

Chapter 5

EMPLOYEE ENTREPRENEURSHIP: RECENT RESEARCH AND FUTURE DIRECTIONS

April Franco
University of Iowa

1. INTRODUCTION

Entrepreneurship has been a focal issue of interest in Economics from the very beginning (Say, 1880; Marshall, 1890; Schumpeter, 1934). Economists have included entrepreneurs as a main feature of their models, either in order to differentiate entrepreneurs from workers as organizers of resources (Lucas, 1978) or as catalysts of change within the economy (Schultz, 1975). This tradition has been followed to the present, and recent research has focused on obtaining a better understanding of what characteristics influence the decision to undertake entrepreneurship, as well as understanding what characteristics might increase the probability of an entrepreneur's success (Evans and Leighton 1989, Evans and Jovanovic 1989, Buera 2004, Hamilton 2000, and Moskowitz and Vissing-Jorgensen 2002).

In particular, several scholars have begun to examine the phenomena of employee entrepreneurship, whereby an employee of an incumbent firm leaves to found a start-up in the same industry as the parent (Klepper, 2001a, b, 2002; Agarwal, Echambadi, Franco and Sarkar, 2004). There is reason to believe that spin-outs, or firms started by former employees of incumbent firms, are highly successful, since they combine the knowledge inherited from their parent with entrepreneurial flexibility (Agarwal et al. 2004). Further, from the strategic perspective, incumbents may be interested in preventing such entrepreneurship, since spin-outs represent a creation of their own competition.

In this chapter, we begin by providing a historical overview of the economic models that focus on *entrepreneurs*, as opposed to entrepreneurial *firms*. We then discuss the literature that examines some of the causes and effects of undertaking the entrepreneurial act, before focusing on employee entrepreneurship in particular. We examine the literature on why aspiring entrepreneurs choose to work with incumbent firms and what are the characteristics of spin-outs. We follow this with a discussion of what

incumbents may do to prevent creating their own competition. Finally, we suggest avenues for future research in this incipient area.

2. A HISTORICAL OVERVIEW OF RESEARCH ON ENTREPRENEURS IN ECONOMICS

Entrepreneurship has been a subject of continual interest in economics. While the term was first used in the 16th century, well before the recognition of economics as a field of study, to describe an individual who undertakes a business venture, Jean Baptiste Say, the renowned 19th century economist popularized the term by defining an entrepreneur as someone who takes on risk in pursuit of profit, in creating value by shifting resources out of low productivity areas to higher productivity areas. In his *Treatise* (1880), Say focused on how value arose from the interaction of supply and demand, known as Say's law, and stated that the entrepreneur's occupation was to "estimate, with tolerable accuracy, the importance of a specific product, the probable amount of demand and the means of production." Marshall (1890) furthered this notion by identifying four primary factors of production; land, labor, capital and organization. Organization or the entrepreneur's input to production was the necessary factor to coordinate all other factors.

In the 20th century, Joseph Schumpeter (1934) argued that entrepreneurs created technical and financial innovations in the face of competition and falling profits. By developing new and better goods, entrepreneurs often destroyed the market for older and established goods, thus creating irregular spurts of economic activity which he termed as creative destruction. Schumpeter viewed this as the main reason for business cycles. While other economists also included entrepreneurs in their models, the two important contributions in the area were made by Theodore Schultz and Robert Lucas. Schultz (1975) saw entrepreneurs as individuals who appropriate value by taking advantage of opportunities for creating new products, thus creating disequilibria. The need for these new products is a result of technological progress and resulted in competitive destruction as described by Schumpeter. For Lucas (1978), the firm manager/entrepreneur was as an organizer of inputs, in line with Say's description. This important feature of Lucas, wherein the term manager is used interchangeably with entrepreneur, has been followed by much of the industrial organization literature. Lucas modeled occupational choice for individuals, where entrepreneurship is one of a possible set of occupations. Based on the premise that better managers organize inputs more effectively, Lucas posited that only individuals who are good enough managers would operate firms. This provided one explanation for differences in the firm size; since better managers are able to operate large firms.

