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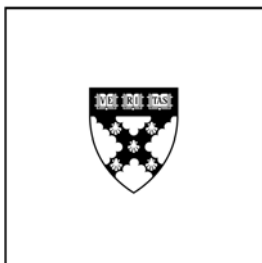
Financing Constraints and Entrepreneurship

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1. Introduction

Surveys of current and potential entrepreneurs suggest that obtaining adequate access to capital is one of the biggest hurdles to starting and growing a new business. Given the important role that entrepreneurship is believed to play in the process of creative destruction – and hence economic growth – it is not surprising that attempts to alleviate financing constraints for would-be entrepreneurs is an important goal for policy makers across the world. For example, the U.S. Small Business Administration funded or assisted in the funding of about 200,000 loans in Fiscal Year 2007, at an administrative cost of about $1,000 per loan (SBA 2008). Financial assistance for entrepreneurs is also high on the agenda in the European Union and OECD, where member states are urged to promote the availability of risk capital financing for entrepreneurs (OECD 2004).

The underlying premise behind these policies is that there are important frictions in the credit markets precluding high-quality entrepreneurs with good ideas (i.e., positive net present value projects) from entering product markets because they are unable to access adequate capital to start a new business. Much of the academic literature has therefore focused on analyzing the nature of these frictions, the effect they have on access to finance, and the impact of reduced financing constraints on rates of entrepreneurship.

This article reviews two major streams of work examining the relevance of financing constraints for entrepreneurship. The first research stream considers the impact of financial market development on entrepreneurship. These papers usually employ variations across regions to examine how differences in observable characteristics of financial sectors (e.g., the level of competition among banks, the depth of credit markets) relate to entrepreneurs' access to finance and realized rates of firm formation. The second stream employs variations across individuals to examine how propensities to start new businesses relate to personal wealth or recent changes therein. The notion behind this second line of research is that an association of individual wealth and propensity for self-employment or firm creation should be observed only if financial constraints for entrepreneurship exist.

These two streams of research have remained mostly separate literatures within economics, driven in large part by the different levels of analysis. Historically their general results have been mostly complementary. More recently, however, empirical research using individual-level variation has questioned the extent to which financing constraints are important for entrepreneurship in advanced economies. This new work argues that the strong associations between the financial resources of individuals and entrepreneurship observed in previous studies are driven to large extents by unobserved heterogeneity rather than substantive financing constraints. These contrarian studies have led to renewed interest and debate in how financing environments impact entrepreneurship in product markets.

This article begins with an overview of the main findings of these two research streams. We highlight the areas where they seem to pose an apparent puzzle based on potentially contradictory implications. We then develop a framework that can reconcile these contradictory findings and outline a set of implications for ongoing research and policy analysis in the area of financing constraints and entrepreneurship.[1]

2. Financial Market Development and Entrepreneurship

Metrics of financial market development quantify the ease with which individuals in need of external finance can access the required capital and the premium they pay for these funds. The role entrepreneurship plays in linking a country's financial market development to its subsequent economic growth is highlighted by King and Levine (1993a,b) and Levine (1997). Their work brought prominence to the role of finance in Schumpeter's creative destruction, whereby entrepreneurs with new ideas and technologies displace incumbents with old technologies, leading to a continued increase in productivity and economic growth. This contrasts with the view, put forth by Joan Robinson and others, that development of financial sectors and institutions simply follows economic growth.

Central to this idea is the notion that a large fraction of the productivity growth in the economy may take place at the extensive margin (e.g., the birth of new firms, the closure of unproductive firms) rather than on the intensive margin (e.g., firms becoming more productive internally). Since most startups need to raise capital in order to implement their new ideas, cross-sectional differences in the ability of capital markets to select and finance the most promising entrepreneurs may lead to important differences in entrepreneurship and productivity growth across economies (Greenwood and Jovanovic 1990; Jayaratne and Strahan 1996; Levine 1997; Beck et al. 2000; Guiso et al. 2004).

Thus a growing line of research has examined the sources of friction in the capital markets that may lead to financing constraints (or the misallocation of capital more broadly) and hence negatively impact productivity growth. In the following sub-sections, we outline three important mechanisms through which frictions in the capital markets lead to financing constraints for entrepreneurs.

