract.

If Lemma 2 holds, the external agent fulfills the contract and surplus  $S_H$  is produced. As the firm's moral hazard problem is not present anymore, the bank maximizes profit

$$V_H^E = p_H R - (c + \phi) \quad (11)$$

subject only to the firm's participation constraint,  $U_H^E \geq 0$ , where superscript  $E$  stands for external agent. Since  $V_H^E$  is increasing in  $R$  and decreasing in  $\phi$ , the bank sets  $R = A$  and  $\phi = \tilde{\phi}$  to make binding both the constraints. Substituting these two values in  $V_H^E$  and  $U_H^E$  we get:

$$V_H^E(A, \tilde{\phi}) = S_H - c \left(\frac{1-\delta}{\delta}\right), \quad (12)$$

$$U_H^E(A, \tilde{\phi}) = 0. \quad (13)$$

When paying  $\tilde{\phi}$  to the external agent, project  $H$  is implemented and the bank gets the entire surplus  $S_H - \tilde{\phi}$ . The firm, instead, receives the reservation profit.

On the contrary, when Lemma 2 is not satisfied, the external agent does not observe the contract and surplus  $S_L$  is produced. In both cases the bank ends up with  $S_L$ , obtained by setting  $R = A$  and  $\phi = 0$ .

The bank selects the option that maximizes its expected profits; under Assumption 2 we can rule out  $S_L$  from the decision set of the bank. As a consequence, the bank decides between hiring the external agent, thus receiving  $V_H^E(A, \tilde{\phi})$ , and the outside option  $\rho$ .

**Lemma 3** *When the bank hires the outside agent, it decides to grant the loan only when  $c \leq c_2 = (p_H A - \rho) \delta$ , otherwise the loan is denied.*

**Proof** By comparing  $V_H^E(A, \tilde{\phi})$  and  $\rho$ , it is immediate to demonstrate that  $S_H - \left(\frac{1-\delta}{\delta}\right)c \geq \rho$  when  $c \leq c_2 = (p_H A - \rho) \delta$ . ■

In other words, when the bank resorts to the expertise of an external agent, the decision about financing the project proposed by the firm depends on the reputational rent required to induce the external agent to behave. When the rent is relatively small ( $c \leq c_2$ ), the bank grants the loan to the firm and pays the external agent to monitor the correct implementation of the project. When, on the contrary, the reputational rent is relatively high ( $c > c_2$ ), the bank does not finance the project given that it obtains a higher return from the outside option.

## 4 The Importance of the external agent

In this section we derive the equilibrium decision of the bank by comparing the profits that it gets in the two cases presented in the previous section. On the one hand, when the external agent is not employed, we know from Lemma 1 that the bank prefers either to pay the informational rent to induce the firm to behave or, when the rent is relatively expensive, not to grant the loan: its profit is  $\max\left\{V_H(\hat{R}), \rho\right\}$ . On the other hand, when the bank decides to hire the agent, we know from Lemma 3 that the bank prefers either to employ the reputation mechanism to induce the agent to monitor and solve the moral hazard problem or not to grant the loan: its profit is  $\max\left\{V_H^E(A, \tilde{\phi}), \rho\right\}$ . It is easy to demonstrate that:

$$V_H^E(A, \tilde{\phi}) \geq V_H(\hat{R}) \quad \text{when } \delta \geq \frac{\Delta p}{p_L} = \delta^* . \quad (14)$$

For low values of  $\delta$  ( $\delta < \delta^*$ ) the reputational rent paid to the external agent is higher than the informational rent paid to the firm: the bank decides to proceed alone and its decision about the grant is summed up in Lemma 1. If instead  $\delta \geq \delta^*$ , then the reputational rent becomes lower than the informational one and the bank would find it profitable to hire the external agent and grant the loan under the conditions reported in Lemma 3.