Both streams of this literature have been successfully followed. Holmes and Schmitz (1990) were one of the first to formally integrate the Schultzian entrepreneur into mainstream theoretical literature. The authors formalized Schultz's view of entrepreneurship and found that the model had implications for firm entry and exit, and business transfers. Business transfers, in their model, occur when a particular business is developed by one person and then managed by another later on. This allows the developer of the business, i.e. the entrepreneur, to pursue other activities. This idea was followed upon by Prusa and Schmitz (1994). They found that, in the PC software industry, most companies' initial products were the most successful, and they found a declining pattern in the success of subsequent products.

In Jovanovic's (1982) model of firm entry and exit, managers, similar to the ones in Lucas, are uncertain about their abilities to succeed before entering the industry. Only after entry do they receive a noisy signal of their ability. The result is relatively Darwinian: better firms stay in the industry for longer periods. The model produces similar patterns as seen in the data with respect to age and employment: younger firms tend to be smaller, but also have higher variability in size, while older firms tend to be larger with little variance. Takii (2003) found that better entrepreneurs are more capable of predict future demand. Industries differ in terms of demand variability; some industries have higher variance in demand than others. Since better managers are better prepared to deal with demand variability, because they can interpret the industry's key factors and deal with changing economic conditions better, the model predicts that better managers will work in industries with higher demand variability. This is supported by the data, since managers with higher abilities, as measured by GRE scores, work in industries with higher output variance.

3. WHAT ARE THE DETERMINANTS AND EFFECTS OF UNDERTAKING ENTREPRENEURSHIP?

In addition to the above models that incorporate entrepreneurs, there has been recent interest in determining who becomes an entrepreneur and how successful they will be. In particular, there is significant interest in determining how much liquidity constraints affect individuals' decisions to both to undertake entrepreneurship projects, and how much to invest in these activities. Further, returns to entrepreneurship are argued to be another critical determinant of entrepreneurship. Several researchers have investigated if the pecuniary returns are as high as that of being an employee, while others have worked on modeling cases where the expected returns from entrepreneurial activities are no different from that of employment. Another important question is whether investor protection helps or hinders entrepreneurial activity. In addition, some of this work has focused on

determining how much of a factor entrepreneurs are in determining the wealth and income distribution in an economy. The following provides a brief review of this literature and highlights some stylized facts.

Using the *National Longitudinal Survey of Young Men* (NLS) for 1966-1981 and the *Current Population Surveys* for 1968-1987, Evans and Leighton (1989) examined the selection process into entrepreneurship, using self-employment as a proxy of entrepreneurship. They find that age and total labor force experience have no effect on the entrepreneurship decision. One possible explanation is that new enterprises require capital, which the young may not have access to. This is supported by the fact that individuals with more capital reserves are more likely to choose self-employment. In addition, the probability of departing from self-employment falls with the duration in self-employment. In the first years in self-employment, it is 10%, and by the eleventh year, it falls to 0%. Finally, their findings suggest that the potential wages of the self-employed are not significantly different from the wages of paid employees.

Evans and Jovanovic (1989) determined that liquidity constraints do bind for entrepreneurs using a structurally estimated static framework. They find evidence that entrepreneurial ability is evenly distributed across the population. In particular, wealthier individuals do not necessarily make better entrepreneurs. This suggests that since the wealthy tend to undertake entrepreneurial activities more often than the poor, liquidity constraints must bind. In addition, any entrepreneur must bear a large fraction of the risk associated with his endeavor.

Buera (2004) investigated a dynamic version of the Evans and Jovanovic model. In his model, individuals who are potentially competent entrepreneurs will either choose to save in order to start a business, or if they start below a particular wealth level, will remain employees forever. His found that able individuals who could increase their earnings by 18% by becoming entrepreneurs will remain employees if they start with zero wealth. In other words, even in the dynamic framework, liquidity is an important binding constraint. This suggests that the impact of poverty traps and the welfare costs of borrowing constraints are significant. In addition, the probability of becoming an entrepreneur is non-linear in wealth. It is increasing for low levels of wealth and decreasing for higher levels of wealth.

Using the 1984 panel of the Survey of Income and Program Participation (SIPP), Hamilton (2000) constructed alternative measures of self-employment earnings. In comparing these measures with the wages of paid employees, he found that jobs in paid employments provided both higher starting wages and higher wage growth. In fact, after 10 years in business, median entrepreneurial earnings are 35% less than the alternative wage on a paid job of the same duration. Finally, most workers who choose to be self-employed receive a substantially lower wage compared to that from their

alternative paid employment. This suggests that entrepreneurship offers substantial non-pecuniary benefits.