2.1 Financial Market Depth

Perhaps the most important factor governing the ability of startups to raise sufficient capital for their projects is the depth of the local capital markets. This depth is therefore a natural starting point for measuring financial market development for funding new capital-intensive projects, through metrics like

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[1] There are two important literature strands that we do not review. The first strand studies financing constraints for entrepreneurship in developing economies, with recent innovations using randomized experiments for causal analysis. Representative papers include Morduch (1999), Paulson and Townsend (2004), Paulson et al. (2006), McKenzie and Woodruff (2006, 2008), Banerjee and Duflo (2008), and De Mel et al. (2008). A second literature uses quantitative techniques to evaluate financing constraints, entrepreneurship, and economic outcomes. Representative papers include Quadrini (2000), Li (2002), Castaneda et al. (2003), Cagetti and De Nardi (2006), Buera (2008), Meh (2005), and Mondragón-Vélez (2007).

the ratio of bank deposits to GDP or stock market capitalization to GDP. For example, Rajan and Zingales (1998) show that industrial sectors with a greater need for external finance develop faster in countries with deeper capital markets. Fisman and Love (2003) find that, in particular, startup firms struggle with overcoming weaknesses in financial market development, even where established firms are able to use trade credit as a substitute for formal financing. Comin and Nanda (2009) show how the difficulties faced by startups in raising capital might adversely impact the commercialization of new technologies. Using historical data on banking-sector development and technology diffusion, they find that capital-intensive technologies are adopted much faster relative to less capital-intensive technologies in countries that are over a certain threshold in banking-sector development.

Why do some regions have greater financial depth than others? The lack of financial market liquidity has been traced to several related factors. At the most basic level, the willingness of financial intermediaries to lend to entrepreneurs (and the willingness of depositors to save with intermediaries) depends on financial and securities laws in a country. For example, La Porta et al. (1997, 1998) and Beck et al. (2001) trace the relationships between the legal origins of financial market laws across countries and relate them to the degree of investor protection and hence the ability of financial intermediaries to raise and lend capital. Paravisini (2008) shows in the context of Argentina that banks not only face frictions in their access to external financing, but that these frictions prevent them from undertaking profitable investment opportunities in the real economy. Banerjee and Duflo (2008) have similar findings in the context of a directed lending program in India.

While the issues of financial market depth may be particularly acute in emerging markets, startups in advanced economies are not immune to these issues. For example, Berkowitz and White (2004) find that entrepreneurs are less likely to get credit for their startups in U.S. states with stronger bankruptcy protection for individuals. When banks are less certain of recovering their loans in the event that a startup fails, they are less likely to extend credit in the first place. Guiso et al. (2004) examine local variation in the supply of credit across regions in Italy. They find that even in a well-developed and integrated financial market like Italy, regions with deeper capital markets promote the entry and growth of new firms and increase the propensity of individuals to start new businesses.

These findings are important in that they underscore the importance of local capital markets for entrepreneurship. The degree of asymmetric information associated with small, entrepreneurial ventures is very high. As a result, the intermediaries who are best able to overcome the costs of screening and monitoring these ventures are often local. Deep, national capital markets alone may not be sufficient to alleviate financing constraints for startups.

The importance of access to local finance seems equally relevant for venture capital (VC) financing as it is for bank financing. Sorenson and Stuart (2001) find that VC firms are much more likely to fund entrepreneurs located within a short geographic distance from where they are based (or to provide funding on the condition that entrepreneurs move closer to the VC firms). Similarly, Black and Gilson (1998) relate the lack of a large biotechnology industry in Germany to the local institutional environment for VCs. They argue that the institutional environment in Germany, which is more bank oriented compared to the U.S.'s market orientation, reduces the ability of German startups to achieve

liquidity events via stock listings. As a consequence, the VC community in Germany is less developed, and the flow of risk capital to good biotechnology projects in Germany is weaker. Other studies find that VC investors appear particularly effective in funding innovative startups (Kortum and Lerner 2000) and that the ebbs and flows in the capital markets may have important follow on consequences for rates of innovation in the economy (Nanda and Rhodes-Kropf 2009).

While capital market depth is a key factor impacting the ability of entrepreneurs to finance their startups, the organization of the financial sector can also have profound effects on financing constraints for potential entrepreneurs. In the next two sub-sections, we explore two related dimensions in which the organization of the financial sector can impact startup activity – the level of competition between financial intermediaries and the internal structure of the financial intermediaries.

2.2 Competition between Financial Intermediaries

The level of competition between financial intermediaries can impact the terms of credit to startups as well as the degree to which capital is allocated to the highest-quality projects (Levine 1997). This issue is particularly acute in developing countries where the banking system may be subject to political capture (Banerjee et al. 2003; Cole 2009). However, bank deregulation is shown to have first-order effects on the *ex ante* allocation of capital to large firms in France (Bertrand et al. 2007) and on entrepreneurship in the U.S. (Black and Strahan 2002; Kerr and Nanda 2009a,b). For example, Bertrand et al. (2007) find that banks were less willing to bail out poorly performing firms in the product markets after the French banking reforms of 1985. As a result, French firms in sectors with a greater reliance on bank finance were more likely to restructure.

The U.S. branch banking deregulations provide a particularly useful laboratory to study the effect of bank competition on entrepreneurship. Prior to liberalization, U.S. banks faced multiple restrictions on geographic expansion both within and across states. The most restrictive of these, known as unit banking, limited each bank to a single branch. From the 1970s through the mid 1990s, banks experienced significant liberalization in the ability to establish branches and to expand across state lines, either through new branches or acquisitions.