However, the decision set of the bank does not narrow down to the comparison between  $V_H^E(A, \tilde{\phi})$  and  $V_H(\hat{R})$ , given that the outside option  $\rho$  may be preferred when both the informational rent and the reputational rent are sufficiently expensive for the firm. A complete evaluation of all the possible alternatives reveals that:

**Proposition 1** *The decision of the bank at equilibrium depends on the combination between the discount factor and the cost of the monitoring activity. In particular, (i) when  $\delta < \delta^*$ , the bank proceeds alone and grants the loan only when  $c \leq c_1$ ; (ii) when  $\delta \geq \delta^*$ , the bank resorts to the external agent and grants the loan only when  $c \leq c_2$ .*

**Proof:** We have to compare  $V_H(\hat{R})$ ,  $V_H^E(A, \tilde{\phi})$  and  $\rho$ . From Lemma 1 and 3 we know respectively that  $V_H(\hat{R}) \geq \rho$  when  $c \leq c_1$  and  $V_H^E(A, \tilde{\phi}) \geq \rho$  when  $c \leq c_2$ . From (14) we already know that  $V_H^E(A, \tilde{\phi}) \geq V_H(\hat{R})$  when  $\delta \geq \delta^*$ . We only need to compare  $c_1$  and  $c_2$  to have a complete ranking of the bank's potential profit. It is easy to demonstrate that  $c_1 > c_2$  when  $\delta < \delta^*$ . As a consequence, we have to consider two cases: (i)  $\delta < \delta^*$ , where the bank prefers  $V_H(\hat{R})$  when  $c \leq c_1$  and the outside option  $\rho$  otherwise; (ii)  $\delta \geq \delta^*$ , where the bank prefers  $V_H^E(A, \tilde{\phi})$  when  $c \leq c_2$  and the outside option  $\rho$  otherwise. ■

Turning to the importance of properly trusted external agents, a very interesting consideration derives from the above results:

**Corollary 1** *When  $\delta \geq \delta^*$ , absent the external agent's option, the bank would not grant the loan in  $c \in (c_1, c_2)$ , thus generating a surplus loss equal to  $S_H - \rho$ .*

Reputation represents therefore a powerful device to mitigate the moral hazard problem in situations where  $\delta$  is relatively high. The agent cares about future contracts with other banks and supervises the correct implementation of the project. Absent the external agent, there exists an interval region where the bank would not finance a valid project, thus generating a surplus loss. This would happen for lack of sufficient guarantees that the firm would behave.

The above results demonstrate that the presence of external agents with established reputation, and the EIB Group is certainly among those financial institutions that care about their credibility and transparency, has a positive effect on the lender-borrower relationship as it is improve the access to credit.

Moreover, given that the results of the theoretical model hinge upon the monitoring activity of the external agent, we analyse the type of monitoring activity carried out by EIB Group, which we indicate as the best candidate to play the role of the external agent.

In the Introduction we argued that EIB Group is a good candidate for the role of a trusted external agent because it is financially independent, properly structured and transparent. The EIB Group offers many services to clients, among which a

careful screening of the submitted project. Moreover, the EIB's contribution does not stop after the project contract approval. The EIB follows the project's financial, technical and environmental aspects in all its stages; it conducts a continuous process of monitoring for all the life-time of the project, from the signature of the loan contract through the project implementation and operation phase, until the loan is paid back. In particular, the EIB monitors the servicing of the loan, checks that the funds are being used in line with the objectives and projections, and keeps itself informed on developments concerning the promoter and its partners. It also ensures that the physical execution of the project is in accordance with the contract and evaluates the results of the investment.<sup>9</sup>

In addition, the EIB creates additional warranties on the loan repayment, ensuring the budget granted is suitably spent, in order to achieve the contract's goals. All the controls carried out on the projects and on the players involved in the EIB's operations, before, after and during the project is put into effect, are very important to ensure that the granted loan is well-utilized and the objectives of the loan contract are reached. For all the aforementioned reasons, we believe that the overall monitoring activity performed by the EIB Groups perfectly matches that of the trusted external agent employed in our theoretical model.

