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INVESTOR PROTECTION AND BUSINESS CREATION

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ABSTRACT: We study the effects of investor protection on the cost of external finance, entrepreneurship, and creation of new firms in an equilibrium search model of private capital markets. In addition to search frictions, we examine contract frictions, specifically interim and ex post moral hazard problems stemming from entrepreneurs' possibilities to expropriate financiers. The contract frictions reduce the transferability of match surplus between entrepreneurs and financiers, but investor protection determines whether and how the transferability reduces. The results indicate that only when investor protection has a sufficiently large impact on the ex post moral hazard problem relative to the interim moral hazard does strengthening investor protection enhance start-up creation. We also find that search frictions dilute the beneficial effect of investor protection and that contract frictions modify the standard Hosios condition for efficiency.

JEL: E50, G21, G24.

KEYWORDS: investor protection, start-up financing, private equity market, entrepreneurship, corporate finance.

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TIIVISTELMÄ: Koska ulkoisen rahoituksen kustannukset ja saatavuus ovat keskeisiä yrittäjyyden esteitä Euroopassa, viime aikaisessa kirjallisuudessa on esitetty, että sijoittajansuojan vahvistaminen edistäisi yrittäjyyttä parantamalla pienten yritysten ulkoisen rahoituksen saatavuutta. Tässä tutkimuksessa tarkastellaan tätä kysymystä, eli etsintäteoreettisen mallin avulla yritetään arvioida, mitkä ovat sijoittajansuojan vaikutukset pienten yritysten ulkoisen rahoituksen kustannuksiin, yrittäjyyteen ja uusien yritysten perustamiseen. Mallissamme sijoittajansuojan parannus vähentää "tilintarkastuskustannuksia", mutta rajoittaa yrittäjän vapautta. Tutkimuksemme osoittaa, että tilintarkastuskustannusten pieneneminen edistää yrittäjyyttä ja lisää uusien yritysten lukumäärää, mutta yrittäjien toimintavapauden kaventaminen saattaa johtaa rahoituskustannusten nousuun ja siten vähentää yrittäjyyden houkuttelevuutta uravaihtoehtona. Tästä seuraa se, että jos politiikan tavoitteena on yrittäjyyden edistäminen ja uusien yritysten luominen, sijoittajansuojaa sääntelevää lainsäädäntöä uudistettaessa on syytä kiinnittää huomio siihen, että pienten ja suurten yritysten tarpeet voivat olla erilaisia. Pienten yritysten toiminnan joustavuus tulisi säilyttää, mutta sitä vastoin kirjanpito-, tilintarkastus- ja tiedonantovelvollisuussäännösten kohdalla poikkeuksia pienten yritysten kohdalla ei ole tarpeen tehdä. Osoitamme myös, että etsintäkustannukset saattavat vahvistaa sijoittajansuojan vaikutuksia yrittäjyyteen.

JEL-luokittelu: E50, G21, G24.

AVAINSANAT: sijoittajansuoja, uusien yritysten luominen, yksityiset pääomamarkkinat, yrittäjyys, yritysrahoitus.

CONTENTS

1 Introduction

The high cost of external capital is a widely recognized impediment to entrepreneurship and small business growth.[1] Empirical findings in emergent law and finance literature, including the contributions of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998, 2000, 2002) and Glaeser, Johnson, and Shleifer (2001), further suggest that improving the legal protection of investors may enhance the development of financial markets and lower the cost of capital. Strong investor protection, however, means that the freedom of entrepreneurs to run their own firms is constrained. Such reduced entrepreneurial freedom can severely discourage entrepreneurship, which has important non-pecuniary benefits such as "being one's own boss" (Hamilton 2000, Hundley 2001, and Moskowitz and Vissing-Jørgensen 2002). This potential trade-off raises the central question of our study: How does investor protection affect entrepreneurship and business creation?

Policymakers increasingly emphasize the need to promote entrepreneurship and reduce the cost of capital to small and medium-sized firms.[2] Because enhancing the protection of investor groups financing small businesses has been seen as a way to reduce the cost of capital, on-going reforms of corporate laws in several countries nominally seek to rebalance the trade-off between the cost of capital and

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[1] See, e.g., Evans and Jovanovic (1989), Holtz-Eakin, Joulfaian and Rosen (1994), Berger and Udell (1998), Blanchflower and Oswald (1998), and Johansson (2000). Blanchflower, Oswald, and Stutzer (2001, p. 690) go so far as to claim that the "lack of capital holds back millions of potentially entrepreneurial people in the industrial countries."

[2] Storey and Tether (1998) describe a range of government activities intended to create high-technology firms in the European Union, and Lerner (1999). Wallsten (2000) evaluates recent experiences where the government acted as venture capitalist in the US. See also European Commission (1999, 2001), and Economic Report of the President (2001).

the freedom of entrepreneurial decision-making in firms.[3] What is not clear, however, is whether such a trade-off actually exists, and if it does exist, where the balance should shift.

The theoretical literature offers surprisingly little guidance. Traditional analyses of public policy on entrepreneurship focus on the effects of taxation, subsidies, and governmental services such as entrepreneurial training and provision of social insurance, on risk taking and occupational choice (e.g. Poterba 1989, Boadway, Marchand, and Pestiau 1991 and, Black and de Meza 1997). Some recent studies, such as Inderst and Müller (2002), Michelacci and Suarez (2002), and Keuschnigg and Nielsen (2003), seek to clarify the effects of public policy measures on venture capital finance and entrepreneurship, but notably do not address investor protection.

Investor protection and decisions of entrepreneurs to go public is considered by Shleifer and Wolfenzon (2002). Following them, we construct an equilibrium model of corporate finance and investor protection but, instead of frictionless equity markets and firms going public, we focus on the *private* equity and debt markets where *search frictions* impede the financing of start-ups. While venture capital finance has recently stolen the headlines, our analysis is more about the traditional and passive types of small business finance – such as equity finance from individuals or other firms, loans from commercial banks and finance companies and trade credit. The quantitative importance of these more traditional sources motivates our focus on them (Berger and Udell 1998).

[3] Reform of corporation laws are under planning or have been recently implemented at least in Australia, Canada, Finland, France, Denmark, Ireland, Italy, the Netherlands, and the UK.

Search frictions of capital markets are also emphasized in Inderst and Müller (2002) and Michelacci and Suarez (2002). Much as in labor market search models (Mortensen and Pissarides 1999, and Pissarides 2000), the central problem of capital market search is the creation of cooperating coalitions of entrepreneurs without financial resources and financiers with idle capital. A basic property of the search models is that, when an entrepreneur and a financier meet, they will find a way to exploit gains from trade, if the match surplus is fully transferable and positive.

Our model goes one step further by also considering the contract frictions arising from the entrepreneur's opportunities to expropriate financiers (interim and ex post moral hazard) that constrain the transferable match surplus. Interim moral hazard limits the "pledgeable" income of entrepreneurs (Holmström and Tirole 1997), which reduces the transferability of utility between entrepreneurs and financiers.[4] Ex post moral hazard may make monitoring or auditing costly. The costs of monitoring reduce the gross match surplus even where the interim moral hazard problem is precluded by the initial financing contract.