Greater bank competition and markets for corporate control due to U.S. deregulations are thought to have improved allocative efficiency by allowing capital to flow more freely towards projects yielding highest returns. Moreover, although the number of banks fell over this period, the number of bank branches increased considerably, reflecting greater competition and increased consumer choice in local markets. From a theoretical perspective, these reforms would have had a strong positive effect on entrepreneurship if startups faced substantial credit constraints. Moreover, since entrepreneurs typically would have faced fewer non-bank options for financing their projects relative to existing firms (e.g., internal cash flow, bond markets), more efficient allocation of capital within the banking industry

should have led to larger increases in startup entry relative to facility expansions by existing firms if startups faced barriers in their ability to raise sufficient external capital to grow.[2]

Black and Strahan (2002), Cetorelli and Strahan (2006) and Kerr and Nanda (2009a) find dramatic increases in startup activity subsequent to inter-state branch banking deregulation. Moreover, Kerr and Nanda (2009a) show that these increases continue to be significant when compared to the baseline of facility expansions by existing firms – particularly so for firms entering at a smaller size where financing constraints are most likely to be most acute. In addition to these changes at the extensive margin, Kerr and Nanda (2009b) also find that startups were likely to be larger at entry relative to their maximum size in the first three years of operation, suggesting intensive margin effects of the reforms as well.

These results are particularly strong in light of theories suggesting that an increase in bank competition has the potential to impede startup activity. For example, Petersen and Rajan (1995) argue that startups may benefit from concentrated banking markets because monopolist banks can engage in inter-temporal cross-subsidization of loans. As a monopolist bank can charge above-market interest rates to mature firms, it can, in turn, charge below-market rates to potential entrepreneurs. By doing so, the bank can maximize the long-term pool of older firms to which it lends. Increased competition weakens the market power of local banks, reducing their ability to charge above-market rates, and thereby weakening the incentives for subsidizing new entrants as well. Despite this possibility, the strong elasticity of entry with respect to the reforms suggests that the overriding impact of the increased competition between banks was to facilitate the provision of cheaper credit and better allocation of capital to new projects.

2.3 Structure of Financial Intermediaries and their Relationship with Firms

Financial intermediaries provide an important role in deciding which projects to fund and in monitoring these projects after funding them. As the costs of acquiring information about borrowers increase, it becomes harder to fund them profitably. Established firms have several advantages in this respect such as history of audited financial statements, greater collateral to pledge against loans, and potentially the ability to partially fund expansion through retained earnings. On the other hand, information asymmetry and limited assets are particularly acute for potential entrepreneurs, resulting in good projects going unfunded because intermediaries are unable to evaluate them effectively.

Stiglitz and Weiss (1981) outline why these large costs of screening and monitoring startups cannot be completely overcome by raising interest rates. They observe that raising interest rates may lead to

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[2] Only twelve states had some form of intra-state deregulation prior to 1970, and no state allowed inter-state branch banking. Starting in the 1970s, and especially in the 1980s, most states passed both forms of deregulations. Accounts of the political economy of these reforms suggest their passage was mostly exogenous to product markets, driven in part by federal actions and state-level structures of the banking industry. Moreover, Kerr and Nanda (2009a) show that the timing of the reforms is not systematically related to the level of entrepreneurial activity in states prior to the reforms. Exploiting cross-state timing in the passage of the reforms provides a useful way to study the effect of an increase in bank competition on entrepreneurship.

adverse selection, where only entrepreneurs starting the most risky projects would agree to the bank's loan terms. In such an instance, the banks would face greater default probabilities, making the loans unprofitable in expectation. They show theoretically that in such an instance, banks may be forced to ration credit rather than raise interest rates to market clearing levels. Credit rationing causes entrepreneurs to face financing constraints. Thus, innovations within the financial sector that lower information costs can have important effects on reducing financing constraints for entrepreneurs.

A large body of work finds that close ties between financial intermediaries and firms reduce information asymmetries and lower financing constraints. For example, Petersen and Rajan (1994) and Berger and Udell (1995) show that borrowers with longer banking relationships are less likely to pledge collateral, less likely to rely on expensive trade credit, and hence are less constrained in their investment decisions than firms with shorter banking relationships. Related work suggests that small or decentralized banks – where branch managers have greater authority to make adjudication decisions – are much more likely to lend to startups and small businesses. These banks have a comparative advantage for evaluating informationally opaque or "soft information" businesses (Berger et al. 2001). They also are more likely to have appropriate incentives to act on the information than branch managers in large, hierarchical banks where adjudication decisions are centrally made (Stein 2002).

Berger et al. (2005) find that differences in bank organizational structures impact the credit constraints of small firms across the U.S. Canales and Nanda (2008) demonstrate a similar effect for terms of lending to small businesses in Mexico. In many respects, the recent innovations for microfinance in developing countries, such as the Grameen Bank founded by Muhammad Yunus, can be seen as reducing monitoring cost for informationally opaque micro-businesses. These innovations enable financial intermediaries to lend smaller amounts to entrepreneurs at a profit due to the lower fixed costs of evaluating and monitoring projects.