Moreover, recent reforms and new measures taken by the EIB Group reinforce our belief that it may play a fundamental role in a period of crisis, where trust between economic players has to be re-established. After the dramatic deterioration of the situation on the financial markets and the expansion of the economic crisis, it is moving to reinforce its skills with "anti-crisis measures".

During the Annual Press Conference, set up in Brussels on 9 March 2009, two specific Briefing Notes concerned these measures. First, since the end of 2008, the EIB has developed new programmes and tools to help SMEs, which have been identified as those particularly suffering from the credit crunch. In particular, the EIB deployed exceptional resources in support of SMEs. In a Briefing Note it was written that:

"[...]the EIB Group launched an out-and-out offensive in support of SMEs, which have been indirectly affected by the financial crisis and,

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<sup>9</sup>Furthermore, some projects are also subject to an ex-post evaluation by the EIB's Operations Evaluation Department. The aim of this procedure is to review with total impartiality certain EIB-financed operations, which have reached their operational phase. The ultimate objective is to frame recommendations serving to improve current and future operations, in the light of past experience, and to enhance transparency.

consequently, the credit squeeze. In its role as a public bank, the EIB was asked by the European Council to commit unprecedented sums, EUR 30bn, in the form of loans for SMEs via commercial banks by 2011. The EIB is on its way to meeting these targets for in 2008 it granted a total of EUR 8.1bn in credit lines for SMEs to 75 commercial banks in 16 countries and aims to cover the whole European Union in 2009"

(Annual Press Conference 2009, Briefing Note No.5, Brussels, 9 March 2009)

The EIB's subscribed capital will be increased by some EUR 67bn to EUR 232bn. The capital increase will enable the Bank to expand its lending volume beyond 2010. The EIB's Corporate Operational Plan for 2009-2011 includes a broad package of support measures which comprises, apart from SMEs and mid-cap companies, the energy, climate change and infrastructure sectors, clean transport and convergence lending.

Second, and this is particularly important for the aim of our paper, another important measure taken by the Bank is a new, simple and transparent system of lending which will target a great number of small businesses. In particular, these new EIB loans, still allocated via commercial banks, will finance a very wide range of projects (from very small projects to those costing EUR 25 million) undertaken by firms with fewer than 250 employees.<sup>10</sup>

The measures already taken by the EIB Group to face the credit crunch mainly concern an increase of its budget. As a policy recommendation, we suggest that the EIB should use a part of this additional resources to improve its skills and become a proper consultant that helps the bank in the evaluation of start-ups' projects. The EIB could increase the number of employees and external experts allocated to the specific task of appraising and monitoring the projects proposed by SMEs. In our formal model, this would imply a reduction of the monitoring cost and a possible expansion of the area where credit is granted.

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<sup>10</sup>The EIB also organized in 2007-2008 a broad consultations with the most relevant players in the SMEs' context (chambers of commerce, professional and employers' associations, commercial banks and the public authorities of the 27 Member States) in order to pinpoint which type of enterprise experienced problems in the access to credit.

## 5 Conclusion

The recent crisis of the global financial system has generated a wide debate on the role that properly reformed financial institutions may play in reducing the negative effect of the credit crunch. In this paper we have fundamentally demonstrated that trusted financial institutions can reduce informational problems between lenders and borrowers. This is of fundamental importance especially in periods of crisis, where trust between economic actors has to be re-established.

We have considered a theoretical model in which the presence of an external agent facilitates the access to bank financing for a start-up which. In particular, we have shown that there exists an interval region where credit is granted only in presence of an external agent that cares for its reputation. Moreover, focusing on the European context, we have argued that the European Investment Bank Group is a very good candidate to the role of external agent.

As our results depend on the desirable feature of an external agent that monitors the correct implementation of the project proposed by the firm, we have suggested that recent increase in funding for the EIB Group could be spent on improving its monitoring activity, thus reducing the barrier to access the credit for start-ups and SMEs.

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