We assert that investor protection has two generic effects on the match surplus, i.e., the stronger the investor protection, the smaller the entrepreneurs' private benefits and the lower the monitoring costs. These two generic effects lead to the trade-off between investor protection and entrepreneurship suggested in recent empirical literature: The reduction in monitoring costs expands the gross match surplus, which encourages entrepreneurship, whereas the reduction in the entrepreneur's private benefits improves transferability of utility by increasing the pledgeable income of entrepreneurs. The increase in pledgeable income dimin-

[4] For examples of expropriation of investors, see Johnson, Boone, Breach, and Friedman (2000) and Johnson, La Porta, Lopez-de-Silanes, and Shleifer (2000).

ishes advantage of becoming an entrepreneur. This trade-off emerges despite that we consider an economy with a fixed amount of private capital. Moreover, search frictions appear to exacerbate the adverse consequences of strengthened investor protection on entrepreneurship.

Because entrepreneurship is latent in search equilibrium, the effects of investor protection on entrepreneurship and business creation are not necessarily equivalent. The creation of a firm requires an individual to seek external project finance. The greater the number of latent entrepreneurs, the tighter the capital market and the more difficult it is to find financiers. We also find, however, that anything that increases (decreases) entrepreneurship also increases (decreases) business creation. Our main finding may thus be re-expressed as follows: If investor protection has a sufficiently large impact on the ex post moral hazard relative to the interim moral hazard, strengthening investor protection enhances business creation. This finding complements the finding of Glaeser et al. (2001), who show that transparency regulation forms the core of investor protection by making private corporate governance and enforcement of laws more effective.

In the next section, we describe the basic model. In section 3, we consider equilibrium search market activity. In sections 4 and 5, we present our main results concerning the effects of investor protection on equilibrium interest rates, entrepreneurship, and business creation. In section 6, we consider the design of optimal policy, showing first how investor protection can be designed to maximize business creation. Since a policy that maximizes business creation does not necessarily maximize social welfare, we also consider the socially optimal level of investor protection. We give concluding remarks in section 7.

2 The Model

The economy consists of entrepreneurs and financiers. They are infinitely lived, risk neutral, and seek to maximize the expected present value of their net income stream. The entrepreneurs lack funds, but are endowed with projects requiring a fixed start-up investment I. The money can be raised from financiers with capital, but without projects. The allocation of funds to entrepreneurs, i.e. the creation of new firms, is constrained by search and contract frictions.

2.1 Frictions

In modeling the effects of search frictions on the trade in a private capital market, we follow the labor market literature on search and matching (e.g. Mortensen and Pissarides 1999, and Pissarides 2000). As we are interested in the creation of new firms, we work with measures of entrepreneurs seeking finance and financiers with idle capital rather than the entire community of entrepreneurs and financiers. We denote the measures e and f, respectively. The matching of entrepreneurs and financiers takes place according to a continuous time search governed by an aggregate matching function with constant returns to scale. From the perspective of an entrepreneur, the arrival rate of a financing deal is given by a decreasing and continuously differentiable function $q(\theta)$, where ratio $\theta=e/f$ measures the tightness of capital market. Since the mass of financing deals per unit of time is $eq(\theta)$, the arrival rate of financing deals from the perspective of a financier is $\theta q(\theta)$, which is

increasing in θ. The arrival rates satisfy the usual limiting properties: $\lim_{\theta\to 0} q(\theta) = \lim_{\theta\to\infty} \theta q(\theta) = \infty$ and $\lim_{\theta\to\infty} q(\theta) = \lim_{\theta\to 0} \theta q(\theta) = 0$.[5]

Contract frictions stemming from the possibility entrepreneurs will expropriate financiers also hinder the creation of start-ups. The two common ways entrepreneurs can expropriate financiers may be described as "interim" and "ex post" moral hazard problems. The interim (i.e. the project choice) moral hazard emerges when, after receiving funds from a financier, the entrepreneur is able to choose between investing in a productive project or diverting the funds to a private "pet" project. The success of the private project is certain and, without investor protection, yields an infinite *non-transferable* stream of private benefits *b* per unit of time to the entrepreneur. In contrast, the productive project succeeds according to a Poisson process with intensity γ and yields a *transferable* income stream of π per unit of time.

Entrepreneurs can also divert and hide returns from successful productive projects. Reminiscent of the Townsend-Gale-Hellwig paradigm of costly state verification (Townsend 1979, Gale and Hellwig 1985), we assume financiers can prevent such ex post moral hazard by incurring monitoring cost flow, which has size *v* in the absence of investor protection. When there is no monitoring, entrepreneurs divert returns and financiers receive nothing, irrespective of initial financial contracts.

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[5] One can argue that in the private capital market search costs do not arise from finding *a* match but rather from finding the *right* match. Allowing for heterogeneous entrepreneurs in our model is straightforward as long as there is no asymmetric information about the entrepreneur's type after a match is achieved. If there were such asymmetric information, however, financial contracting in a bilateral matching model used here would become rather complicated, because of the known problems of bargaining with asymmetric information (see, e.g., Muthoo, 1999, ch. 9.8. and Inderst, 2001) We plan to investigate such an extension in future research.

2.2 Investor Protection

We assume that investor protection mitigates both moral hazard problems. To formalize the two general effects of investor protection in a transparent way we specify that investor protection reduces the stream of private benefits by αb and the monitoring cost flow by αv, where $\alpha \in [0,1]$ reflects the degree of investor protection in the economy. Thus, the net stream of private benefits from the private project and the total monitoring cost flow of the productive project are $(1-\alpha)b$ and $(1-\alpha)v$ per unit of time. The idea underlying this formulation is that the more stringent the general level of protection, the less of a problem the contracting frictions should be.

Although we are primary interested in the general effects of investor protection, one can think that the rules of accounting, auditing, and disclosure govern monitoring costs almost by definition. To some extent they also affect to project choices, since the better the transparency, the more difficult it is to enjoy the private benefits of the pet project. The relevant investor protection also consists of the legislation allowing creditors and equity investors to bind the hands of entrepreneurs or to monitor the project returns. Covenant rules are an example of creditor protection that reduces the possibilities to pursue pet projects. In the case of equity financing, we can take that investor protection reflects company law and other legislation governing minority shareholder protection. For example, the antidirector rights index of minority shareholder protection developed by La Porta et al. (1997, 1998) and extensions by Pistor (2000) and Glaeser et al. (2001) include rules for limiting entrepreneurial freedom – for example, the possibility of

outside investors to call an extraordinary shareholders' meeting, or qualified majority requirements for charter changes and sales of major assets.

We could also explicitly assume that compliance with investor protection is costly. For example, a productive project could yield a non-transferable stream of private benefits that is reduced by investor protection. As long as the stream per unit of time is strictly less than b, we can normalize it to zero without loss of generality. Similarly, the reduction in the monitoring cost flow caused by investor protection may also be partly offset by an increase in the disclosure costs that entrepreneurs must incur. As long as obtaining relevant information for ex post monitoring is less expensive to the entrepreneur than the outside financier, one would expect no change in the basic results. This property of the model means that our analysis is consistent with an intuitive trade-off between a stifling effect of regulation stemming from compliance costs and the benefits of the regulation to investors.

Finally, in the chosen specification, investor protection affects the two moral hazard problems proportionally. As we show in section 6, it is straightforward to generalize the model so that investor protection reduces the stream of private benefits by $h_b(\alpha)b$ and the monitoring cost flow by $h_v(\alpha)v$, where $h_b(\alpha)$ and $h_v(\alpha)$ are increasing functions of α.