Although we have outlined these sources of financing constraints as distinct channels impacting entrepreneurship, they are of course interlinked. For example, Canales and Nanda (2008) show the important effects of the interaction between bank structure and the competitive environment when studying the terms of lending to small businesses in Mexico. Bozkaya and Kerr (2007) show that countries with strong employment protection laws – where firing workers is more difficult – are associated with weaker VC and private equity markets.   Their findings suggest that institutional environments can have first-order effects on the presence and structure of certain types of financial intermediaries and hence on the availability of startup capital in certain types of industries.

3. Personal Wealth and Entrepreneurship

We now turn to the second broad stream of research on financing constraints and entrepreneurship. While the first stream of research relies on cross-sectional differences in the institutional environment to study the impact of financial development and financial frictions on entrepreneurial activity, the

second stream analyzes the propensity of individuals to become entrepreneurs depending upon their financial resources.

Entrepreneurs tend to be significantly wealthier than those who work in paid employment. For example, Gentry and Hubbard (2004) find that entrepreneurs comprise just under 9% of households in the U.S., but they hold 38% of household assets and 39% of the total net worth. Not only are entrepreneurs wealthier, but also the wealthy are more likely to become entrepreneurs.

The canonical model to understand this relationship between individual wealth and entrepreneurship was developed by Evans and Jovanovic (1989). In their model, the amount an individual can borrow to fund a new venture is a function of the collateral that he or she can post, which in turn is a function of personal wealth. If the amount the entrepreneur needs to borrow is sufficient to cover the capital required to start the business, then the entrepreneur is said to be unconstrained. On the other hand, if the entrepreneur needs to invest more than he or she can borrow, then a financing constraint leads to sub-optimal investment for the project at hand. Since returns to projects are a positive function of the capital invested, some projects that would have been profitable for an unconstrained entrepreneur become unprofitable for a constrained entrepreneur.

Thus, a central prediction of this model is that the propensity to become an entrepreneur is a function of personal wealth if potential entrepreneurs are credit constrained. Wealthy individuals are less likely to be constrained for a given project. On the other hand, a null relationship between wealth and entrepreneurship would suggest that borrowing constraints are not binding for potential entrepreneurs. Looking at whether there is a strong association between personal wealth and the propensity to become an entrepreneur may thus shed light on the nature of financing constraints in the economy.

Evans and Jovanovic (1989) estimate their model using data from the National Longitudinal Survey of Youth (NLSY) and find significant support for the presence of financing constraints in their data. They argue that the positive relationship between personal wealth and entry into entrepreneurship can be seen as evidence of market failure, where talented but less wealthy individuals are precluded from entrepreneurship because they lack sufficient wealth to finance their new ventures. This finding has been extremely influential in both academic and policy circles.

While a null relationship between personal wealth and entrepreneurship points to a lack of financing constraints, Evans and Jovanovic (1989) note that unobserved heterogeneity may lead to a spurious correlation between personal wealth and entrepreneurship in empirical studies even if individuals do not face financing constraints. Subsequent work in this second strand of research has built on this canonical model, while attempting to better control for sources of endogeneity in order to understand the causal relationship between personal wealth and the propensity to enter into entrepreneurship. Below, we organize the subsequent work by two major categories of potentially spurious correlation.

3.1 Endogenous Wealth Creation

In the Evans and Jovanovic (1989) model, returns to entrepreneurship are greater for high-ability individuals. An important concern with empirical findings that show wealthier individuals become

entrepreneurs is that personal wealth accumulation is endogenous. That is, if individuals with high ability are more likely to generate savings (because they earn more in wage employment relative to the mean person) and are also more likely to become entrepreneurs, the observed correlation between personal wealth and entrepreneurship may reflect this unobserved attribute rather than the causal effect of financing constraints (Holtz-Eakin et al. 1994; Blanchflower and Oswald 1998). A similar concern may apply to results showing that those who are less wealthy start smaller firms (Cabral and Mata 2003).

In order to address such concerns, researchers have sought to find exogenous shocks to personal wealth and study their effects on selection into entrepreneurship. In addition, dynamic models of occupational choice have aimed to characterize better the inter-temporal savings and consumption paths of individuals who eventually become entrepreneurs (Buera 2008).

An early innovation to overcome the endogeneity of wealth accumulation came from Holtz-Eakin et al. (1994) and Blanchflower and Oswald (1998) who looked at bequests as a way to untangle the endogeneity of wealth creation. Blanchflower and Oswald (1998) find that bequests increase the likelihood of entry into self-employment, especially for younger workers who are less likely to have saved as much. Relatedly, Holtz-Eakin et al., (1994) look at the continuation probabilities of self-employed individuals as a function of bequests. They find that those who received bequests were less likely to shut down their businesses and had better firm performance conditional on continuing operations.