Another possible reason for why individuals choose to become entrepreneurs is that the return to their capital is higher than when invested in publicly traded equity. Moskowitz and Vissing-Jorgensen (2002) investigated this, since approximately 75% of all private equity is held by households for which at least half of their total net worth is held in that form. They found that the average return to private equity is similar to that of public equity. In addition, they suggest that one reason that individuals become entrepreneurs is not because of the monetary returns, but because of the non-monetary returns to undertaking such an activity, in accord with Hamilton.¹

Hopenhayn and Vereshchagina (2003) have developed a model to take into account the fact that the empirical evidence shows no sign of a positive premium for entrepreneurs. Their entrepreneurs face borrowing constraints, and endogenous risk choice. In each period, agents decide first whether to work or become an entrepreneur. Self-financed entrepreneurs then choose how much to invest in a project as well as the riskiness of this project, given a set of possibilities. According to their model, entrepreneurs with little savings will tend to invest in more risky projects than those with more savings. The model has implications for the effects of business size and age on survival rates that are consistent with empirical data; their theory predicts larger and older firms tend to be more likely to survive but, conditional on survival, experience smaller rates of returns than younger and smaller firms do.

The issue of risk is a critical problem faced by entrepreneurs when faced with borrowing constraints. A potential way to encourage entrepreneurs to undertake risky projects is through financial intermediation, since this helps to increase the risk sharing across the economy. Castro, Clementi and MacDonald (forthcoming) have recently investigated the commonly held view that investor protection helps foster economic growth. They found that better investor protection has two effects: better risk-sharing and increases in the interest rate. Since entrepreneurs tend to be risk-averse, this improvement in risk-sharing results in an increase in the demand for capital. Since an increase in the interest rate lowers the income of entrepreneurs, it also decreases the current savings. The model predicts that the second effect is outweighed by the first effect in countries with lower capital flow restrictions. In other words, in countries with higher restrictions on capital flows, one would expect to see lower growth than in a country with lower restrictions.

The importance of financial intermediation for undertaking entrepreneurial activities, and its effects on economic growth was seminaly investigated by Greenwood and Jovanovic (1990). They presented a model in which financial intermediation and the rate of growth are endogenously determined. Financial intermediation increases the rate of growth, since capital is more efficient allocation within the economy, leading to higher rates

of return. In addition, higher rates of growth allow for the economy to invest in costlier forms to financial structures. Finally, during the transition from a lower rate of growth to one with a higher rate of growth, the wealth distribution between the poor and rich widens. In the same vein, Gentry and Hubbard (1999) determined the relationship between entrepreneurial saving decisions and household wealth accumulation. They found that entrepreneurs own a substantial share of wealth and income and this share is increasing in both the wealth and income distributions after the entrepreneurial act. In addition, entrepreneurs' portfolios tend to be highly undiversified, and a larger share of their assets is in active businesses. Finally, entrepreneurs have higher wealth-income ratios and savings rates, even conditional on age and other demographic variables.

In Cagetti and De Nardi (2003), the effects of borrowing constraints faced by entrepreneurs on aggregate capital accumulation and wealth inequality are considered. They construct a model that matches wealth inequality for both entrepreneurs and non-entrepreneurs, noting that entrepreneurship is an important determinant of capital accumulation and wealth concentration. More restrictive borrowing constraints generate less wealth concentration, but also reduce average firm size, aggregate capital, and the fraction of entrepreneurs. Voluntary bequests play an important role in allowing some high-ability workers to establish or enlarge an entrepreneurial activity. Without voluntary bequests, there would be fewer large firms, fewer entrepreneurs, and less aggregate capital, as well as less wealth concentration.

The above review points to wealth as a constraining factor in undertaking entrepreneurship activities. In addition, most entrepreneurs have portfolios that are highly undiversified, thus increasing their risk-bearing. There also seems to be little evidence that suggests that entrepreneurship has higher returns either through wage earnings or through privately held equity. Since financial intermediation may also play a role in determining entrepreneurship, one would expect to see more entrepreneurship activity in countries with more access to capital markets. Since entrepreneurs have a larger impact on savings rates and the wealth distribution, countries with higher growth and better financial markets may tend to have both higher saving rates and more skewed wealth distributions. If individuals are equally likely to be successful as entrepreneurs, independent of wealth, then why do they choose to take on such risk? One reason may be non-monetary, such as the ability to be one's own boss. As we elaborate below, this may be one reason for the entrance of spin-outs.