2.3 Financial Contracting

To focus on the generic effects of investor protection, we follow Holmström and Tirole (1997) and deliberately stay away from modeling the exact form of the financing contract. Because of the monitoring cost flow, v, debt might in our model dominate equity. However, in our model debt does not necessarily economize the

monitoring costs which, in contrast to the Townsend-Gale-Hellwig paradigm, are paid *until* the project succeeds. The repayment in our model might thus as well reflect an equity-like contract.

We further assume that, even in the absence of investor protection, entrepreneurs can directly raise funds for the fixed start-up investment from outside financiers. As in Holmström and Tirole (1997), this requires that the entrepreneur's "pledgeable" income is larger than the financier's investment costs. Denoting the common discount rate by ρ>0 allows us to formalize the Assumption as

Assumption. $\frac{\gamma\pi}{(\gamma+\rho)\rho} - \frac{b}{\rho} - \frac{v}{\gamma+\rho} - I \geq 0$.

The two first terms in the Assumption reflect the entrepreneur's pledgeable income, i.e. the maximum amount an entrepreneur can credibly promise to pay back to a financier. The two last terms capture the investment costs. From the financier's point of view, both fixed start-up cost I and monitoring cost v are needed get a productive project going. Thus, if there is no interim moral hazard (b=0), the Assumption simply says that the net present vlue of the productive project should be positive. In the presence of the interim moral hazard, however, a positive net present value is insufficient to guarantee that the entrepreneur will prefer the productive project.

If the Assumption failed to hold, there would be no private capital markets in the economy. The studies of Holmström and Tirole (1997) and Michalecci and Suarez (2002) suggest that, in such circumstances, an agent is needed to mitigate the moral hazard problems. In principle, the government in our model could be such an agent and raise the economy out of autarky by imposing a minimum level

of investor protection. For simplicity, we normalize the minimum level of investor protection to zero and state that the Assumption holds even if α=0.

Although we assume pledgeable income exceeds investment costs, this does not render financial contracting trivial. In fact, as we see in the next section, moral hazard problems modify the standard conditions for formation of a match. When an entrepreneur seeking finance and a financier with idle capital meet, bargaining over the terms of finance takes place. Provided that the shares received by each partner exceeds the forgone option of continued search, they write a financial contract stipulating the entrepreneur's repayment obligation, ω, which is the amount per unit of time a successful entrepreneur pays back to the financier. The standard conditions for formation of a match are modified, since the moral hazard problems in our model reduce both the gross match surplus and the possibilities to transfer utility using ω.

The bargaining takes a simple form, whereby the entrepreneur makes a take-or-leave-it offer with probability β. With complementary probability 1-β, the financier makes a similar take-or-leave-it offer on the repayment obligation. In the event of rejection, the parties resume their searches for other partners.[6]

In summary, both search and contracting frictions in our model hamper business creation. In the next section, we show how these frictions are reflected in the endogenous variables measuring the capital market tightness (θ) and the repayment obligation flow (ω).

[6] At a cost of obscuring the analysis, we could also have employed the generalized versions of alternating-offer bargaining or the Nash bargaining solution. For example, our results extend to the usual Nash bargaining with equal bargaining power in so far the stream of private benefits, b, is sufficiently large.

3 Equilibrium

We look for solutions in the class of dynamic stochastic equilibria, so time and uncertainty are explicit, expectations rational, private gains from trade exploited subject to search and contracting frictions, and agents' actions mutually consistent.

Let U_E and U_F denote the value of an unfunded project for an entrepreneur and the value of idle capital to a financier. Following Michalecci and Suarez (2002), we focus on an economy with limited available private capital but rich in opportunities for entrepreneurs.[7] Specifically, we normalize the total mass of financiers to unity and assume free entry of entrepreneurs. This implies that the equilibrium measure of entrepreneurs seeking finance, e, solves the no-profit condition

$$U_E=0. \tag{1}$$

The value of idle capital to a financier must be non-negative, $U_F \geq 0$, because participation is voluntary. To characterize the equilibria, we determine the equilibrium values of θ, ω, and U_F.

For an arbitrary repayment obligation, ω, the value of the project with transferable return to an entrepreneur, G_E, solves the asset pricing equation

$$\rho G_E = \gamma\left(\frac{\pi-\omega}{\rho}-G_E\right). \tag{2}$$

[7] This is in line both with a large empirical literature on the existence of financing constraints (cf. footnote 1) and the standard assumption in labor market literature, which maintains unlimited entry for entrepreneurs, but a fixed labor supply (see Mortensen and Pissarides 1999 and Pissarides 2000).

Analogously, the value of the private project to the entrepreneur, B_E, is given by

$$B_E = \frac{(1-\alpha)b}{\rho}. \tag{3}$$

The entrepreneur does not divert the funds to the private project if $G_E \geq B_E$ which, using (2) and (3), can be re-expressed as

$$\omega \leq \overline{\omega} \equiv \pi - \frac{(\rho+\gamma)}{\gamma}(1-\alpha)b. \tag{4}$$

Inequality (4) is the entrepreneur's incentive compatibility constraint. Note that the discounted value of $\overline{\omega}$, $\gamma\overline{\omega}/(\rho+\gamma)\rho \equiv \gamma\pi/(\rho+\gamma)\rho - (1-\alpha)b/\rho$, equals the entrepreneur's pledgeable income for a given level of investor protection.

If the entrepreneur diverts the funds, either at the outset or after the project has successfully been completed, the value of the project to the financier is zero (B_F=0). Provided that the entrepreneur's incentive compatibility constraint (4) is satisfied, the value of a productive project to the financier, G_F, solves the asset pricing equation

$$\rho G_F = \gamma\left(\frac{\omega}{\rho} + U_F - G_F\right) - \nu(1-\alpha). \tag{5}$$

Comparing (5) with (2) shows that, in the event of success, only the financier returns to search (value U_F). This follows from our assumption that financial capital can be recycled, while entrepreneurial talent is specific to each project.

As explained above, once an entrepreneur and a financier meet, they begin negotiating to form a coalition. With fully transferable match surplus, a necessary and sufficient condition for the formation of a coalition is that the gross match surplus, G_E+G_F-I, exceeds the sum of the forgone options of continued search, U_E+U_F. In our model, however, moral hazard problems reduce both the gross match surplus and the transferability of utility. To make this clear, let us first con-

sider an entrepreneur who gets to propose a repayment obligation with probability β. The entrepreneur demands the entire match surplus $S = G_E + G_F - I - U_E - U_F$ by offering repayment

$$\underline{\omega} = \frac{\rho}{\gamma}\left[\rho U_F + I(\rho + \gamma) + v(1-\alpha)\right], \tag{6}$$

which solves $G_F = U_F + I$.