As Blanchflower and Oswald (1998) note, a potential concern with the use of bequests as an instrument for personal wealth is that the bequests may not be truly exogenous. For example, bequests may be factored into the financial calculations of children. Children of wealthy parents may choose to consume more in the present and invest in the business once they receive the bequest. Consistent with this idea, Hurst and Lusardi (2004) find that future bequests predict entry into self-employment as much as past bequests do. Other novel attempts to overcome this endogeneity concern – for example, Lindh and Ohlsson (1998) examine self-employment entry among lottery winners finding a strong positive relationship between shocks to personal wealth and subsequent self-employment entry. It is debated, however, whether these techniques can ultimately account for wealth effects associated with large changes in personal assets that may impact preferences or relative ability as later discussed.

3.2 Wealth Effects, Preferences, and Sorting

A second source of spurious correlation arises from the fact that observed and unobserved individual abilities and preferences for entrepreneurship may be systematically correlated with personal wealth. For example, wealthy people may have lower absolute risk aversion, making them more likely to become entrepreneurs (Evans and Jovanovic 1989; Khilstrom and Laffont 1979). People may also have a preference for being their own boss that increases with greater personal wealth (Hurst and Lusardi 2004). Further, if wealthy individuals are more effectively able to exploit certain networks that help them gain access to scare resources, the relative ability of an individual as an entrepreneur compared to a wage worker may systematically change as they get wealthier – irrespective of their absolute ability in

each sector. This may make wealthier individuals more likely to sort into entrepreneurship even if less wealthy individuals do not face financing constraints.

Hurst and Lusardi (2004) argue in favor of this perspective. They document that the propensity to enter self-employment is relatively flat up to the 80th percentile of the U.S. wealth distribution. Moreover, the strongest association between wealth and entry into self-employment is in the top five percent of the wealth distribution. As these very wealthy individuals do not generally start very capital-intensive firms, Hurst and Lusardi (2004) conclude that entrepreneurship may be a luxury good. People may derive non-pecuniary benefits of being their own boss (Hamilton 2000), in which case the wealthy may be more likely to sort into entrepreneurship due to these unobserved preferences rather than due to substantive financing constraints.

In a similar vein, Moskowitz and Vissing-Jorgensen (2002) find that the returns to private equity investments among wealthy business owners are not large enough relative to public markets to account for the undiversified and illiquid stakes that they have in their businesses. These authors also point to the presence of unobserved preferences for self-employment that may drive this "private equity premium puzzle." These studies would suggest caution about implementing policies to reduce financing constraints for entrepreneurs.

Using micro data from Denmark, Nanda (2009) finds the same non-linear relationship between personal wealth and entrepreneurship identified for the U.S. by Hurst and Lusardi (2004). Moreover, he also finds that the wealthiest entrepreneurs are more likely to fail, particularly those founding businesses in less capital-intensive industries. Nanda argues that an important factor explaining this may be the disciplining role of the external capital markets. Wealthy individuals are less likely to have their ideas screened and vetted by potential investors, lowering the threshold level of ability required for wealthy individuals to start businesses. In such an instance, a far greater proportion of wealthy individuals may become entrepreneurs because they do not face the discipline of external finance, even if less wealthy individuals with high ability do not face financing constraints. This view is similar to that of de Meza (2002), who provides a theoretical framework where an individual who is indifferent between becoming an entrepreneur and staying a wage earner is higher ability than the wage earners, but lower ability than the entrepreneurs. When the cost of finance falls, these marginal individuals are most likely to select into entrepreneurship.

This sub-section has highlighted a growing set of studies that have noted either a potentially spurious association between personal wealth and entrepreneurship or provided explanations for the correlations that do not invoke financing constraints. The conclusions of these studies suggest that in advanced economies, financing constraints may not play as important a role in impacting entrepreneurship as was previously believed. Yet regional-level studies discussed in Section 2 suggest a very consistent pattern of financing constraints faced by firms. How should we reconcile these different views?

4. An Approach to Reconciling the Different Explanations

In this section, we propose a simple framework that may help to reconcile these different views. We also highlight some fruitful areas of research that may help to better explain the nature of financing constraints faced by entrepreneurs.

{Insert Figure 1 here}

This graph places entering businesses into a two-dimensional space. The vertical axis documents the firm size or capital intensity of the new business. At lower levels, the entrepreneur may be part time and self-employed, without any significant investment or employment of others. At higher levels, the firm is entering with a substantial number of employees in the first year. Most hobby entrepreneurs or sole proprietors will never seek to hire someone else, remaining permanently in the lower bubble. In some cases, the start-up will grow much larger, following the path of famous Silicon Valley firms like Hewlett-Packard that began in a garage.