4. EMPLOYEE ENTREPRENEURSHIP AND SPIN-OUT FIRMS

The above literature review indicates that in addition to the study of entrepreneurial firms, economists have also examined the causes and consequences of individuals undertaking the entrepreneurial act. However, none of reviewed literature thus far has addressed the question of where entrepreneurs come from. In this section, we focus on employees who turn into entrepreneurs by leaving their place of employment to start-up a new firm in the same industry as the previous employer. In several industries, new firms are started by former employees of incumbent firms. Spin-outs², firms started by former employees of incumbent firms, have been documented in construction and the early automobile industries, as well as among advertising agencies and law firms (Garvin 1983, Phillips 2000). Typically, spin-outs occur at the beginning of the industry's lifecycle, though in some industries, most notably those where technological know-how is often embodied in human capital, they do not occur as disproportionately at the early stages of the industry. Two generic examples of this type of industry are the semiconductor and rigid disk drive industries, where Braun and Macdonald (1982) and Christensen (1993) document the importance of spin-outs. This suggests that entrepreneurs may choose to work for an incumbent in order to learn about the organizational capital used at that firm.

In the last decade, interest in spin-outs has resulted in some incipient research that provides a strong base to study the issue. Klepper (2000a) has provided an excellent review of some of the theoretical and empirical work in this area. In particular, Klepper's review piece provides a well-done breakdown of the differences in the models along four dimensions; the nature of spin-outs, characteristics of the parents, the timing of spin-outs, and spin-out performance. We recommend that readers interested in the economic research on employee entrepreneurship begin by reading Klepper's review. The following section builds on Klepper's review by including work that has been published since, and highlighting some other issues that are of interest. In particular, we focus on research that has examined why aspiring entrepreneurs choose to work at incumbent firms, the characteristics of the spin-out firms, and parent firm strategies that are related to spin-outs.

4.2 Why do Aspiring Entrepreneurs Work at Incumbent Firms?

To examine whether aspiring entrepreneurs apprentice at incumbent firms, Franco and Filson (2000) incorporated a learning mechanism similar to the one seen in the data into a standard industry dynamics model. Agents can learn to be more efficient managers by working for a well organized firm as a researcher. Firms, in turn, can improve their own organizational capital by hiring researchers. This paper follows in Lucas' span of control tradition by including occupational choice in a model where agents vary by organizational

ability, thus allowing better managers to operate larger firms. Franco and Filson found that more technologically advanced firms produce spin-outs. This is a consequence of the fact that over time, the knowledge within the industry improves. As a result of this improvement, the critical level of know-how required to run a firm will increase as the industry evolves. Employees of firms which are lagging behind the technological frontier may not acquire sufficient know-how to run a firm and therefore laggards do not produce spin-outs. In using data from the hard drive industry, they find strong support for this implication in the data. This is regardless of the size of the firm. An implication of their research is that it is not that larger firms, but more technologically advanced firms that are generating more spin-outs.

In Franco and Filson's paper, the firms are similar in terms of hierarchy and organization, though some are more technologically advanced than others. There are two views of what might lead to the creation of spin-outs: one in which young firms provide employees with the necessary resources in order to become an entrepreneur, and another in which employees become entrepreneurs because of frustration with the lack of interest that their employer has in developing or bringing to market their ideas. In Gompers, Lerner, and Scharfstein (forthcoming), these competing hypotheses are examined using data from employees leaving public companies to start venture capital firms between 1986-1999. While they find evidence that both contribute to the entrance of venture capital firms, most entrants come from smaller entrepreneurial firms. Additionally, more entrants come from firms in Silicon Valley and Massachusetts. This suggests that individuals may choose to work at smaller entrepreneurial firms in order to acquire not only organizational capital for a future entrepreneurial venture, but the necessary networks and attributes.