With probability 1-β, the financier gets to propose a repayment obligation, but cannot similarly demand the entire match surplus S. As G_E decreases in ω and $B_E > U_E = 0$ by (1) and (3), the entrepreneur's incentive compatibility constraint $G_E - B_E \geq 0$ binds sooner than the entrepreneur's participation constraint $G_E - U_E \geq 0$. The financier therefore demands the maximum repayment, $\overline{\omega}$, that satisfies the entrepreneur's incentive compatibility constraint (4). We proceed under the assumption that the repayment determined by the financier's participation constraint satisfies the entrepreneur's incentive compatibility constraint, so that $\underline{\omega} < \overline{\omega}$.[8]

The two conditions determining repayments (4) and (6) illustrate how moral hazard problems decrease the transferable match surplus. On one hand, the utility is less transferable because the entrepreneur's private benefits reduce pledgeable income. On the other hand, the gross match surplus shrinks as monitoring increases the financier's investment costs. Because improvements in investor protection lower both the entrepreneur's private benefits and the monitoring costs, they enlarge the transferable match surplus irrespective of the agents' bargaining power.

The solution to the bargaining problem implies that the financier's share of the match surplus is

$$G_F - U_F - I = (1-\beta)\left(S - B_E\right), \tag{7}$$

where B_E equals B_G evaluated at $\omega = \overline{\omega}$. The entrepreneur's share of the match surplus is

$$G_F - U_E = \beta S + (1-\beta)B_E. \tag{8}$$

Because $S = G_E + G_F - I - U_E - U_F$ is a decreasing function of v by (5), equations (7) and (8) show that the ex post moral hazard problem decreases both parties' shares of the match surplus. The effect of the interim moral hazard is, however, asymmetric. It increases the entrepreneur's share and decreases the financier's share. Reminiscent of Ayres and Madison (2000), it may thus pay to "handicap oneself", e.g., by choosing a bad form of corporation, to make a credible threat of performing inefficiently. The asymmetric effect results from the fact that the interim moral hazard problem plays a role only when entrepreneurs are "competitive," i.e. when financiers get to propose the repayment obligation. Were there no interim moral hazard, B_E would be zero and equations (7) and (8) would collapse to the familiar expressions of the match surpluses.

We complete the characterization of the search equilibrium by determining the conditions for equilibrium free-entry and repayments. The value of an unfunded project for an entrepreneur satisfies

$$\rho U_E = -c + q(\theta)(G_E - U_E), \tag{9}$$

[8] The assumption is fulfilled in equilibrium, but rather tedious to prove (calculations available upon request). The intuition, on the other hand, is clear. If it were not so, no matches would be formed and capital markets would collapse.

where c represents the flow cost of finding capital or, more generally, the flow start-up cost of a new firm (see Fonseca, Lopez-Garcia, and Pissarides 2001).

Similarly, the value of idle capital for a financier solves

$$\rho U_F = \theta q(\theta)(G_F - U_F - I). \tag{10}$$

By substituting (1) and (2) for (9), we can write the equilibrium free-entry condition for entrepreneurs, i.e. *the latent entrepreneurship condition*, as

$$\frac{c}{q(\theta)} = \frac{\gamma(\pi - \omega)}{\rho(\rho + \gamma)}. \tag{11}$$

Entrepreneurship can be regarded as latent, because not all those willing to become entrepreneurs automatically create firms. The creation of a start-up requires securing external finance to initiate the project. The latent entrepreneurship condition therefore determines the dynamic demand for financial capital. Since the expected duration of finding capital for an un-funded project is $1/q(\theta)$, the left-hand side of (11) captures the expected cost of finding capital. The right-hand side captures the entrepreneur's expected payoff from the productive project. Thus, the latent entrepreneurship condition balances the expected costs and benefits of entrepreneurship.

It is more laborious to determine the condition for equilibrium repayments, since we first need to solve the equilibrium value of idle capital (U_F). Inserting $S = G_E + G_F - I - U_E - U_F$ into (8) and rearranging the terms, we obtain

$$G_E - U_E = B_E + \frac{\beta}{1-\beta}(G_F - I - U_F). \tag{12}$$

Substituting (1), (9) and (10) for (12) gives

$$U_F = \frac{(1-\beta)\theta}{\rho\beta}[c - q(\theta)B_E]. \tag{13}$$

From (13), we observe that a necessary condition for the existence of equilibrium is $\theta \geq \underline{\theta} \equiv q^{-1}(c/B_E)$.

After a somewhat involved process, wherein we insert (13), (1), (2), (5) back into (12) and then rearrange the terms, we write the *interest rate equation*, i.e. the condition for equilibrium repayments, as

$$\frac{\omega}{\rho} = (1-\beta)\left[\frac{\pi}{\rho} + \frac{\theta c - B_E(\rho+\gamma+\theta q(\theta))}{\gamma}\right] + \beta\left[\frac{(\rho+\gamma)I + v(1-\alpha)}{\gamma}\right]. \tag{14}$$

The search equilibrium is fully described by the capital market tightness and repayment pair (θ, ω) that satisfy (11) and (14). The two equilibrium conditions have useful descriptive properties as shown in Figure 1. By totally differentiating (11) and (14), we see that the latent entrepreneurship condition (LE) is a downward-sloping curve in (θ, ω) space and the interest rate equation (IR) slopes upward:

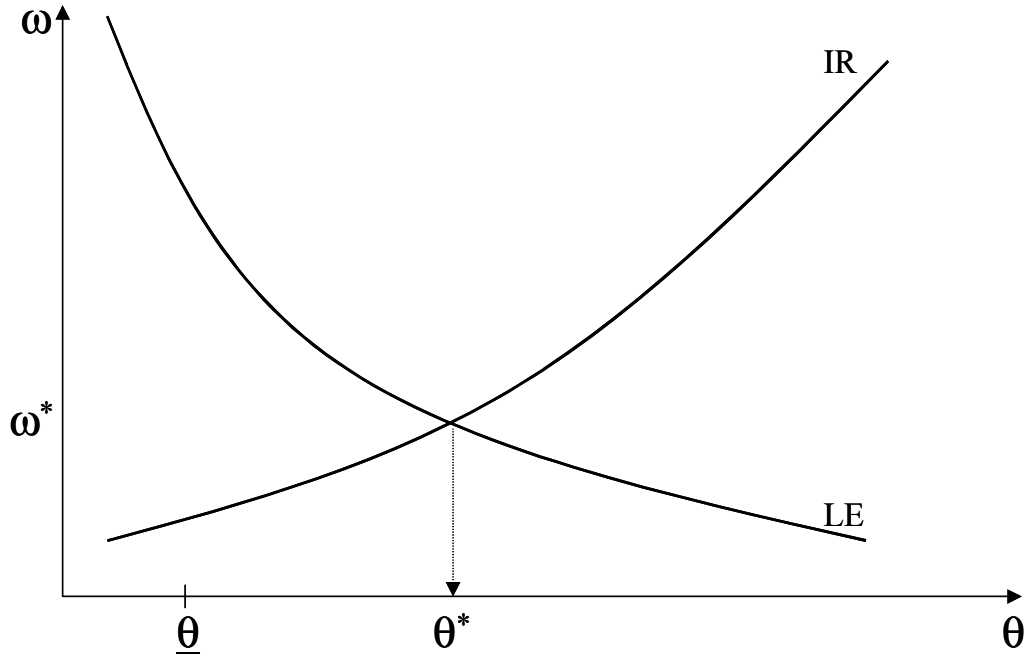
$$\left.\frac{d\omega}{d\theta}\right|_{LE} = \frac{c\rho(\rho+\gamma)}{q(\theta)^2\gamma} q'(\theta) < 0 \tag{15a}$$

and

$$\left.\frac{d\omega}{d\theta}\right|_{IR} = \frac{(1-\beta)\rho}{\gamma}\left[c - B_E(q(\theta)+\theta q'(\theta))\right] > 0. \tag{15b}$$

It follows from the condition for $U_F \geq 0$ (see equation (13)) that the term in the brackets in (15b) is positive.