The horizontal axis considers the technological novelty of the project. This includes both the actual technical challenges required and the difficulty that investors have in assessing the technologies in advance. Most entrepreneurs use off-the-shelf business models with proven technologies, such as restaurants, consulting firms, franchised dealerships, and construction firms, among others. Other projects have unproven technologies, where the technology generalizes to include many aspects of the business model like design combinations, delivery methods, and so on. This definition would cover, for example, the launch of Federal Express as well as pure technology-oriented startups. The right-hand bubble in the chart represents these latter cases, which we label as "Schumpeterian Entrepreneurship" in short hand.

The first point of this taxonomy is to highlight that the two literature strands in Sections 2 and 3 tend to sample different forms of entrepreneurship. Regional studies, at either the country or sub-country level, typically consider financial development and entrepreneurship among firms that are above a certain explicit or implicit size. The top left bubble in Figure 1 represents this group. This selection may be due to the legal status of businesses in the sample (e.g., incorporated firms only) or how the data are collected (e.g., payroll tax registers). The data often build from administrative and tax records, and only the firms that have reached a corresponding size or status are included. Moreover, the collection agency may explicitly sub-sample small firms that are below a certain number of employees, using imputation techniques for other firms. This selection factor from government records can be particularly acute in developing countries where many entrepreneurs operate in informal sectors.

On the other hand, studies looking at personal wealth and entrepreneurship often use self-employment as a proxy for entry into entrepreneurship. Questions regarding self-employment are the most prevalent on household surveys from which these studies draw, and this definition of entrepreneurship is easily linked to the notion of the number of people leading independent enterprises. This metric, however, weighs small-scale, independent operators very heavily vis-à-vis high-growth entrepreneurship. This can be seen in self-employment rankings that list West Palm Beach, Florida, as

America's most entrepreneurial city while San Jose, California, home to a large portion of Silicon Valley, is near the bottom of the rankings. This contrasts with measures of firm startups or VC funding that rank San Jose near the top. This self-employment group is the bottom left bubble in Figure 1.[3]

Thus studying different populations may be an important factor for explaining some of the differences in the results. The bottom, left bubble represents the vast majority of entrants. The U.S. provides a vivid illustration. Of the 26 million firms in the U.S., 20 million are self-employed individuals, full or part time, without paid employees. Of the remaining six million businesses, 80% have 20 employees or fewer. When looking at new entrants subject to payroll tax, Kerr and Nanda (2009) find that only 5% of startups are formed with more than 20 employees in the first year. This share would be substantially lower if calculated relative to the large majority of entrants that are not paying payroll tax.

A threshold of 20 employees, however, is not an uncommon bar for observing entrepreneurship in many cross-country or cross-regional studies employing official statistics on business starts. These government entry figures capture a very small share of the total entrepreneurial activity that may be reported on individual-level surveys. This observation does not mean that studies based on firm-level administrative data are weaker or less reliable than inquiries employing individual-level data. Indeed, the small share of businesses in the former sample captures most of the job creation and innovation that policy makers typically seek with entrepreneurship initiatives. This trade-off is even more acute in studies employing samples of VC-backed firms. VC-backed samples are not representative for the overall landscape of entrepreneurship even among employer firms, but they do capture even more the very high-growth entrepreneurship that some researchers hope to analyze.

Both types of studies are important, but it is essential to position findings regarding financial constraints within the landscape of entry activity and its various metrics. As an example from our own work, Kerr and Nanda (2009a) show that U.S. banking deregulations led to significant increases in churning entry – that is, very small entrants that survive three years or fewer. This extensive margin effect suggests large increases in weaker entrants following relaxed constraints. This churning growth helps reconcile why prior work found that the U.S. inter-state reforms resulted in entry increasing by over 10% a year (Black and Strahan 2002) but no measured effects on the firm size distribution and limited productivity gains (Cetorelli and Strahan 2006; Jayaratne and Strahan 1996). In a similar vein, Nanda (2009) finds a substantial growth in weak entrants with high failure rates after financing constraints were lessened in Denmark using individual-level data.

On the other hand, Kerr and Nanda (2009a,b) find important intensive margin effects after the U.S. reforms. Deregulation promoted larger entry sizes for those startups that survive three years, along the lines of the theoretical predictions by Evans and Jovanovic (1989). Moreover, the overall effects for reducing incumbent market shares were consistent with other regional-level findings. These patterns

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[3] Glaeser and Kerr (2009) discuss further measurements of entrepreneurship. The self-employment pattern is also evident in country rankings. For example, Southern European countries (e.g., Portugal, Greece) rank very high on European self-employment scales but tend to have very small VC markets. On the other hand, Scandinavian countries rank low on self-employment indices but have been among the most successful European countries in attracting VC investments (Bozkaya and Kerr 2007).

suggest that the reduced financing constraints brought about by U.S. banking deregulations also facilitated a group of stronger entrants that before the reforms would have not entered or would have entered at sub-optimal firm sizes.