4.3 What are the Characteristics of Spin-outs?

Of course, this begs the question, are spin-outs important? In other words, are spin-outs better prepared to meet the demands of the industry than other entrants? In the rigid disk drive industry, there is significant evidence that shows that while spin-outs are not the only entrants, they comprise the most important source of entrants in that industry. Christensen (1993) focuses on the U.S. disk drive industry during the period covering 1976 to 1989. His detailed examination shows that spin-outs accounted for all but four of the start-ups that were successful at generating revenue; further spin-outs accounted for 99.4 percent of the total cumulative revenues generated by the start-up group. And while only three out of 28 non-spin-out entrants survived until 1989, 16 of 40 spin-outs survived during the same period. By 1989, almost three quarters of the world OEM/PCM market's ten largest firms were spin-outs.

Using data from the same industry, Agarwal, Echambadi, Franco, and Sarkar (2004) compared spin-outs to other entrants by distinguishing among the other types of entrants. In contrast with other work that makes a more coarse grain distinction between *de novo* and *de alio* entrants, these researchers compare spin-out entrants with other *de novo* entrants that have no apparent ties to the industry, and with *de alio* entrants who are either diversifying entrants or incumbent-backed ventures. In comparing these four groups, in terms of knowledge, they find that spin-outs, along with incumbent-backed entrants, have a higher level of technological know-how than the non spin-out *de novos*. The technological know-how of diversifying entrants is lower than the non spin-out *de novos*. This result is mimicked when using market pioneering knowledge in comparing the spin-outs with the non spin-out *de novos*. The effect of incumbent-backed entrants on market pioneering knowledge is not significant, while that of diversifying entrants is negative and significant. Together, these results indicate that spin-out firms have higher know-how levels than both diversifying entrants and the non spin-out *de novo* entrants. In addition, when comparing the survival probabilities of the different types of entrants, spin-outs are found to have a higher probability of survival relative to all other types of entrants.

Franco and Filson's model also implies that a firm's probability of surviving is increasing in its technological know-how. If the price falls over time, then the critical level of knowledge that a firm owner must have in order to operate a firm successfully will increase over time. Since the probability of improving a firm's knowledge is positively related to the firm's current level of knowledge, firms with lower levels of knowledge will tend to be less successful at improving their knowledge when compared to firms with higher levels of knowledge. This implies that firms with lower than the critical level of knowledge are more likely to failure in the future and hence a positive relationship between survival and knowledge. Finally, because more technological advanced firms are more likely to produce spin-outs, along with the learning mechanism used by entrepreneurs, the model implies that a spin-out's probability of surviving is increasing in its parent's know-how. Their empirical analysis supports their model; they find that better firms, in terms of know-how, are more likely to survive. In addition, spin-out survival is closely related to parental know-how.

4.4 Parent Firm Strategies

Parent firm strategies, both before and after the generation of spin-outs, is an important issue to examine when investigating spin-outs, since it has obvious implications for both the creation and the sustenance of the new entrepreneurial venture. Since firms would like to prevent from creating their own competition, an important question is what types of firms are more likely

to produce spin-outs? Agarwal et al. (2004) find that parents tend to be those with higher market pioneering knowledge or higher technological knowledge. This highlights the fact that knowledge can be a double edged sword. However, there is some consolation: firms with higher marketing knowledge and higher technological knowledge are less likely to create spin-outs. One possible explanation is that firms that not only create knowledge by improving their technological knowledge, but appropriate it, by increasing their market pioneering knowledge, they are able to keep their employees happy and less interested in spinning out.

Obviously, this is not the only way to prevent employees from leaving. Firms have used a variety of legal tactics as well. The use of trade secrets legislation has been relatively unsuccessful, since by the time that a former employer has used the trade secret in either his own firm or a competitor's, the original firm has lost market power or sales. Another method that is commonly used is by relying on non-compete clauses. However, not all states enforce these and in the states that do, they are only enforced for a specific, well-defined time, geographic area, and industry.