Figure 1. Equilibrium of θ and ω



To establish the existence of a unique equilibrium as drawn in Figure 1, we write

Proposition 1. There exists a unique equilibrium.

Proof: Equations (15a) and (15b) establish that if an equilibrium exists, it is unique. To guarantee that the existence of equilibrium, we show that the LE curve is above the IR curve when θ approaches to $\underline{\theta} \equiv q^{-1}(c/B_E)$ that solves U_F=0 in (13). When $\theta \to \underline{\theta}$, (11) and (14) become $\frac{\omega}{\rho} = \frac{\pi}{\rho} - \frac{c(\rho+\gamma)}{q(\underline{\theta})\gamma}$ and $\frac{\omega}{\rho} = (1-\beta)\left[\frac{\pi}{\rho} - \frac{B_E(\rho+\gamma)}{\gamma}\right] + \beta\left[\frac{(\rho+\gamma)I + v(1-\alpha)}{\gamma}\right]$. Because $\frac{c}{q(\underline{\theta})} = B_E$ by definition of $\underline{\theta}$, we need to establish that $\frac{\pi}{\rho} - \frac{B_E(\rho+\gamma)}{\gamma} > (1-\beta)\left[\frac{\pi}{\rho} - \frac{B_E(\rho+\gamma)}{\gamma}\right] + \beta\left[\frac{(\rho+\gamma)I + v(1-\alpha)}{\gamma}\right]$ or, equivalently, that

$$\frac{\gamma\pi}{(\gamma+\rho)\rho}-\frac{v(1-\alpha)}{\gamma+\rho}-I-B_E>0. \tag{16}$$

Under our Assumption, (16) holds. QED.

As (11) and (14) show, another property of the equilibrium is that the interest rate equation directly depends on *b* and *v*, whereas the latent entrepreneurship equation does not. Using this property yields

Proposition 2. Interest rates are directly and latent entrepreneurship inversely related to the ratio *v*/*b*.

Proof: Totally differentiating (14) with respect to ω, *b*, and ν shows that $\left.\frac{d\omega}{db}\right|_{IR}=-\frac{(1-\beta)\rho[\rho+\gamma+\theta q(\theta)](1-\alpha)}{\gamma}<0$ and $\left.\frac{d\omega}{dv}\right|_{IR}=\frac{\beta\rho(1-\alpha)}{\gamma}>0$, which means that the IR curve shifts up if either *b* decreases or *v* increases. Because the LE curve remains intact when *b* or *v* changes, ω increases and θ decreases if the ratio *v*/*b* increases. QED.

Proposition 2 suggests that interim and ex post moral hazards have counterbalancing effects on each other. The repayment obligation increases and, accordingly, the incentive to become an entrepreneur reduces, if monitoring costs increase or private benefits decrease. An increase in monitoring costs increases the financier's reservation value, which in turn increases the repayment obligation ω when the entrepreneur proposes it. A decrease in the private benefit increases pledgeable income, which increases the repayment obligation ω when the financier proposes it.

4 Entrepreneurship and Interest Rates

We next investigate whether investor protection increases or decreases latent entrepreneurship. As the model determines the dynamic demand for capital and the repayment obligation, it is meaningful to determine the effect of investor protection on equilibrium interest rates. Because the latent entrepreneurship condition (11) is independent of α, the effect of investor protection on latent entrepreneurship depends on whether the interest rate equation shifts up or down in (θ, ω) space (Figure 2). To address the questions, consider (14) as a function of α.

Proposition 3. Only if the ratio v/b is sufficiently high, strengthening investor protection lowers interest rates and increases latent entrepreneurship. Otherwise, the reverse obtains.

Proof: Totally differentiating (14) with respect to θ and α shows that

$$\left.\frac{d\theta}{d\alpha}\right|_{IR} = \frac{\beta\rho v - (1-\beta)b[\rho+\gamma+\theta q(\theta)]}{(1-\beta)\rho[c - B_E(q(\theta)+\theta q'(\theta))]}. \tag{17}$$

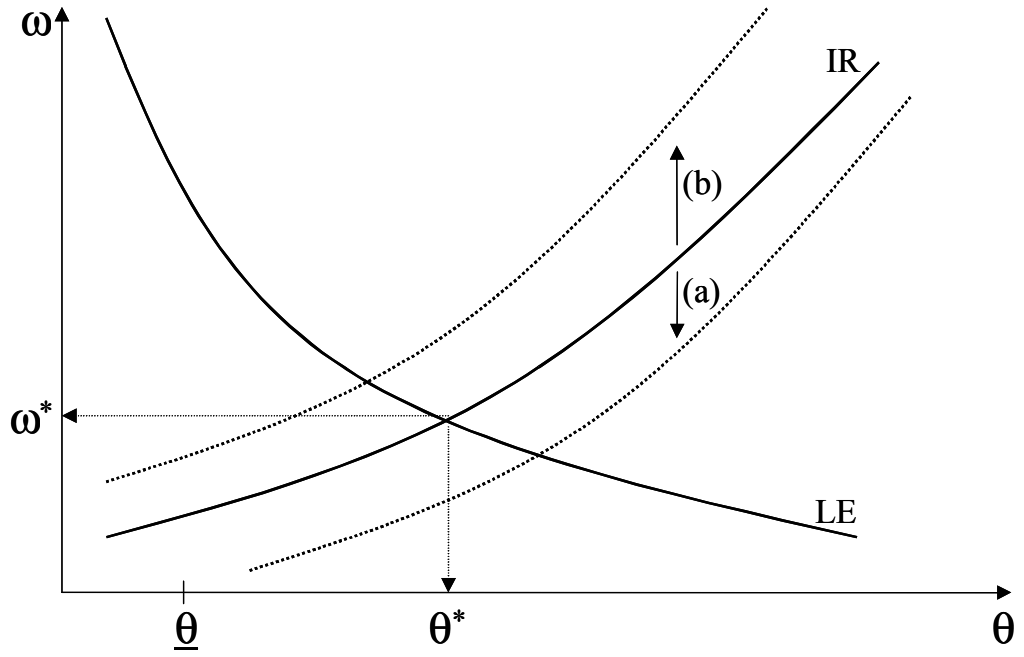
Because the nominator of (17) is positive, the sign of the denominator determines the sign of $d\theta/d\alpha$. We rewrite the denominator so that the sign of $d\theta/d\alpha$ is given by the sign of

$$\frac{v}{b} - \frac{(1-\beta)[\rho+\gamma+\theta q(\theta)]}{\beta\rho}. \tag{18}$$

As θ is inversely related to the ratio v/b by Proposition 2 and as $\theta q(\theta)$ is an increasing function of θ, (18) is an increasing function of the ratio v/b. Consequently, there exists a unique positive threshold level of v/b such that $d\theta/d\alpha=0$. If the ratio v/b is larger (smaller) than the threshold, $d\theta/d\alpha >$ (<) 0. QED.