The U.S. Census Bureau data that undergird these results are built from payroll tax information. They thus include very small firms with less than five employees that are often incompletely measured. This was important for seeing the first effect, which is where the two bubbles overlap. The data also include the larger entrants that lie behind the second result, which is more typical of firm-level data. A consideration of different effects and samples is important in this context.[4]

Additional studies employing micro data can shed further light on how the motivations and needs of these sub-populations differ, along with the ultimate response to changes in local financing environments. Data advances worldwide are helping in this effort. While the Kerr and Nanda (2009a,b) sample lacks many entrants in the bottom, left bubble – the non-employer firms that are missing from payroll records – recent efforts by the U.S. Census Bureau incorporate income tax data about self-employed entrepreneurs . Moreover, the self-employed records are matched to subsequent employer firms where appropriate. These types of data are also emerging in many European countries. Richer data should provide deeper insight into how changes in financial conditions impact different forms of entrepreneurship and transitions across the types.

In addition to more detailed government registers, there is a complementary element of expanding data from additional sources. For example, Braguinsky et al. (2009) study whether scientists who work on startups related to their field of study seem to have similar levels of non-pecuniary benefits from self-employment as those who work in startups unrelated to their field of study (Hamilton 2000). They find substantial differences between these groups, suggesting that the motivations for starting new businesses can also vary in important ways across sub-populations.

This study also relates to the second dimension of Figure 1, which measures the technological novelty of a new project. The vast majority of new firms started in the economy are not undertaking major technological advances or changes to existing methods of production. This is true even among Bhide's (2000) sample of growth-oriented founders in the Inc. 100 list. Moreover, many of the newly founded small businesses require little capital or have a set of hard assets that banks can take as collateral (Fluck et al. 2000). On the other hand, the more novel and unverifiable the technology proposed by the entrepreneur, the more difficult it is for traditional financial institutions to evaluate the creditworthiness of the project at hand. Many such startups are likely to have fewer tangible assets with verifiable valuations that can be pledged for a bank loan. This axis thus highlights why it is the case that projects towards the left of the horizontal axis tend to be bank financed, but why equity and more complex

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[4] This sensitivity to entrepreneurship definition and scope is not exclusive to financing constraints. A consistent finding in the labor economics literature is that stricter employment protection increases entrepreneurship defined through self-employment indices (Blanchflower et al. 2001, Addison and Teixeira 2003). Studies of entrepreneurial finance, however, show that stricter regulations reduce VC investment and high-growth entrepreneurship (Jeng and Wells 2000, Da Rin et al. 2006, Bozkaya and Kerr 2007). Autor et al. (2007) also find employment protections reduce entry rates for firms with payroll. A similar mapping of entry distributions and the entrant types considered can reconcile these two findings.

financial contracts (e.g., the convertible preferred stock forms used by VCs) may be necessary to finance projects based on novel technologies.

VC firms attempt to fill at least part of this gap in the U.S. and other countries. VCs screen entrepreneurial projects, structure financing deals, and monitor the performance of the companies in which they take equity stakes. VCs also provide non-financial resources like customer and supplier contacts, technical expertise, employee recruitment, and so on, which may improve the chances of success for unproven technologies and business models. While institutions such as VC have evolved in some countries to cover these extreme market failures, they have not taken root in all countries as discussed in Section 2. The absence of such intermediaries may thus help to explain differences in the kinds of entrepreneurship prevalent across regions – for example, the weaker relative entry of Silicon Valley type startups in Europe – as well as the types of industries that emerge or do not emerge in different regions.

Even in the U.S., extremely capital-intensive and novel technologies like wind turbines, refineries for biofuels, and other clean energy projects, which would lie in the top right-hand corner of Figure 1, are said to fall into the "valley of death" (Nanda and Stuart 2009). They are too capital intensive for traditional venture capital and too risky for project finance. While these latter financiers are very comfortable funding highways, dams, coal powered-plants, and other well-proven technologies, they are reluctant to fund risky projects with long financing cycles and the potential to become obsolete before the investment pays off. On the other hand, clean technologies may be too capital intensive for traditional VC investors. VC investors typically fund $5-10 million investments, and syndicate out larger investments, but the risk capital and coordination costs involved in funding a $250 million demonstration bio-refinery may be too great for VC investors, even if the projects have positive net present value.

While in theory such types of innovation can be done within the context of large firms (or through financing from strategic investors in such sectors), the interests of strategic investors are not always aligned with the success of these new technologies. Often the new technology has the potential to cannibalize the core business of the incumbents, as is the case of biofuels and oil companies, making incumbents much less likely to focus on commercializing new technologies. In other instances, the bureaucracies associated with larger firms may stifle new innovations. It is for these reasons that the process of creative destruction is said to be so important in leading to continued economic growth, and hence, it is perhaps in such areas that government subsidies to alleviate credit constraints may have the greatest leverage.

5. Conclusions

Financing constraints are one of the biggest concerns impacting potential entrepreneurs around the world. Academic literature has focused on understanding several dimensions of financing constraints. In this review article, we outlined two major streams of research examining this question. While many

of the findings are complementary, some of the results pose a puzzle regarding the extent to which financing constraints may be a problem for entrepreneurs in advanced economies.