In the legal and sociological research, several authors have suggested that the effects of non-compete clauses are detrimental to growth and the success of the state's economy (See for example, Gilson (1999), and Hyde (2003)). The main example is the difference between the hard drive industry in Massachusetts, where non-compete clauses are enforced, and California, where they are not. However, Franco and Mitchell (2004) show that employee turnover is affected by non-compete clauses only in cases where either the employee's imitative ability is uncertain, or when wages can not be back loaded. Saxenian noted that while Silicon Valley started out much more slowly, it surpassed Massachusetts' Route 128 in 20 years. Franco and Mitchell define the necessary conditions for this outcome to arise, while allowing for uncertainty regarding the employee's imitative ability. These include conditions on the industry's profits over time, as well as the probability of allowing for employees to spin-out, given that firms in California will have to pay worker a higher wage in the following period in order to prevent them from spinning out. Because of this, the value of starting up in California is lower and there are fewer firms there at the beginning of the industry's lifecycle. In Massachusetts, firms can appropriate more of its value, by "charging" its employees to spin-out. This implies that the value of entering in Massachusetts is higher, leading to more firms there at inception of the industry.

This delineates one clear way to prevent employees from spinning out: paying higher wages. However, imitative ability is typically not considered to be the only characteristic that determines whether an employee can spin-out. In addition to this ability, there is an issue of preferences over risk or what could be thought of as entrepreneurial spirit. In this case, the firm may use a long term wage contract. A firm offers a lower starting wage,

with the promise of higher wages in the future, conditional on staying in the firm. Agents with the same managerial ability who are more risk averse will choose to remain at the firm, while those who are risk-takers will leave to spin-out. The firm will recapture much of the value of the employee's as long as the contract can allow for negative wages or if the loss in profits is less than the return from hiring the employee.

5. AVENUES FOR FUTURE WORK

The study of individual entrepreneurs has been an important topic in economics, and recent research has begun to focus on which type of individuals become entrepreneurs. While there is evidence that former employees are the most likely to become entrepreneurs in several industries, as well as being the most successful entrants, this has not been broadly documented. There is some evidence that this occurs in several industries, but the question of how important this type of entrants across industries remains, to a large extent, unanswered. In what follows, we highlight some avenues for future research in the area.

5.1 Industry Characteristics

The models reviewed above indicate some evidence that most spin-outs occur in the beginning of an industry's lifecycle. However, in industries with rapid technological change, this appears to continue up to the middle point of the lifecycle. In recent research, Agarwal, Sarkar and Echambadi (2002) provide evidence that the stages of the industry life cycle condition certain relationships that were previously thought to be universalistic, such as the relationship between survival and firm age and size. In the same vein, future research could focus on whether spin-outs are more likely to enter in certain periods more than others, and the underlying reasons for this relationship. Further, it may be that spin-out performance is also a function of the industry life cycle.

In addition to examining temporal patterns of spin-out generation and performance, we would benefit from additional research on whether there exist cross-sectional differences in industries in their propensity to create and foster entrepreneurial start-ups by employees. In some industries, firms follow the spin-out generating formula, while in others, firms follow the no spin-out generating formula. An example of the former is consulting firms, while an example of the latter is pharmaceutical firms. Are there features of the industry that give rise to the importance of following a particular design? Further, there is some evidence that industries that are rich in tacit knowledge (e.g. consulting, law, high tech industries) are more prone to employee

entrepreneurship. Given the empirical context of the above papers, there is a need for a systematic examination of how industry characteristics affect spin-outs. Another one question worth exploring is the extent to which tacit knowledge versus codified knowledge plays a role in determining entrepreneurship.

5.2 Firm Characteristics

The incipient research in the area indicates that firms choose not to introduce new products because of the lock-in effect of technology and/or markets. In the hard drive industry, all but one of the new diameters was introduced by an entrant, usually a spin-out, though the technology was developed by an incumbent. This suggests that there are high costs of switching to new products, whether due to cannibalism of older products, the cost of retraining a sales force or the inherent cost of retooling a manufacturing plant. A detailed examination of the characteristics of incumbents vs. spin-out firm will help shed light on the effect of factors other than technological expertise on the probability of entering new market niches, exploiting technological opportunities, and survival. Thus, firm characteristics other than knowledge related ones may explain spin-out generation and performance remains an unexplored area of interest.

In addition to the inter-industry variation in the propensity of spin-out generation discussed above, there is a need for examining intra-industry variations that relate to firm structure. The semi-conductor industry is a prime example, where Fairchild followed the spin-out generating formula, while its own spin-out, Intel, followed the no spin-out generating formula. A potential avenue of research is the comparison of larger, more diversified firms, and smaller more entrepreneurial firms in their propensity of spin-out generation. This leads to the question of what parent firm structures allow for more spin-out generation, and the benefits and costs to both the parent firm, and economic welfare at large, of the different firm structures as it relates to employee entrepreneurship, as well as what the implications are of firm level heterogeneity on spin-out generation and performance.