In Figure 2 we illustrate the two possible outcomes of enhanced investor protection suggested by Proposition 3. If the ratio v/b is sufficiently high (outcome (a) in Figure 2), an increase in investor protection shifts the interest rate equation (14) down. Otherwise the interest rate equation shifts up (outcome (b)). The two potential outcomes have drastically different properties. If the interest rate equation shifts down, the new equilibrium will be characterized by low interest rates and therefore strong incentives to become an entrepreneur. As many entrepreneurs seek finance, capital markets are correspondingly congested. When the interest rate equation shifts up, interest rates are high. Entrepreneurship is unattractive and capital markets are slack.

Figure 2. Effect of investor protection.



As an increase in investor protection may have wildly different consequences, we explain Proposition 3 carefully. We rewrite the denominator of (17) again to get the following formula that determines the sign of $d\theta/d\alpha$:

$$\frac{\beta v}{\rho+\gamma}-\frac{(1-\beta)b}{\rho}\left[1+\frac{\theta q(\theta)}{\rho+\gamma}\right]. \tag{19}$$

Equation (19) captures the effect of investor protection on the entrepreneur's share of the match surplus that, under the assumption of free-entry, determines latent entrepreneurship and capital market tightness. Enhancing investor protection decreases monitoring costs, which in turn increases the gross match surplus G_E+G_F-I. As the first term in (19) shows, the entrepreneur benefits from the increase whenever she gets to propose the repayment obligation.

Since an increase in investor protection makes the entrepreneur's threat of expropriating the financier less valuable, there is also a reduction in the entrepreneur's share of the match surplus whenever the financier gets to propose the repayment obligation, as shown by the second term in (19). In a static environment, the negative effect on the entrepreneur's share of the match surplus would simply be $(1-\beta)b/\rho$, but search frictions create the multiplier in the brackets. The reason for the multiplier is that better investor protection increases the financier's reservation value, U_F, because searching for a new match becomes more rewarding.

5 Business Creation

In the previous section, we proved that if the ratio of the monitoring costs to the private benefits is sufficiently high, improving investor protection increases entrepreneurship. It is tempting to infer that the greater the number of entrepreneurs, the more firms that will be created. Our model indicates this is not necessarily the case. Entrepreneurship is latent and search frictions discourage entrepreneurs from starting up new firms. How investor protection affects business creation is not clear a priori.

To address the question of whether investor protection increases or decreases business creation, we calculate the steady-state flow of new firms. Be-

cause the stock of idle capital is f and a free financier matches an entrepreneur seeking funds at the rate $\theta q(\theta)$, the flow of new start-ups at any point in time is

$$n = \theta q(\theta) f \ . \tag{20}$$

The stock of idle-capital evolves according to

$$\dot{f} = \gamma(1 - f) - n \,, \tag{21}$$

where $\gamma(1\text{-}f)$ captures the recycling of financial capital from successful projects. In a steady state, $\dot{f} = 0$, which, by (20) and (21), means that the steady-state rate of business creation is

$$n = \frac{\theta q(\theta)\gamma}{\theta q(\theta) + \gamma} \,. \tag{22}$$

Equation (22) shows how capital market tightness has two opposite effects on business creation. The tighter the market, the faster idle capital finds a project, $\theta q(\theta)$, but the smaller the steady-state stock of idle capital $f = \gamma/(\gamma+\theta q(\theta))$. As can be verified from (22), the former effect dominates.

Proposition 4. Business creation is directly related to latent entrepreneurship.

Proof: From (22), we see n is an increasing function of $\theta q(\theta)$, which in turn is an increasing function of θ. QED.

Since the steady-state rate of business creation is directly related to latent entrepreneurship and thus capital market tightness, we can combine Proposition 3 and 4 to obtain the main finding of our study.

Proposition 5. Only if the ratio v/b is sufficiently high, strengthening investor protection promotes business creation. Otherwise, the reverse obtains.

Proposition 5 provides a characterization of the trade-off that the on-going reforms of corporate laws aim at rebalancing: Better investor protection reduces the cost of capital, but limits the freedom of entrepreneurial decision-making. Our result shows that the trade-off can only emerge in economies with serious interim moral hazard problems. There is no such trade-off in economies where the ex post moral hazard is severe and thus monitoring costs relatively high, because there improvements in investor protection lower interest rates and stimulate business creation.

6 Designing an Optimal Policy

6.1 Maximizing Business Creation

The foregoing analysis suggests that, depending on emphasis, a legal reform aimed at improving the position of investors may have wide ranging consequences for business creation. How then should the protection of investors be reformed if policy is appraised, as in fact often happens, solely in terms of the number of start-ups created? We address this question before characterizing the socially optimal level of investor protection.

To obtain practical policy advice, we assume that investor protection reduces the stream of private benefits by $h_b(\alpha)b$ and the monitoring cost flow by $h_v(\alpha)v$, where $h_b(\alpha)$ and $h_v(\alpha)$ are increasing and continuously differentiable func-

tions of α with images [0, 1]. It is straightforward to show that the effect of investor protection on business creation boils down to the sign of

$$\frac{h_v'(\alpha)v}{h_b'(\alpha)b} - \frac{(1-\beta)[\rho+\gamma+\theta q(\theta)]}{\beta\rho}, \tag{23}$$

which corresponds to equation (18) in our basic model. Combining equation (23) with Propositions 3 and 5 gives

> **Proposition 6.** Only when the ratio $h_v'(\alpha)/h_b'(\alpha)$ is sufficiently high does strengthening investor protection lower interest rates and increase latent entrepreneurship and business creation. Otherwise, the reverse obtains.

Proposition 6 suggests that if a reform mainly reduces monitoring costs (i.e. $h_v'(\alpha)$ is high), it lowers interest rates and promotes entrepreneurship and business creation. A concrete example might be a tightening of auditing regulation or of the accounting rules that govern how cash flows are recognized in the bookkeeping. If, however, the reform principally constrains the freedom of entrepreneurs to choose projects (i.e. $h_b'(\alpha)$ is high), it has the reverse effect of raising interest rates and discouraging entrepreneurship and business creation. An example of such a reform is, in the context of debt finance, a creditor-friendly covenant regulation or, in case we think equity finance, a minority-friendly rule for how the members of the board of directors are selected.

6.2 Maximizing Social Welfare

The previous sections discussed the objective of maximizing the creation of start-ups. Such an objective is not necessarily socially optimal due to the limited supply

of private capital and search costs. Entry of a new entrepreneur causes a positive externality on the other side of the market by increasing the probability that financiers find a match (thin-market externality). Decreasing the probability that other entrepreneurs match it simultaneously causes a negative externality on the same side of the market (congestion externality). In this subsection, we compare the market equilibrium to the constrained social optimum and characterize the conditions under which investor protection can be used to obtain efficiency.

