Journal of Economic Behavior & Organization 111 (2015) 119–136

Contents lists available at ScienceDirect

Journal of Economic Behavior & Organization

journal homepage: www.elsevier.com/locate/jebo

Inter-company matching and the supply of informed capital☆

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ARTICLE INFO

Article history:
Received 29 May 2014
Received in revised form
19 December 2014
Accepted 31 December 2014
Available online 10 January 2015

JEL classification:
D20
D80
G24
G32
L20

Keywords:
Financial intermediation
Matching
Venture capital

ABSTRACT

We model an economy where it is beneficial for high-type organizations to collaborate with other high types, and where this assortative-matching pattern allows informed financiers to provide inexpensive funds to partner companies of their high-type ventures. The expected funding benefit associated with finding high-type partners increases in the supply of informed capital, which creates an additional incentive for high types to search. Our main result is that, in such a setting, a critical mass of informed capital is sometimes required for an efficient equilibrium to obtain. We provide a novel channel for how the financial sector can impact real outcomes, specifically by affecting matching patterns.

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1. Introduction

Economists often use single-firm models for tractability, but most real-world organizations interact in important ways. For example, all ten top-selling biotechnology drugs in 2001 were developed by specialized biotech companies; but only five of the drugs were marketed by biotech companies, and only four were marketed by its developer (Powell et al., 2005). If some important projects in the economy are a collaborative endeavor, it seems reasonable to conjecture that getting the "right" organizations to match plays an important role in achieving success. However, efficient matching may be challenging in fast-paced high-tech sectors that are naturally plagued by high uncertainty and informational asymmetries.

Our paper develops a model where a minimum supply of informed capital—for example, the number of venture capitalists catering to a particular technology cluster—is instrumental in enabling efficient matches on a large scale, where many

☆ This paper circulated previously under the title "Collaborative Innovation and the Supply of Informed Capital". The authors thank Andres Almazan, Aydoğan Alti, Jonathan Cohn, Nicholas Crain, Cesare Fracassi, Richard Lowery, William Neilson (editor), Robert Parrino, Paul Povel (discussant at the 2013 SFS Cavalcade), Clara Raposo, David Robinson, Ana Paula Serra, Sheridan Titman, Malcolm Wardlaw, Adam Winegar, and two anonymous referees for their comments and discussions. The authors also appreciate helpful comments from seminar participants at UT Austin, ISEG (Lisbon, Portugal), FEP (Oporto, Portugal), Universidad de Chile, Pontificia Universidad Católica de Chile, Universidad Adolfo Ibañez, The Central Bank of Chile, and from conference participants at the 2012 meetings of the European Economic Association, and at the 2013 SFS Finance Cavalcade.

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http://dx.doi.org/10.1016/j.jebo.2014.12.028
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high-quality organizations associate with one another to produce. In light of our main result, the normative takeaway of the paper is that fostering the supply of informed capital (e.g., by promoting the VC industry) might be efficient, if this policy pushes the supply of informed capital beyond a critical threshold. The more positive implication of the model is that jumps or acceleration in economic output can sometimes be observed when certain levels in the supply of informed capital are exceeded.

The model we propose builds on a labor economics paper on job search and social connections (Montgomery, 1991). In this paper, employees exogenously display (positive) *assortative matching*, that is, the tendency for high types to associate with other high types. As employers learn which current employees are high-type, they are able to make informed, above-market wage offers to their employees' social connections. In our model, the social connection is replaced by a business association between two organizations that want to collaborate on a project. As the employees in Montgomery (1991), the organizations in our model also differ with respect to type, and under certain conditions financiers will be able to infer the quality of their current ventures' business association. In such an informative equilibrium, financiers pursue good investment opportunities and high-type firms fund their operations at a cheaper cost. The main difference with respect to Montgomery (1991) is that we do not take assortative matching as exogenous. In the model all firms internalize the advantages of being associated with high types and sometimes assortative matching will not obtain in equilibrium. The endogeneity of the matching notwithstanding, we do assume at the outset that assortative matching is efficient.[2]

We consider two types of financiers: an exogenous number of VC-like agents (informed capital) and a competitive uninformed financial market, which operates as long as adverse selection is not too severe. The model then adds two key frictions. The first is that companies need to incur an exogenous certification (or search) cost to be matched with a high-quality partner. The second is that companies (or entrepreneurs) are financially constrained.[3] With these ingredients, the model predicts that the economy is in one of two mutually exclusive equilibria: (1) only informed finance is available, and thus the level of aggregate output is dictated by the supply of informed capital; or (2) uninformed financial markets are feasible and many more projects are financed (large-scale regime). Our model generates two main results: (1) for the large-scale regime to be an equilibrium, a critical threshold for the supply of informed capital must be exceeded; and (2) if the critical threshold is positive, then the large-scale regime is more efficient than the informed-finance-only equilibrium when the supply of informed capital is *at the threshold*.

The mechanics of the result is as follows. Whereas an informed-finance-only economy can weed out many low types, the opening of the uninformed financial market attracts these types as well. However, the main problem with the presence of low types is not that they have negative net present value projects, but the fact that they may disrupt assortative matching, without which the large-scale regime is unfeasible. In the model, low-type organizations do not have an incentive to incur the certification cost required to find a high-quality partner, and not incurring in certification costs relaxes their financial constraints. In turn, the relaxed financial constraints allow low-type companies to make large transfers to their partners, who are picked from a residual matching market at random. Given high prices in the residual matching market, high-quality companies might not receive offers from prospective high-quality partners that are good enough, in which case assortative matching is no longer sustainable. The financial sector, then, plays an important role in offsetting the negative indirect effect of certification costs. A minimum supply of informed capital guarantees that, even with the financial slack of low types present, the difference in the costs of financing across high and low types is still large enough that high types want to engage in assortative matching (i.e., to incur certification costs). A higher supply of informed capital increases the probability that high types can obtain low-cost informed financing and worsens the adverse selection in the uninformed capital market, which in turn increases the cost of financing for low types.

The role of informed financial intermediaries in this model is thus different from its role in standard models, in the sense that they operate as enablers of the uninformed financial market. This situation is counter-intuitive because we expect adverse selection generated by informed intermediaries to simply crowd out uninformed financiers.

For a minimum supply of informed capital to be instrumental in sustaining the large-scale regime, internal funds must be at an intermediate level. On the one hand, they cannot be too high. This necessity is intuitive, as we would expect financially unconstrained agents to more easily implement the efficient outcome in equilibrium. However, on the other hand, internal funds also cannot be too low. With too few internal funds, high-quality companies participating in the certified matching market tend to overbid for potential partners, and these high bids come at the expense of uninformed financiers. Investors anticipate this behavior, and because uninformed finance is no longer available, the large-scale regime collapses. In other words, internal funds need to be high enough to align the interests of insiders and outsiders.

Another necessary condition for the proposed mechanism to be relevant is that the companies incurring the certified-matching-market participation cost appropriate little surplus. When these companies' surplus is high, the amount transferred to partners is low. Everything else constant, this reduces the necessity of raising external capital, which in

[2] A similar assumption is made in Rhodes-Kropf and Robinson (2008) in a context of mergers. Many other papers on search and matching start with the assumption that match synergies exist; for a review of this literature, see Smith (2011). For a discussion of assortative matching and efficiency, see Durlauf and Seshadri (2003).

[3] Financial constraints play an important role in our model. Therefore, our framework is less suited to settings where one of the partnering firms (e.g., Google) has a high level of internal funds.

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