While the above questions addressed issues related to firm characteristics, similar questions may also be raised regarding firm strategies, and how they may adapt over time. For instance, what are the competitive dynamics implications (parent-spin-out relationships) *after* the birth of the firm? Extant research has focused on the parent spin-out linkages only prior to the start-up of the spin-out; yet given that both firms operate in the same industry, there is a need to examine the implications of parent/spin-out actions and reactions to each other's strategies. To some degree, these competitive dynamics may be shaped by whether spin-outs compete directly with parents, or occupy positions in nearby product spaces. Future research could examine

the implications of such competition for parent/spin-out performance. Christensen (1997) recommended that firms can retard spin-out formation by creating separate business units to target emerging segments. It would be interesting to know the benefits and costs of continued parental involvement for such “spin-offs” or incumbent backed ventures, vis a vis spin-out firms in a manner that extends the work done by Agarwal et al. (2004).

5.3 Employee and Founder Team Characteristics

Finally, in addition to industry and firm level characteristics, there is a need for examining employee and founder team characteristics that are related to both spin-out generation and performance. At the broadest level, it would be worthwhile to examine whether the models described in Section 2 above for the general phenomena of undertaking the entrepreneurial act hold more for employee entrepreneurs than other individuals. Intricate and prior knowledge of the industry may loosen some of the liquidity constraints faced by aspiring entrepreneurs, and the work by Gompers et al. (2004) certainly highlights the importance of prior experience in attracting superior venture capital access. In the same vein, more research is needed to tease out whether aspiring entrepreneurs *select* to apprentice, or whether employees develop an entrepreneurial desire only after working with an incumbent firm for a period of time. Thus, while opportunity recognition is critical to the act of entrepreneurship, it may be that employees differ either in their intrinsic characteristics before working with the firm, or develop entrepreneurial motivation only after tenure at the incumbent firm.

Further, the effect of networks and the choice of founding teams in a start-up are important unresolved issues related to spin-outs. How do aspiring entrepreneurial employees search in their locus of networks to choose their founding team partners, or charter employees, and how do these search criteria relate to the functional domains of expertise, prior experience, and future prospects? These issues are of interest both in the formation of the spin-out firm, and for its continued development and performance. Further, how do founding team dynamics impact the generation and performance of the spin-out firm? Do these dynamics differ among founding teams that have a higher density of prior industry experience, versus founding teams that have fewer members with prior industry experience? We would benefit from a research agenda that systematically examines these issues to the extent that founders enabled or constrained by their experience with the parent firm, particularly in terms of non-technologically related expertise.

6. CONCLUSION

Entrepreneurs have been an important feature in economics from the beginning. Recent work has shown that entrepreneurs are an important factor in determining savings rates, wealth accumulation, and the distribution of wealth. Savings and access to capital are important in determining entrepreneurial activity. But why do individuals undertake entrepreneurial activity, given the evidence of little monetary benefit? This article focuses on spin-outs and their characteristics for an answer. One proposed reason has been the ability to minimize the frustration faced by some employees when their employer chooses not to develop one of their ideas. Another possible reason is that some individuals have more entrepreneurial interest and choose to work at firms that will help to encourage such behavior. While current research in the area has not categorically resolved the underlying mechanisms, there is evidence that employee entrepreneurs represent an important source of knowledge transfer; spin-outs inherit from their parents and this has implications for their future success. We also highlight issues related to parent firm strategies, and in particular, discuss the literature on what a firm can do to prevent creating its own competition.

The review of the current literature also indicates that there is much need for future research in the area, so that we can better understand, industry, firm and individual related characteristics that impact the generation and performance of spin-out firms. We hope to have excited interest in the area.

NOTES

¹However, the reader should note that in Campbell's chapter that both Hamilton's and Moskowitz and Vissing-Jorgensen's results are called into question since these studies do not have a strong counterfactual group.

²Note that in other articles, the term, spin-offs, is used to describe firms started by employees who left firms within the same industry. However, in the finance literature, spin-offs is typically used to describe a firm that is created when the parent firm sells a division. In order to avoid any confusion, we use the term spin-out.

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