Since (22) suggests that, for a given γ, the creation of start-ups in market equilibrium is fully characterized by capital market tightness, θ, we derive the condition that explicitly determines θ. This can be found by combining the two equilibrium conditions (11) and (14), whereby

$$\beta\left[\frac{\gamma\pi}{\rho}-\nu(1-\alpha)-(\rho+\gamma)I\right]-(1-\beta)[c\theta-B_E(\rho+\gamma+\theta q(\theta))]=\frac{c(\rho+\gamma)}{q(\theta)}. \qquad (24)$$

Against this benchmark, we evaluate policymakers' actions, assuming policymakers are subject to the same search and contract frictions as market participants. Thus, the evolution of idle capital given by (21) also constrains policymakers. The social value of a new firm is $\gamma\pi/\rho$-$\nu(1$-$\alpha)$ and the flow and fixed start-up costs are c and I, so the social welfare function for an infinitely lived economy is

$$SW=\int_0^\infty e^{-\rho t}\left\{(1-f)\left[\frac{\gamma\pi}{\rho}-\nu(1-\alpha)\right]-f\theta[c+q(\theta)I]\right\}dt. \qquad (25)$$

A utilitarian social planner's problem is to choose capital market tightness θ to maximize SW subject to (21). The current-value Hamiltonian associated with this dynamic optimization problem can be written as

$$H(\theta,f,\lambda)=(1-f)\left[\frac{\gamma\pi}{\rho}-\nu(1-\alpha)\right]-f\theta[c+q(\theta)I]+\lambda[\gamma(1-f)-\theta q(\theta)f], \qquad (26)$$

where λ is a co-state variable. Maximizing (26) with respect to θ and f yields the following first-order conditions:

$$-fc - f[q(\theta) + q'(\theta)](I + \lambda) = 0 \tag{27a}$$

and

$$v(1-\alpha) - \frac{\gamma\pi}{\rho} - \theta[c + q(\theta)I] - \lambda[\gamma + \theta q(\theta)] = \lambda\rho - \dot{\lambda}. \tag{27b}$$

Evaluating (27b) in the steady state and substituting λ from (27b) for (27a) gives the condition that determines socially optimal θ and thereby the socially optimal number of start-ups as

$$[1-\eta(\theta)]\left[\frac{\gamma\pi}{\rho} - v(1-\alpha) - (\rho+\gamma)I\right] - c\theta\eta(\theta) = \frac{c(\rho+\gamma)}{q(\theta)}, \tag{28}$$

where $\eta(\theta) \in [0,1]$ denotes the elasticity of the matching function $q(\theta)$.

Comparing the social optimum (28) with the market equilibrium (24), we see that they coincide if, and only if,

$$\eta(\theta) = (1-\beta)(1-\xi), \tag{29a}$$

where

$$\xi \equiv \frac{(1-\alpha)b(\rho+\gamma+\theta q(\theta))}{\gamma\pi - \rho[v(1-\alpha) + (\rho+\gamma)I + c\theta]} \geq 0. \tag{29b}$$

Equation (29b) shows that, in the absence of interim moral hazard, ξ=0. As a result, equation (29a) reduces to $\eta(\theta)$=1-β, i.e. the Hosios condition (Hosios, 1990), which states that the bargaining power of market participants should reflect their contribution to the creation of net surplus. Contributions are captured by the elasticity of the matching function.

Similar to Michelacci (2003), who extends Hosios' (1990) results to incorporate technological externalities, we use equations (29a) and (29b) to extend Hosios' (1990) results to a capital market environment where the contract frictions reduce the transferability of utility between market participants.

Proposition 7. In the presence of interim moral hazard, market allocation can generate the socially optimal allocation only if the financiers' bargaining power 1-β is larger than $\eta(\theta)$.

Proof: If $b>0$, $\xi>0$, and equation (29a) only holds if $1-\beta>\eta(\theta)$. QED.

To understand this, recall from section 3 that the interim moral hazard problem plays a role only when entrepreneurs are "competitive," i.e. when financiers propose the repayment obligation. When proposing the repayment obligation, the financiers need to allow entrepreneurs a sufficiently high share of the output to avoid expropriation. This link between the interim moral hazard problem and the financiers' bargaining power is reflected in (29a) and (29b). Compared to the standard Hosios condition, the opportunity of expropriating financiers makes entrepreneurship overly attractive from the standpoint of social welfare. It makes the negative congestion externality created by the entry of an entrepreneur on the same side of the market overly strong with respect to the positive thin-market externality on the other side of the market. Thus, the market allocation can be efficient only if the effect of the interim moral hazard on the entrepreneurs' entry decisions is offset by an increase in the financier's bargaining power.

Can the protection of investors be reformed to obtain efficiency? To address this question, we write $\xi(\alpha)$ given by (29b) as a function of α. Note that although the direct effect of α on $\xi(\alpha)$ is negative, the indirect effect through θ determined by (24) is quite complicated. This makes it hard to obtain decisive conclusion

without imposing further restrictions on parameters. Nonetheless, we can prove that

Proposition 8. If $\frac{\eta(\theta)}{1-\beta} \in [1-\xi(0),1]$, there exists $\alpha^* \in [0,1]$ such that market allocation and social optimum coincide.

Proof: Because $\xi(\alpha)$ is a continuous function of α and (29b) shows that $\xi(0)>\xi(1)=0$, there exists at least one $\alpha \in [0,1]$ such that (29a) holds if $\frac{\eta(\theta)}{1-\beta} \in [1-\xi(0),1]$. QED.

It immediately follows from Propositions 7 and 8 that if the financiers' bargaining power 1-β is smaller than $\eta(\theta)$, policymakers can *never* use investor protection to implement efficiency. If 1-β < $\eta(\theta)$, the congestion externality is relatively strong compared with the thin-market externality. It would thus be desirable to mitigate the congestion externality by discouraging entrepreneurship. However, even imposing the maximal level of investor protection does not sufficiently reduce the entry by entrepreneurs to balance the two externalities. Nevertheless, if the standard Hosios condition holds, the maximal level of investor protection, α = 1, yields the social optimum. At $\eta(\theta)$ = (1-β), the congestion and thin-market externalities without contract frictions counterbalance each other exactly. As contract frictions only tend to enhance the congestion externality, they should be eliminated completely.

7 Conclusions

We built an equilibrium model of private capital markets characterized by search and contracting frictions arising from interim and ex post moral hazard. The search frictions delay the funding of start-ups, while the contracting frictions reduce the transferable match surplus. We examine how investor protection affects the cost of capital, entrepreneurship and business creation in this economy.

Our analysis confirms the existence of the trade-off between investor protection and business creation suggested in recent empirical literature. Our result shows that the trade-off can only emerge in economies with serious interim moral hazard problems. Search frictions appear to exacerbate the adverse consequences of strengthened investor protection. There is no trade-off in economies where the ex post moral hazard is severe and thus monitoring costs relatively high, because there improvements in investor protection lower interest rates and stimulate business creation.

In a desire to make a first cut on the role of investor protection in a private capital market with search frictions, we have only considered its generic effects. We show that, depending on the policy emphasis, improving the position of investors can have widely disparate consequences. A reform that mainly reduces monitoring costs lowers interest rates and promotes entrepreneurship and business creation. A reform that principally constrains the freedom of entrepreneurs to choose projects has the reverse effect of raising interest rates and discouraging entrepreneurship and business creation. It also turns out that the search frictions dilute the beneficial effect of investor protection on business creation.

To obtain these insights, we abstract from modeling features that would enable us identify the form of small business finance and, consequently, the exact

form of investor protection. We neither specify whether the financial contracts involve debt or equity nor our financier who could be a bank, an equity investor, a friend, another firm, or any other passive financier that does not provide business advice. To be able to carefully evaluate the effects of a specific legal reform, additional ingredients should be brought into the model.