Our framework is a starting point for reconciling these seemingly contradictory findings. The slice of entrepreneurship examined is very important for the appropriate positioning of research on financing constraints, but studies too often fail to consider this dimension in the conclusions drawn from empirical results. The choice of where in the space of capital intensity and technological novelty to found a firm may reflect a whole set of unobserved factors that researchers need to be careful about when they look at the question of financing constraints in entrepreneurship. This framework is also useful for thinking about the appropriate role of public policy in stimulating entrepreneurship. Promoting entrepreneurship is an important goal of many governments, and researchers need to define for policy makers a more unified perspective for how studies and samples fit together.

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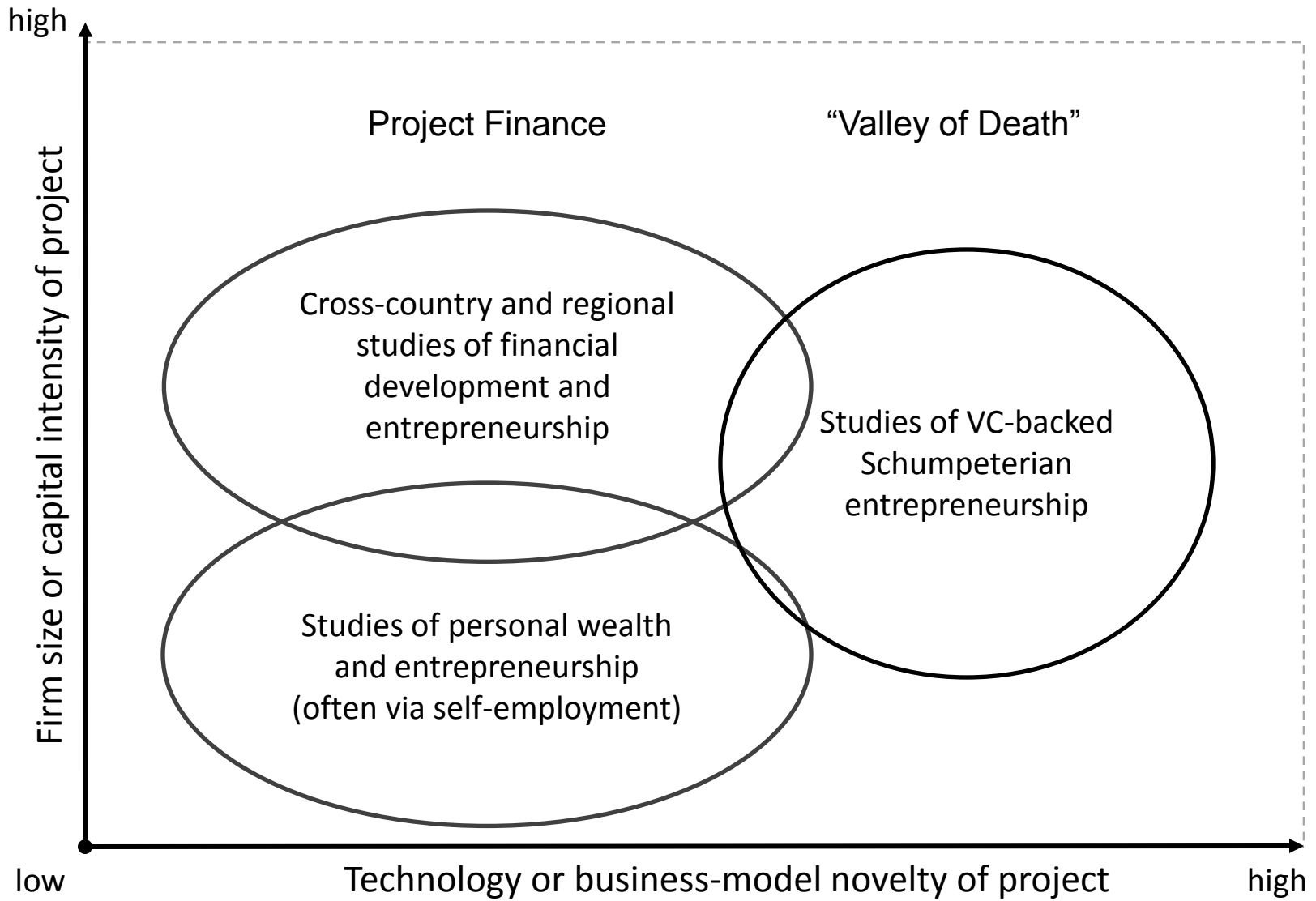
Firm size or capital intensity of project

Project Finance

"Valley of Death"

Cross-country and regional studies of financial development and entrepreneurship

Studies of VC-backed Schumpeterian entrepreneurship

Studies of personal wealth and entrepreneurship (often via self-employment)

low

Technology or business-model novelty of project

high

Figure 1