Nonetheless, we boldly offer several rather concrete policy recommendations. If we think that various transparency rules such as accounting, auditing, and disclosure govern monitoring costs more extensively than project choices, our analysis suggests that strengthening such transparency rules might stimulate entrepreneurship and business creation. In contrast, a cautious approach is called for with regulations controlling the freedom of entrepreneurs to choose projects. Many laws governing minority-shareholder protection such as low thresholds for calling extraordinary shareholders' meetings, or qualified majority requirements for charter changes and sales of major assets, typically reduce entrepreneurial freedom. In particular, the antidirector rights index of minority shareholder protection developed by La Porta et al. (1998) and its extensions by Pistor (2000) and Glaeser et al. (2001) include several rules that limit entrepreneurial freedom if applied to small companies. The implication here is that such laws should not be applied to small companies as harshly as to large corporations. In these respects, our findings are quite in line with the on-going company law reform in the UK:

> "Our law should provide the maximum possible freedom combined with the transparency necessary to ensure the responsible and accountable use of that freedom." (The Final Report of the Company Law Review, Department of Trade and Industry, UK, 2001, p. xi).

References

Ayres, I. and K. Madison, 2000, "Threatening Inefficient Performance", *European Economic Review* 44, 818-828.

Berger, A. N., and G. F. Udell, 1998, "The Economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle, *Journal of Banking and Finance* 22, 613-673.

Black, J. and D. de Meza, 1997, "Everyone May Benefit from Subsidising Entry to Risky Occupations," *Journal of Public Economics* 66, 409-424.

Blanchflower, D. G. and A. J. Oswald, 1998, "What Makes an Entrepreneur?" *Journal of Labor Economics* 16, 26-52.

Blanchflower, D. G., A. J. Oswald and A. Stutzer, 2001, "Latent Entrepreneurship Across Nations," *European Economic Review* 45, 680-691.

Boadway, R., M. Marchand and P. Pestieau, 1991, "Optimal Linear Taxation in Models with Occupational Choice," *Journal of Public Economics* 46, 133-162.

Department of Trade and Industry, UK. (2001). Modern Company Law for a Competitive Economy. The Final Report of the Company Law Review Steering Group.

Economic Report of the President, 2001, United Sates Government Printing Office, Washington.

European Commission, 1999, "Risk Capital Markets: A Key to Job Creation in Europe," in *Fragmentation to Integration*, Euro Papers, No. 32, 1-36.

European Commission, 2001, "Creating an Entrepreneurial Europe. The Activities of the European Union for Small and Medium-Sized Enterprises (SMEs)," Report from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions.

Evans, D. and B. Jovanovic, 1989, "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints," *Journal of Political Economy* 97, 808-827.

Fonseca, R., P. Lopez-Garcia, and C. A. Pissarides, 2001, "Entrepreneurship, Start-up Costs and Employment," *European Economic Review* 45, 692-705.

Gale, D. and M. Hellwig, 1985, "Incentive-Compatible Debt Contracts: The One-Period Problem," *Review of Economic Studies* 52, 647-663.

Glaeser, E., S. Johnson, and A. Shleifer, 2001, "Coase versus the Coasians," *Quarterly Journal of Economics* 116, 853–899.

Hamilton, B. H., 2000, "Does Entrepreneurship Pay? An Empirical Analysis of the Returns to Self-Employment," *Journal of Political Economy* 108, 604-631.

Holmström, B., and J. Tirole, 1997, "Financial Intermediation, Loanable Funds and the Real Sector," *Quarterly Journal of Economics* 112, 663-691.

Holtz-Eakin, D., D. Joulfaian and H. S. Rosen, 1994, "Entrepreneurial Decisions and Liquidity Constraints," *RAND Journal of Economics* 25, 334-347.

Hosios, A.J., 1990, "On the Efficiency of Matching and Related Models of Search and Employment," *Review of Economic Studies* 57, 279-298.

Hundley, G., 2001, "Why and When Are the Self-Employed More Satisfied with Their Work?" *Industrial Relations* 40, 293-316.

Inderst, R., 2001, "Screening in a Matching Model", *Review of Economic Studies* 68, 849-868.

Inderst, R., and H. M. Müller, 2002, "The Effect of Capital Market Characteristics on the Value of Start-Up Firms," forthcoming in *Journal of Financial Economics.*

Johansson, E., 2000, "Self-employment and Liquidity Constraints: Evidence from Finland," *Scandinavian Journal of Economics* 102, 123-134.

Johnson, S., P. Boone, A. Breach, and E. Friedman, 2000, "Corporate Governance in the Asian Financial Crisis," *Journal of Financial Economics* 58, 141-186.

Johnson, S., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer, 2000, "Tunneling," *American Economic Review Papers and Proceedings* 90, 22-27.

Keuschnigg, C. and S. B. Nielsen, 2003, "Tax Policy, Venture Capital and Entrepreneurship," *Journal of Public Economics* 87, 175-203.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1997, "Legal Determinants of External Finance," *Journal of Finance* 52, 1131–1150.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1998, "Law and Finance," *Journal of Political Economy* 106, 1113–55.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 2000, "Investor Protection and Corporate Governance," *Journal of Financial Economics* 58, 2–27.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 2002, "Investor Protection and Corporate Valuation," *Journal of Finance* 57, 1147-1171.

Lerner, J., 1999, "The Government as Venture Capitalist: The Long-run Effects of the SBIR Program," *Journal of Business* 72, 285-318.

Michelacci, C., 2003, "Low Returns in R&D Due to the Lack of Entrepreneurial Skills," *Economic Journal* 113, 207-225.

Michelacci, C. and J. Suarez, 2002, "Business Creation and the Stock Market," forthcoming in *Review of Economic Studies*.

Muthoo, A. 1999, *Bargaining Theory with Applications*. Cambdridge, Cambridge University Press.

Mortensen, D. T. and C. A. Pissarides, 1999, "New Developments in Models of Search in the Labor Market," in O. Ashenfelter and D. Card, eds., *Handbook of Labor Economics* 3, 2567-2627. Amsterdam: Elsevier Science.

Moskowitz, T. J. and A. Vissing-Jørgensen, 2002, "The Returns to Entrepreneurial Investment: A Private Equity Premium Puzzle?" *American Economic Review* 92, 745-778.

Pissarides, C. A., 2000, *Equilibrium Unemployment Theory*, Cambridge, MA, The MIT Press.

Pistor, K., 2000, "Patterns of Legal Change: Shareholder and Creditor Rights in Transition Economies," *European Business Organisation Law Review* 1, 59–108.

Poterba, J. M., 1989, "Capital Gains Tax Policy Toward Entrepreneurship," *National Tax Journal* 42, 375-389.

Shleifer, A. and D. Wolfenzon, 2002, "Investor Protection and Equity Markets," *Journal of Financial Economics* 66, 3-27.

Storey, D. J. and B. S. Tether, 1998, "Public Policy Measures to Support Technology-Based Firms in the European Union," *Research Policy* 26, 1037-1057.

Townsend, R., 1979, "Optimal Contracts and Competitive Markets with Costly State Verification," *Journal of Economic Theory* 21, 265-293.

Wallsten, S. J., 2000, "The Effects of Government-Industry R&D Programs on Private R&D: The Case of the Small Business Innovation Research Program," *Rand Journal of Economics* 31, 82-100.

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